Analysis Of Idx 30 Stock Portfolio Performance During Covid 19 Pandemic

Juan Anastasia Putri[1], Elly Susanti[2*], Ruth Tridianty Sianipar [3]

[1,2,3] Accounting Lecturer, Sekolah Tinggi Ilmu Ekonomi Sultan Agung, Sumatera Utara Indonesia.
[*]Corresponding Author:
Email: susantielly82@gmail.com

Abstract.
Investors need to do proper analysis before making a decision in investing. If the investor does not do the right analysis, the investor will experience significant losses. One of the analyzes used is CAPM, and for the next step the researcher evaluates the performance of the stock portfolio. This study aims to analyze the performance evaluation of stock portfolios during the covid 19 pandemic. The research objects were companies registered in IDX 30 during the period January 2020 to July 2022. The result of this study is the Treynor index is the most indicative of conformity without differences between the three measures, as Treynor. Its value is similar to Sharpe and the Jensen index has the smallest difference.

Keywords: *CAPM, Stock Portfolio Performance, Indeks Sharpe, Indeks Treynor and Indeks Jensen.*

I. INTRODUCTION

The World Health Organization (WHO) announced that the coronavirus that is currently spreading can be categorized as a global pandemic. The announcement could shake already fragile world markets since SARS-Cov-2 spread, and lead to strict travel and trade restrictions [1]. WHO urges the public to do physical distancing, namely maintaining physical distance as a way to avoid the wider spread of Covid-19. The covid 19 pandemic condition greatly affects all aspects of the economy, especially the economy in Indonesia. This impact is also felt by the Indonesia Stock Exchange this is characterized by the movement of shares in the Indonesia Stock Exchange that slows down and even halt trading occurs. The investors became so panicked that they made a stock sale transaction which resulted in the stock price decreased. This also has an impact on the movement of stocks incorporated in IDX 30. The IDX30's performance weakened 0.80% ytd and parked at 496.26. indicates that the performance of IDX30 is slowing down compared to the JCI movement. IDX30's performance throughout this year tends to laggard or slow down when compared to the JCI because the index contains many large-cap stocks aka big caps [2]. This can be seen from Figure 1. as follows :

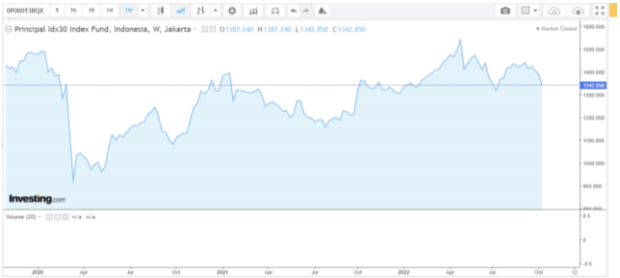

Fig 1. IDX30 movement for the period January 2018-July 2022

Source: [3]

To overcome this, investors should conduct an appropriate analysis and evaluation in order to minimize the risk of risks that will be faced by investors. Correct analysis and evaluation requires basic knowledge of the basic concepts of capital market analysis. Knowing and understanding the basic concepts of capital market analysis is very important so that investors can ride the wave or Master investment in the capital market. To measure the performance of the portfolio can not only be seen from the return but also need to pay attention to the risks that will be borne by investors. There are 3 parameters used to measure portfolio performance developed by William Sharpe, Jack Treynor and Michael Jensen. These three performance measurements are called Sharpe performance measures, Treynor performance and Jensen

performance. The three performance measurements assume a linear relationship between portfolio returns and returns from several market indices.Many previous studies have discussed the evaluation of portfolio performance but still have a research gap [4] and [5] did not show significant differences between each treatment, so far the differences are not significant. Furthermore, according to the results of statistical tests of differences in mutual fund performance ratings using Sharpe, Treynor and Jensen methods, it can be concluded that the three performance evaluation methods did not produce significant differences. performance rating. Furthermore, based on [6] and [7] using the Jensen Method for the performance of Islamic stocks, it is not possible to assess whether Islamic stocks are performing well or underperforming. Meanwhile, based on [8] dengan hasil penelitian adalah perbedaan yang signifikan antara pengujian dengan metode Sharpe, Treynor dan Jensen.

Portfolio Performance Measurement

At the end of the 1960s, research and research related to the development of the concept of portfolio performance measurement. The concept was pioneered by William Sharpe, Treynor, and Michael Jensen. The basic foundation of this concept is Capital Market, this concept is divided into 3 performance measures known as composite (risk adjusted) measure of portfolio performance because the three performance measures combine return and risk in a calculation [9]. The three performance measures are :

Sharpe Performance Measure

Sharpe performance measure (Reward to Variability (RVAL)) the higher the sharpe index number of a portfolio, the better the performance of the portfolio [10]. Sharpe Performance Index is calculated as follows :

$$RVAR = \frac{\overline{TR_p} - \overline{R_{BR}}}{\sigma_p} \text{ …….[9]}$$

Treynor Performance Measures

Treynor performance measure (Reward to Volatility (RVOL)). Equation measurement of stock performance Treynor method and Sharpe method that is the same as using risk Premium, but Treynor method using beta (β) which is the risk of fluctuations relative to market risk [6]. The greater the value of the Tryenor Index, the better the performance of the investment portfolio [11]. The Treynor Performance Index is calculated as follows :

$$RVOL = \frac{\overline{TR_p} - \overline{R_{BR}}}{\beta_p} \text{ ……..[9]}$$

Jensen Performance Measure

Jensen's Alpha measurement Model is based on the concept of the security market line, a line that connects a market portfolio with a risk-free investment opportunity [6]. It can also be done in an easier, faster, and more efficient way. The Formula Jensen Alpha as follows:

$$\alpha_p = \overline{TR_p} - \left[\overline{R_{BR}} + \beta_p \left(\overline{R_M} - \overline{R_{BR}}\right)\right] \text{…….[9]}$$

II. METHODS

Research Design

The approach is carried out by means of a quantitative approach, because the main data used in this study is in the form of numbers. This study uses data in the form of stock prices, JCI, BI Rate on IDX30 listed on the IDX.

Population and Sample

The population in this study was all companies included in IDX30 registered on the IDX for the period January 2020-July 2022. The sampling technique used in this study is purposive sampling, which means sampling based on criteria that have been made by the researcher.

Data Source

The source of data used is secondary data sourced from the IDX website and the website of each company. Details can be seen in Table 1.

Table 1. Types and sources of research Data

Variable	Analyzed Data	Sumber
Closing Price Of Shares	Return Saham (R_i) dan Expected Return [$E(R_i)$]	www.idx.co.id www.investing.com
Composite Stock Price Index	Return Market (R_M)	www.idx.co.id www.investing.com
BI Rate	Return Bebas Resiko (R_{BR})	www.bi.go.id

Data Analysis Techniques

Data analysis was performed using the Microsoft Excel 2010 and using the SPSS program 21. Stages in analyzing the data sequentially can be described as follows :

1. Stock price data collection (closing pricing) on the IDX30, JCI, BI Rate Board for the period January 2020 to July 2022. Then perform calculations from these data.
2. Perform calculations in the formation of the CAPM model stock portfolio
3. Measurement of Portfolio Performance Index Sharpe, Treynor and Jensen
4. Perform transformations to standardize performance measures by using Z-Score transformations (standard-ized)
5. Uji Kruskal Wallis
   Criteria for decision-making is done by looking at the following provisions :
   a. If the value of if < value (0.05) then H0 is known there are differences in the method of measuring portfolio performance between Sharpe, Treynor and Jensen indices on IDX30
   b. A. if the sig value > zero value (0.05) then H0 is accepted there is no difference in the method of measuring portfolio performance between the Sharpe, Treynor and Jensen indices on the IDX30
6. Conclusion

III. RESULT AND DISCUSSION

RESULT

In this study, the classification of stocks by taking the expected Return data that has a positive value with the assumption that the expectation of a positive return indicates that the stock of the stock will provide a level of profit to investors in the future. Thus, the data obtained as many as 7 stocks that can be seen in Table 2

Table 2. Expected Return value CAPM and Beta

Issuer Code	Company Name	E(Ri)CAPM	Beta
BMRI	PT Bank Mandiri (Persero), Tbk	0,0032	0,0573
ICBP	PT Indofood CBP Sukses Makmur, Tbk	0,0071	0,7905
INDF	PT Indofood Sukses Makmur, Tbk	0,0049	0,3682
PGAS	PT Perusahaan Gas Negara, Tbk	0,0043	0,2656
PTBA	PT Bukit Asam, Tbk	0,0034	0,0994
UNTR	PT United Tractors, Tbk	0,0042	0,2388
UNVR	PT Unilever Indonesia, Tbk	0,0046	0,3216

Source: processed data (2022)

Next then lacan perpetua Alpa, stock and Market Risk, various remaining stocks, value of Ay , Bi, and Ci, ERB, tic attack or cut-off rate (C*) for perpetua pemberton optimal portfolio results of perpetua pemberton optimal portfolio Table 3.

Table 3. Stock Portfolio Period From January 2020-July 2022

Issuer Code	E(Ri) CAPM	Rm	Beta	α	ERB	Aj	Bj	Ci	C*
BMRI	0.0032	0.008236	0.0573	0.020987	0.29521	0.17827	0.603874159	0.000124	C*
ICBP	0.0071	0.008236	0.7905	0.022947	0.005186	0.297751	57.4175579	0.000199	C*
INDF	0.0049	0.008236	0.3682	0.02082	0.028469	1.440179	50.58782208	0.000969	C*

PGAS	0.0043	0.008236	0.2656	0.039141	0.116223	8.329667	71.66962027	0.005528	C*
PTBA	0.0034	0.008236	0.0994	0.075285	0.707952	1.444694	2.040664857	0.001005	C*
UNTR	0.0042	0.008236	0.2388	0.065257	0.240858	2.020228	8.387632647	0.0014	C*
UNVR	0.0046	0.008236	0.3216	0.03115	0.067631	0.548315	8.107488297	0.00038	C*

Source: processed Data (2022)

From the sample of shares listed on IDX 30 during the covid 19 pandemic, namely the period January 2020-July 2022, companies that meet the criteria for entering portfolio candidates through the portfolio formation method based on the Capital Asset Pricing Model (CAPM) are 7 shares. Furthermore, the calculation of proprosi funds on the seven shares of the company can be seen in Table 4 as follows :

Table 4. Proprosi Stock Portfolio Fund

Issuer Code	Company Name	Proportion Of Funds
BMRI	PT Bank Mandiri (Persero), Tbk	5.04%
ICBP	PT Indofood CBP Sukses Makmur, Tbk	0.59%
INDF	PT Indofood Sukses Makmur, Tbk	6.12%
PGAS	PT Perusahaan Gas Negara, Tbk	48.38%
PTBA	PT Bukit Asam, Tbk	23.51%
UNTR	PT United Tractors, Tbk	13.62%
UNVR	PT Unilever Indonesia, Tbk	2.75%

Source: processed Data (2022)

Stock portfolio performance by Sharpe Index

Measurement using the Sharpe Index or also known as the Reward to Variability ratio (RVAR) emphasizes total risk or standard deviation. Standard deviation shows the size of the change in the return of a stock to the average return of the stock in question. For the sake of predicting future performance used past data. The average past Return is considered as the predicted future return and the standard deviation of the past return is considered as the predicted future risk. The following is an assessment of the performance of the stock portfolio using the Sharpe Index

Table 5. Stock Portfolio Performance Appraisal Based On Sharpe Index

Issuer Code	Company Name	Sharpe
BMRI	PT Bank Mandiri (Persero), Tbk	0,28833
ICBP	PT Indofood CBP Sukses Makmur, Tbk	31,23768
INDF	PT Indofood Sukses Makmur, Tbk	1,53730
PGAS	PT Perusahaan Gas Negara, Tbk	0,07462
PTBA	PT Bukit Asam, Tbk	0,02987
UNTR	PT United Tractors, Tbk	0,14294
UNVR	PT Unilever Indonesia, Tbk	2,00018

Source: processed Data (2022)

Stock portfolio performance with Treynor Index

In evaluating the performance of a stock portfolio with the Treynor Index or often referred to as the Reward to validity Ratio (RVOR), using the average return of the past as the expected return and beta as a measure of risk. Beta shows the size of the change in the return of a stock portfolio to changes in market return. As a benchmark for investment risk, beta is used because in general stock price fluctuations are influenced by market fluctuations.To analyze performance using the Treynor index, data such as avarage return, stock beta, and risk free rate are needed. The results of the calculation of stock portfolio performance from IDX 30 with Treynor index can be seen in Table 6 as follows :

Table 6. Stock portfolio performance appraisal based on Treynor Index

Issuer Code	Company Name	Treynor
BMRI	PT Bank Mandiri (Persero), Tbk	0,10561

ICBP	PT Indofood CBP Sukses Makmur, Tbk	0,90678
INDF	PT Indofood Sukses Makmur, Tbk	0,08692
PGAS	PT Perusahaan Gas Negara, Tbk	0,01100
PTBA	PT Bukit Asam, Tbk	0,02263
UNTR	PT United Tractors, Tbk	0,03905
UNVR	PT Unilever Indonesia, Tbk	0,19372

Source: processed Data (2022)

Stock portfolio performance with Jensen Index

The Jensen index only accepts investments whose return exceeds the expected return or minimum rate of return. The Return in question is the average return of the past, while the minimum rate of return is the expected return Calculated by The Capital Asset Pricing Model (CAPM). The difference between the average return and the minimum rate of return is called alpha. Jesen ALPHA is an absolute measure that estimates a constant rate of return over an investment period that obtains a Jesen ALPHA rate of return above (below) that of a buy-hold strategy with the same systematic risk. To analyze the Jensen method requires data such as average return, stock beta, minimum rate, and risk free rate. The results of the calculation of stock portfolio performance before and during the covid 19 pandemic on the IDX with the Jensen index can be seen in Table 7

Table 7. Stock portfolio performance appraisal based on Jensen Index

Issuer Code	Company Name	Jensen
BMRI	PT Bank Mandiri (Persero), Tbk	0,00853
ICBP	PT Indofood CBP Sukses Makmur, Tbk	0,01243
INDF	PT Indofood Sukses Makmur, Tbk	0,01013
PGAS	PT Perusahaan Gas Negara, Tbk	0,00927
PTBA	PT Bukit Asam, Tbk	0,00870
UNTR	PT United Tractors, Tbk	0,00941
UNVR	PT Unilever Indonesia, Tbk	0,00992

Source: processed Data (2022)

Furthermore, during the covid 19 pandemic, the Jensen index value showed a minimum range of -0.0211 to a maximum range of 0.0239. During the covid 19 pandemic, almost evenly every period this index shows a positive value which means that the portfolio is the best of the existing portfolios. In addition, it also shows that financial managers produce better performance than market indices

Comparative analysis of stock portfolio performance with Sharpe Index, Treynor Index, and Jensen Index

The company's stock portfolio will be measured using different methods, namely the Sharpe method, the Treynor method, and the Jensen Method. When measuring portfolio performance for 3 different methods, it requires data in the form of portfolio return, market return, standard deviation, beta and risk free rate. Each portfolio performance measurement has a relative numerical basis that cannot be compared directly between one method and another considering that the measurement methods for measuring performance vary. Therefore, researchers use the Z Score to convert the value of the data into a standardized score that has a mean value equal to zero and a standard deviation equal to one. The Z Score calculation results can be seen in Table 8 as follows :

Tabel 8. Nilai Z Score Indeks Sharpe, Treynor dan Jensen

Issuer Code	Company Name	Z Score Sharpe	Z Score Treynor	Z Score Jensen
BMRI	PT Bank Mandiri (Persero), Tbk	-0.2156	-0.2426	-0.2569
ICBP	PT Indofood CBP Sukses Makmur, Tbk	4.3505	-0.1244	-0.2563
INDF	PT Indofood Sukses Makmur, Tbk	-0.0314	-0.2453	-0.2567
PGAS	PT Perusahaan Gas Negara, Tbk	-0.2471	-0.2565	-0.2568

Issuer Code	Company Name	Z Score Sharpe	Z Score Treynor	Z Score Jensen
PTBA	PT Bukit Asam, Tbk	-0.2537	-0.2548	-0.2569
UNTR	PT United Tractors, Tbk	-0.2371	-0.2524	-0.2568
UNVR	PT Unilever Indonesia, Tbk	0.0370	-0.2296	-0.2567

Source: processed Data (2022)

After identifying each method of performance already has a rating of stock portfolio performance measurement with different methods, then the next stage is to try to identify and also test whether the portfolio performance will have the same rating if processed using three different indices. Because the data used next is in the form of ratings, then testing with non-parametric statistics using SPSS statistical tools will be more appropriate to use. Here are the results of statistical description

Table 9.Npar Test

	N	Minimum	Maximum	Mean	Std. Deviation
Ri_CAPM	21	,00853	31,23768	1,7497630	6,77810068
Valid N (listwise)	21				

Source: Data Processing Results (SPSS 2022)

Table 9 shows that the total number of samples in this study as many as 21 with a Mean value of 1.7497630 and a standard deviation of 6.77810068. The resulting minimum value of 0.00853 resulting from the measurement of the Jensen Index and the maximum value of 31.23768 obtained from the measurement of the Sharpe Index. The next step in processing portfolio performance in this study was measured using the Sharpe, Treynor and Jensen indices which have different formulations and characteristics of performance measurements so that the calculation results of the index numbers are also different. Kruskal Wallis test is a non parametric test for K independent samples. This test is used as an alternative when a one-way ANOVA in parametric statistics cannot be used because the assumptions required in a one-way ANOVA are not met [12]. Test results using Kruskal Wallis can be seen in Table 10 below :

Table 10. Kruskal Wallis Test Results

	Zscore
Chi-Square	14,078
df	2
Asymp. Sig.	,001

a. Kruskal Wallis Test

b. Grouping Variable: Indeks

Source: Data Processing Results (SPSS 2022)

Chi-Square value (14.078) and significance value 0.001 < 0.005 were obtained based on the test results using Kruskal Wallis test for the three methods, namely Sharpe, Treynor and Jensen. These results show that there are differences in portfolio performance measurement methods between the Sharpe, Treynor and Jensen indices on the IDX30.The next test is to compare the mean between the treatment of portfolio performance calculation to determine the difference in the Three mean rank. Comparison between treatment for each method can be seen in Table 11 as follows

Table 11 Comparison Between Treatments

	Indeks	N	Mean Rank
Zscore	Sharpe	7	16,29
	Treynor	7	12,57
	Jensen	7	4,14
	Total	21	

Source: Data Processing Results (SPSS 2022)

Table 11 shows the difference between the Three mean rank is quite far between the three methods and it can be concluded that from the difference of these three indices there is a significant difference. However, the Treynor Index is the one that shows the most consistency in the undifferentiation between the three measurements, because treynor has the lowest mean rank difference against Sharpe and Jensen.

DISCUSSION

Formation Of A Stock Portfolio Candidate

Based on Table 2, the expected return obtained during the covid 19 pandemic, namely the period January 2020 to July 2022, shows that the highest expected return value is in the shares of PT Indofood CBP Sukses Makmur, Tbk (ICBP) of 0.0071 or 0.71% while the highest expected return value is in the shares of PT Bank Mandiri (Persero), Tbk (BMRI) of 0.0032 or 0.32 %.As for the beta value, all stocks show a beta value of less than 1 then this indicates that the stock price sensitivity is smaller than the composite stock price index in other words stocks move slower than the market.

The highest Beta value was in the shares of PT Indofood CBP Sukses Makmur, Tbk (ICBP) which amounted to 0.7905 while the lowest beta value in the shares of PT Bank Mandiri (Persero), Tbk (BMRI) which amounted to 0.0573.According to [13] that the performance of the IDX30 index year-to-date (ytd) has outperformed the performance of the Composite Stock Price Index (JCI) and has the opportunity to continue to strengthen. Based on data from the Indonesia Stock Exchange, IDX30's performance throughout 2022 as of Wednesday (26/1/2022), grew by 2.05 percent. Where the performance is quite far from the JCI performance which increased 0.29 percent ytd.

Proportion Of Stock Portfolio Funds

Fund proportion (Wi) describes how much money an investor invests in a stock. The highest share portfolio was in the shares of PT Perusahaan Gas Negara Tbk (PTBA) which amounted to 48.38% while the lowest share portfolio fund was in the shares of PT Indofood CBP Sukses Makmur Tbk (ICBP) which amounted to 0.59 %. For example, an investor has an investment fund of Rp. 100,000,000 then the amount of funds allocated for PTBA stock investment of Rp. 48,380,000 and the lowest share investment in ICBP shares amounted to Rp. 590.000

Analysis of Sharpe, Treynor and Jensen indices during the Covid 19 Pandemic on IDX 30

Based on Tables 3, 4 and 5 shows that the overall performance of the stock portfolio is good assessed based on the index sharpe, treynor and jensen showed positive results, which means that the performance of the stock portfolio is good. The shares of companies that have the highest value from both the Sharpe, Treynor and Jensen indices are PT Indofood CBP Sukses Makmur, Tbk (ICBP) while the shares of companies that have the lowest value from both the Sharpe, Treynor and Jensen indices are PT Bukit Asam, Tbk (PTBA).In general, starting from March to December 2020, JCI began to show price stability despite a decline in September. The government's strategy in implementing the PSBB is considered right even though it is a little late seeing from the JCI increase chart starting from April 2020.

An increase in the number of investors, especially retail investors, can have a positive impact on the capital market. Expectations in the following years of existing transactions in the capital market can be healthier with the increasing number of retail investors. For that, retail investors need to pay attention to the reasons for making transactions, not only the origin of buying and selling but digging deeper information about the Issuer through fundamental and technical information. In addition, the mentality of investors must also be prepared for conditions such as this pandemic. A good emotional condition is needed to deal with situations with negative trends like today, and also at the time of positive trends [14].

Comparative analysis of stock portfolio performance evaluation with Sharpe Index, Treynor Index, and Jensen index during Covid 19

Based on the results of testing using Kruskal Wallis test (table 10), known Sig asymmetric value of 0.001. These two values look larger than their significance values, so it can be concluded that H0 is accepted, that is, there is a difference in the performance of the IDX 30 stock portfolio listed on the Indonesia Stock Exchange during the COVID-19 pandemic stock trading. These results are in line with research conducted by [15] Furthermore, for the ranking of the three indices (average rating), it can be seen that in the pre-covid-19 period, the Treynor index was the one that most demonstrated conformity without distinction between the three measures, as Treynor. Its value is similar to Sharpe and the Jensen index has the smallest difference

IV. CONCLUSION

The results of using the Kruskal Wallis test to measure the difference in portfolio performance using the Sharpe, Treynor, and Jensen indices show a significant difference in measuring the performance of stock portfolios during the COVID-19 pandemic. When measuring the difference in average ratings, the Tryenor index is the most consistent indicator of the difference between the three indices, since the difference between the Tryenor index and the Sharpe and Jensen indices is the smallest. Therefore, when choosing a stock portfolio performance measure, it will be returned to investors as the main consideration to use the Treynor index to produce a better stock portfolio performance measure.

V. ACKNOWLEDGMENTS

This research is the result of a start-up lecturer Research Grant which is fully funded by the Ministry of Research, Technology and Higher Education. Therefore, the research team would like to thank Kemenristekdikti who has funded this research so far, LPPM Sekolah Tinggi Ilmu Ekonomi Sultan Agung who has facilitated the research for the team and the parties who have helped the implementation of the research.

REFERENCES

[1] A. P. Utomo, "WHO Umumkan Virus Corona Sebagai Pandemi Global," *Kompas.com*, 2020. https://www.kompas.com/global/read/2020/03/12/001124570/who-umumkan-virus-corona-sebagai-pandemi-global?page=all.

[2] I. F. Ramadhansari, "Meski Terbatas, Indeks IDX30 Berpotensi Menguat di Akhir Tahun," *market.bisnis.com*, 2021. https://market.bisnis.com/read/20211220/7/1479879/meski-terbatas-indeks-idx30-berpotensi-menguat-di-akhir-tahun (accessed Jan. 24, 2022).

[3] F. M. Ltd, "Investing.com," *Investing.com*, 2007.

[4] D. F. M. Sari, I. G. B. Wiksuana, and I. B. A. Purbawangsa, "KINERJA PORTOFOLIO SAHAM BERDASARKAN STRATEGI PEMILIHAN SAHAM DI BURSA EFEK INDONESIA," ***E-Jurnal Ekon. dan Bisnis Univ. Udayana,*** vol. 5, pp. 3141–3174, 2016.

[5] S. Nurlaeli and D. Artati, "Analisis Kinerja Portofolio Saham dengan Metode Sharpe, Treynor, dan Jensen," ***J. Ilm. Mhs. Manajemen, Bisnis Dan Akunt.,*** vol. 2, no. 6, pp. 972–990, 2020.

[6] F. H. Juwenah, "ANALISIS KINERJA SAHAM SYARIAH SEKTOR PERTANIAN DENGAN MENGGUNAKAN METODE SHARPE, TREYNOR, DAN JENSEN," ***J. Ris. Keuang. Dan Akunt.,*** vol. 3, no. 1, 2017, doi: https://doi.org/10.25134/jrka.v3i1.462.

[7] H. Manurung, "Analisis Kinerja Portofolio Saham dengan Menggunakan Metode Sharpe, Jensen dan Treyno," ***J. Bus. Stud.,*** vol. 4, no. 1, pp. 1–16, 2019.

[8] I. A. Yuri, N. O. Lisadi, and M. R. Sari, "Analisis Kinerja Portofolio Saham Perusahaan Pada Sektor Jasa Penerbangan Di Beberapa Negara Asean," vol. 9, no. 3, pp. 563–574, 2021.

[9] J. Hartono, *Teori Portofolio dan Analisis Investasi*, 11th ed. ***J. Ilm. Akunt. Kesatuan,*** Yogyakarta: BPFE, 2017.

[10] E. Tandelilin, *Portofolio dan Investasi Teori dan Aplikasi*, Pertama. Yogyakarta: Penerbit Kanisius, 2010.

[11] W. Wihardi and A. Lutfi, "Pembentukan Portfolio Optimal Untuk Berinvestasi pada Saham Perusahaan Perbankan di Bursa Efek Indonesia dengan Metode Sharpe, Treynor dan Jensen Periode 2013-2017," ***J. Manaj. Bisnis dan Kewirausahaan,*** vol. 4, no. 3, pp. 74–80, 2020, doi: 10.24912/jmbk.v4i3.7920.

[12] Jagostat.com, "Uji Kruskal Wallis," *Jagostat.com*, 2020. https://jagostat.com/statistik-nonparametrik/uji-Kruskal-Wallis (accessed Sep. 27, 2022).

[13] I. F. Ramadhansari, "Kinerja Ungguli IHSG, IDX 30 Berpeluang Bikin Investor Sumringah," *Bisnis.com*, 2022. https://market.bisnis.com/read/20220126/189/1493874/kinerja-ungguli-ihsg-idx30-berpeluang-bikin-investor-sumringah (accessed Jul. 18, 2022).

[14] S. R. Fadly, "Aktivitas Pasar Modal di Era Pandemi," *Kementerian Keuangan Republik Indonesia*, 2021. https://www.djkn.kemenkeu.go.id/kpknl-kupang/baca-artikel/13817/Aktivitas-Pasar-Modal-Indonesia-Di-Era-Pandemi.html

[15] N. P. A. Darmayanti, N. P. S. Suryantini, H. Rahyuda, and S. K. S. Dewi, "Perbandingan Kinerja Reksa Dana Saham dengan Metode Sharpe, Treynor, dan Jensen," ***J. Ris. Ekon. dan Bisnis***, vol. 11, no. 2, pp. 93–107, 2018.