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Portfolio Formation Using the Mean-Semi-Variance Method on Jakarta Islamic Index (JII)

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ABSTRACT

Indonesians are increasingly drawn to sharia-compliant stock investments. Investors ought to strive to enhance their profits to effectively attenuate existing risks. The difficulties faced by investors can be reduced through careful portfolio construction. The mean-semivariance method acts as an advanced portfolio optimization technique that bypasses distribution assumptions and is proficient at creating portfolios marked by minimal risk. Prior to entering the realm of investment, it is essential for investors to assess the performance of their portfolios. This study employs the Sharpe Index as an insightful gauge for performance evaluation. The analysis will focus on five stocks that have consistently been included in the Jakarta Islamic Index (JII) over the last decade, namely: ADRO, AKRA, ICBP, KLBF, TLKM, UNTR, and UNVR. Drawing from stock returns between November 17, 2022, and November 17, 2023, the ideal risk-minimized portfolio is formulated using two stocks: AKRA, with a weight of 24.23%, and ICBP, with a weight of 75.77%. This carefully curated composition results in an expected return of 0.00035 and a risk measure of 0.0000748. In addition, the Sharpe index of 0.02295 indicates that the constructed portfolio showcases commendable performance, establishing it as a judicious option for investors seeking reliable investment assets.

KEYWORDS: Portfolio, Mean-Semivariance, JII Equity.

I. INTRODUCTION

Investment is perceived as the process of allocating funds or resources in the present with the intention of generating profits in the future. This can take the form of investments in tangible assets, such as gold, real estate, or land, or in financial instruments including deposits, stocks, or bonds. At present, stock investment stands out as the most favored investment option, as evidenced by the continuous rise in market capitalization and share trading volume on the Indonesia Stock Exchange (BEI). Furthermore, stock investment signifies a calculated move for individuals or entities aiming to yield benefits and augment the value of their capital.

Before undertaking capital investments, an investor must cultivate the necessary skills to analyze and select investments with the purpose of minimizing potential risks. A diversification strategy provides an effective means of achieving this by involving the investment across a spectrum of assets, commonly referred to as portfolio formation. The construction of a stock portfolio is carried out with the intention of diversifying asset holdings within stock investments, consequently enhancing the potential for portfolio gains while managing risks effectively; in addition, stock selection serves as a crucial component in the portfolio development process. One technique employed in portfolio construction is the mean-semivariance methodology.

Prior research conducted by Vasant et al. (2014) on portfolio formation utilizing data from the Johannesburg Stock Exchange (JSE) demonstrated that the mean-semivariance method produces portfolios characterized by superior returns and reduced risk when juxtaposed with the mean-variance approach. In addition, a study by Suyasa et al. (2021) compared portfolio formation analyses between the mean-semivariance and mean-absolute deviation methodologies concerning the LQ45 stock index from February 2017 to July 2019. The research findings revealed that the mean-semivariance calculation yielded portfolio returns that were 2.4% lower than those derived from the mean-absolute deviation, while the risk associated with the mean-semivariance method was 10.8% less than that of the mean-absolute deviation. Prior studies have corroborated that the mean-semivariance method effectively minimizes risk in comparison to the mean-variance and mean-absolute deviation methods.

In the current study, the application of the mean-semivariance method was conducted by refreshing the data with stocks that have consistently been part of the Jakarta Islamic Index (JII) for the last ten years, namely PT Adaro Energy Tbk (ADRO), PT AKR Corporindo Tbk (AKRA), PT Indofood CBP Sukses Makmur Tbk (ICBP), PT Kalbe Farma Tbk (KLBF), PT Telkom Indonesia (Persero) Tbk (TLKM), PT United Tractors Tbk (UNTR), and PT Unilever Indonesia Tbk (UNVR). The primary objective of this research is to formulate an optimal portfolio model utilizing the mean-semivariance method, the performance of which will be assessed using the Sharpe Index.

II. THEORETICAL FRAMEWORK

Investment, within the realm of the capital market, constitutes the strategic allocation of funds or capital with the objective of cultivating wealth, which subsequently yields a favorable rate of return both in the present and in the future (Herlianto, 2013). The management of these assets is executed through the acquisition of financial instruments, encompassing equities, bonds, and derivative products such as options and futures contracts (Jorion, 2014). Among these instruments, stocks are particularly favored by investors due to their potential for substantial profitability. The Jakarta Islamic Index (JII), inaugurated by the Indonesia Stock Exchange (BEI) on July 3rd, 2000, serves as a benchmark for assessing the performance of the 30 most liquid sharia-compliant stocks, evaluated based on the highest average market capitalization and average daily transaction value within the regular market listed on the IDX, as reported on the IDX Indonesia Stock Exchange website (http://www.idx.co.id).

Return refers to the yield or gains accrued by an investor from their investment endeavors in a particular asset. Furthermore, Jorion (2014) elucidates that realized returns denote the returns that have materialized, calculated based on historical data. Mathematically, Jorion (2014) articulates that stock returns at time t can be determined using Equation (1).

$$R_{i,t} = \ln\left(\frac{P_t}{P_{t-1}}\right) \quad (1)$$

where

$R_{i,t}$: return value of $i-th$ stock in period t

P_t : closing stock price at time t

P_{t-1} : closing stock price at time $(t+1)$

In contrast to returns that have been realized, which are referred to as realized returns, expected returns denote the anticipated level of profit that has yet to be actualized (Maruddani, 2019). Furthermore, as articulated by Tandelilin (2010), expected return serves as the benchmark for making investment decisions. Essentially, expected return represents the average value of anticipated returns. The calculation of expected return can be executed using Equation (2).

$$E(R_{i,t}) = \frac{\sum_{t=1}^{T} R_{i,t}}{T} \quad (2)$$

where

$E(R_i)$: expected return value of stock i in period t

T : the number of observation time periods

Estimating the anticipated return of a portfolio can be accomplished by calculating the weighted average of the expected returns for each individual asset within the portfolio, predicated on the proportion of the portfolio's value allocated to each asset, commonly referred to as the portfolio weight (Markowitz, 1959). Portfolio returns may be derived by employing Equation (3).

$$E(R_p) = \Sigma_{i=1}^{N} w_i\, E(R_{i,t}) \quad (3)$$

where

$E(R_p$: expected return from the portfolio

w_i : the weight of the $i-th$ stock portfolio towards all shares in the portfolio

N : the number of stocks in the portfolio

A portfolio may be characterized as a curated assemblage of investments held by an individual or an organization, encompassing equities, fixed-income securities, and cash equivalents. Furthermore, as articulated by Antika et al. (2022), within the realm of asset investment, a portfolio is delineated as a linear amalgamation of diverse assets.

Markowitz (1952) introduced a methodology for portfolio construction known as mean-semi-variance. The semi-variance portfolio offers a quantifiable measure of downside risk, focusing exclusively on adverse fluctuations in asset values. By neutralizing all figures that exceed the average or target return, semi-variance adeptly estimates the average loss associated with the portfolio. In a subsequent work, Markowitz (1959) proposed an approach to calculate the semi-variance of a portfolio against a benchmark b, as illustrated in Equations (4) and (5).

$$\varphi_p^2 = \Sigma_{i=1}^{N}\Sigma_{j=1}^{N} w_i w_j \varphi_{ij} \quad (4)$$

$$\varphi_{ij} = \frac{1}{T}\ \Sigma_{k=1}^{K}(R_{ik} - b)(R_{jk} - b) \quad (5)$$

where

φ_p^2 : portfolio semivariance with benchmark b

φ_{ij} : semi-covariance between $i-th$ stock and $j-th$ stock with benchmark b

w_i : weight of $i-th$ stock

w_j : weight of $j-th$ stock

R_{ik} : return of $i-th$ stock in period k is below the benchmark

R_{jk} : return of $j-th$ stock in period k which is below the benchmark {1,2,...,K}

k : periods when a portfolio underperforms a benchmark

b : benchmark

Benchmark serves as a reference point selected by an investor. This benchmark may assume a value of zero, the risk-free rate, a stock market index, or the average return of a portfolio.

The semivariance equation posited by Markowitz is beset by challenges that are both asymmetric and endogenous, thereby influencing the computation of the semivariance-semicovariance matrix. Furthermore, the determination of semicovariance for securities is notably more complex to articulate. Additionally, Estrada (2008) identified a methodology to delineate semivariance and semicovariance in relation to a benchmark; for instance, as illustrated in Equation (6) and Equation (7).

$$\varphi_i^2 = E\left[Min\left(R_{i,t} - b, 0\right)^2\right] \quad (4)$$

$$\varphi_{ij} = \frac{1}{T}\sum_{t=1}^{T}\left[Min\left(R_{i,t} - b, 0\right) \cdot Min\left(R_{j,t} - b, 0\right)\right] \quad (5)$$

where

φ_i^2 : semivariance stock of i

$R_{i,t}$: return of $i-th$ stock in period t

$R_{j,t}$: return of $j-th$ stock in period t

Equation (4) is defined as the semivariance of $i-th$ stock and Equation (5) in order to calculate the semicovariance. The approach taken by Estrada produces a semivariance-semi-covariance matrix that are symmetrical and exogenous so that weight calculations for the mean-semivariance portfolio can use the same method as mean-variance.

Mean-semivariance portfolio weighting is conducted with the weight $\mathbf{w} = [w_1, w_2, ..., w_n]$ $0 \le w_i \le 1$ with the aim of minimizing the semivariance of the portfolio. Thus, the optimization function can be transformed into the following form,

Minimize $\boldsymbol{w^T\Sigma_{sv}w}$

with constraints $\boldsymbol{w^T 1_N} = 1$

where

$\boldsymbol{w}$: stock weight vector (N × 1)

$\boldsymbol{w^T}$: transpose of $\boldsymbol{w}$

$\boldsymbol{\Sigma_{sv}}$: semi-variance-semi-covariance matrix (N × N)

$\boldsymbol{1_N}$: vector one with size (N × 1)

Optimization problems can be conducted by utilizing the Lagrange function described in Equation **Error! Reference source not found.**.

$$L(\boldsymbol{w}, \lambda) = \boldsymbol{w^T\Sigma_{sv}w} + \lambda\,(1 - \boldsymbol{w^T 1_n}) \quad (8)$$

In order to acquire the optimal value of w, the Lagrange function is deduced from w. The minimum L is attained if it satisfies the conditions $\frac{dL}{d\mathbf{w}} = 0$ and $\frac{d^2L}{d\mathbf{w}^2} > 0$ requirements.

$$\frac{d}{d\boldsymbol{w}}\left[\boldsymbol{w^T\Sigma_{sv}w} + \lambda\,(1 - \boldsymbol{w^T 1_N})\right] = 0$$

$$\boldsymbol{w} = \frac{1}{2}\,\boldsymbol{\Sigma_{sv}}^{-1}\lambda\boldsymbol{1_n} \quad (6)$$

Equations (9) are multiplied $\boldsymbol{1_N^T}$, since $\boldsymbol{1_N^T\,w} = 1$, thus

$$\boldsymbol{1_N^T\,w} = \frac{1}{2}\,\boldsymbol{1_N^T\,\Sigma_{sv}}^{-1}\lambda\boldsymbol{1_N}$$

$$\lambda = \frac{2}{\boldsymbol{1_N^T\,\Sigma_{sv}}^{-1}\boldsymbol{1_N}} \quad (7)$$

Based on equation (9) and (10) the weight **w** can be formulated as Equation (7).

$$\boldsymbol{w} = \frac{\boldsymbol{\Sigma_{sv}}^{-1}\,\boldsymbol{1_N}}{\boldsymbol{1_N^T\,\Sigma_{sv}}^{-1}\boldsymbol{1_N}} \quad (8)$$

where

Σ_{sv}^{-1} : inverse semivariance-semicovariane matrix

1_N^T : transpose from $\mathbf{1}_N$

Solving the first derivative set to zero yields the optimal solution \(w \) as delineated in Equation (11). Furthermore, it is demonstrated that the second derivative of the Lagrange function with respect to \(w \) constitutes a positive definite matrix, thereby ensuring that the objective function attains a minimum value. The second derivative of L with respect to w creates $2\,\boldsymbol{\Sigma_{sv}}$. It should be proven that $\boldsymbol{\Sigma_{sv}}$ is a positive semidefinite matrix. The semivariance-semicovariance matrix is a linearly independent symmetric matrix which has all elements on the main diagonal of $\boldsymbol{\Sigma_{sv}}$ which are semivariance so that the values are positive. In addition, another element is the semicovariance between mutually independent portfolio forming variables with a very small value or zero so that the semivariance-semicovariance matrix has a determinant value greater than zero; besides, it has a positive eigenvalue. It shows that the matrix $\boldsymbol{\Sigma_{sv}}$ is positive semidefinite. Therefore, the value of $\boldsymbol{w}$ in Equation (8) is the optimal portfolio weight for the mean-semivaraince portfolio.

The Sharpe index is used in order to assess the risk premium of each risk unit in a portfolio Makowitz (1959). According to Nuzula and Nurlaily (2020), the Sharpe Index can be calculated by using Equation (9)

$$Sharpe = \frac{E(R_p) - R_f}{\sigma_p} \quad (9)$$

where

R_f : risk-free interest rate

σ_p : portfolio standard deviation

III. RESEARCH METHOD

(1) This study employed secondary data, specifically daily closing price information for seven stocks that have consistently been listed in the Jakarta Islamic Index (JII) over the past decade. Data pertaining to the Composite Stock Price Index and risk-free interest rates were sourced from the website https://finance.yahoo.com/, while monthly risk-free interest rate data was obtained from https://www.bi.go.id. The analytical stages of the data were delineated as follows:

(2) Accumulating daily closing price data for each stock alongside the BI Rate values utilized in the analysis

(3) Computing the return values for each stock

(4) Estimating the expected return values for each stock

(5) Excluding stocks that exhibit an expected return of zero or less
(6) Calculating the semivariance for each stock
(7) Determining the semicovariance between the stocks
(8) Establishing the weights for each stock by employing the mean-semivariance approach
(9) Constructing a portfolio
(10) Evaluating portfolio performance using the Sharpe Index.

IV. RESULTS AND DISCUSSIONS

The test of signicance model by using F-test was obtained the F-statistics of 17.07 and the p-value of 0.00000007162. It can be concluded that by level of significant $\alpha = 5\%$, the model is simultaneously significant. The data which used in this study consist of daily closing price data on stocks included in the JII index that were 7 stocks that had been consistently listed over the last ten years in one period, benchmark data (b), and risk-free interest rate data for the period November 17-th 2022 until November 17-th 2023 with a total of 242 data. Meanwhile, Composite Stock Price Index (IHSG) data was used as a benchmark in calculating mean-semivariance portfolio formation. In addition, BI-7 Day Reverse Repo Rate data was used as a risk-free interest rate in order to evaluate portfolio performance.

Table 1. Descriptive return statistics

Stocks	Expected Return	Kurtosis	Skewness	Standard Deviation
ADRO	-0.001452	3.283861	-0.390928	0.024099
AKRA	0.000310	4.742745	-0.005437	0.020845
ICBP	0.000369	3.835470	0.269862	0.012958
KLBF	-0.000948	4.213163	0.303133	0.020341
TLKM	-0.000548	4.638376	-0.470500	0.013889
UNTR	-0.000827	6.416209	-0.021495	0.021124
UNVR	-0.001172	6.044951	0.060895	0.016404
IHSG	-0.000051	4.114654	-0.377185	0.006215

It is evident from Table 1 that not all average stock returns are favorable. The stocks of ADRO, KLBF, TLKM, UNTR, UNVR, and IHSG exhibit negative average returns, whereas the stocks of AKRA and ICBP demonstrate positive average returns. Notably, ICBP stocks boast the highest average positive return, quantified at 0.000369. Furthermore, the skewness values for the stock returns of ADRO, AKRA, TLKM, UNTR, and IHSG are negative, indicating that the distribution of stock returns is skewed to the left. In contrast, the stocks of ICBP, KLBF, and UNVR present a positive skewness value, suggesting that their return distributions are skewed to the right.

The kurtosis values for all stocks exceed three, signifying a leptokurtic distribution characterized by a pronounced peak. Additionally, as illustrated in Table 1, it can be concluded that the standard deviation of returns for ADRO stocks, owned by PT Adaro Energy Tbk, surpasses that of the other stocks, measuring at 0.024099. This implies that ADRO stocks exhibit the most significant fluctuations in returns among the stocks analyzed, while the stocks of IHSG and ICBP, held by PT Indofood CBP Sukses Makmur Tbk, present the lowest risk of return fluctuations, recorded at 0.006215 and 0.012958, respectively.

The selection of securities that constitute a portfolio is undertaken with the objective of evaluating potential losses or gains that these securities may yield in the future. A critical step in this selection process involves examining the expected return for each stock.

Table 2. Summary of calculation of expected return values

t	Return						
	ADRO	AKRA	ICBP	KLBF	TLKM	UNTR	UNVR
1	0.00000	0.01105	-0.00259	0.01467	-0.00745	0.00609	0.01083
2	0.02747	0.02532	0.01542	0.02398	0.00498	0.00000	-0.01959
3	0.00271	-0.00717	-0.01542	-0.04359	-0.00747	0.00519	0.00220
…	…	…	…	…	…	…	…
240	0.01202	0.00685	0.01189	0.00311	0.00643	-0.01447	0.013914
241	0.00794	-0.00685	0.00000	0.00310	-0.00282	0.002134	0.008708
Exp. Return	-0.00145	0.00031	0.00036	-0.00094	-0.00054	-0.00082	-0.00117

Table 2 shows that the expected return value for AKRA and ICBP stocks is positive and above zero. It indicates that there is a possibility that these stocks will provide profits in the future. On the other hand, ADRO, KLBF, TLKM, UNTR and UNVR stocks have a negative expected return value and they are below zero. It means that these stocks have the possibility of causing losses in the future. Portfolio preparation is conducted in orer to reduce the risk of loss from investment activities. Therefore, ADRO, KLBF, TLKM, UNTR and UNVR stocks are not included in the portfolio. The stocks included in the portfolio are AKRA and ICBP stocks. The semi-variance value of each stock is obtained by conducting calculations by using the formula Equation (4).

$$\varphi_i^2 = E\left[Min\left(0, R_{i,t} - b\right)^2\right]$$

Based on the results of calculating the Semivariance value in Table 3, it can be seen that AKRA stocks show the highest Semivariance value, namely 0.00020, while ICBP stocks have the lowest Semivariance value, namely 0.00009. Therefore, it can be concluded that ICBP stocks have a lower level of risk compared to AKRA stocks for single asset investment.

Table 3. Calculation of semi-variance values

t	$\left[Min\left(R_{1,t} - b, 0\right)^2\right]$	$\left[Min\left(R_{2,t} - b, 0\right)^2\right]$
1	0.00000	0.00000
2	0.00000	0.00000
3	0.00001	0.00012
…	…	…
240	0.00005	0.00000
241	0,00040	0.02115
Total	0.04710	0.02100
Semivariance	0.00020	0.00009

The calculation of the semicovariance of AKRA stocks with ICBP stocks was conducted by using the formula Equation (5) (see Table 4).

Table 4. Calculation of semicovariance values

t	$\left[Min\left(R_{1,t} - b, 0\right)\right]$	$\left[Min\left(R_{2,t} - b. 0\right)\right]$	$\text{Min}\left[\left(R_{1,t} - b\right),0\right] \times \text{Min}\left[\left(R_{2,t} - b\right),0\right]$
1	0.00000	-0.00797	0.00000
2	0.00000	0.00000	0.00000
3	0.00249	-0.00107	0.00003
…	…	…	…
242	-0.00707	0.00000	0.00001
243	-0.00682	0.00000	0.00000
Sum			0.00899
Semi-covariance value of AKRA stocks with ICBP stocks (φ_{12})			0.00004

The semivariance-semicovariance matrix is a sophisticated construct that encompasses elements reflecting the semivariance value for each stock within the portfolio, as well as the semicovariance values that characterize the interrelationships among the stocks comprising the portfolio. Following the meticulous calculations of the semivariance and semicovariance values that have been conducted, a comprehensive semivariance-semicovariance matrix can be meticulously assembled.

$$\boldsymbol{\Sigma_{sv}} = \begin{bmatrix} \varphi^2{}_1 & \varphi_{12} \\ \varphi_{12} & \varphi^2{}_2 \end{bmatrix}$$

$$\boldsymbol{\Sigma_{sv}} = \begin{bmatrix} 0.00020 & 0.00004 \\ 0.00004 & 0.00009 \end{bmatrix}$$

Weight calculations were conducted by using the formula Equation (8)

$$\boldsymbol{w} = \frac{\boldsymbol{\Sigma_{sv}}^{-1}\,\boldsymbol{1_N}}{\boldsymbol{1_N^T}\,\boldsymbol{\Sigma_{sv}}^{-1}\boldsymbol{1_N}}$$

$\boldsymbol{1_N}$ was a column matrix containing the number one. In this study, $\boldsymbol{1_2}$ was used since the number of stocks used was 2. After obtaining the values from the Semivariance-Semi-covariance matrix, the inverse value of the matrix was calculated.

$$\boldsymbol{\Sigma_{sv}}^{-1} = \begin{bmatrix} 5539.84888 & -2353.600749 \\ -2353.600749 & 12439.6326 \end{bmatrix}$$

Next, inverse values of the semivariance-semicovariance matrix and $\boldsymbol{1_2}$ were entered into Equation (8).

$$\boldsymbol{w} = \frac{\begin{bmatrix} 5539.84888 & -2353.600749 \\ -2353.600749 & 12439.6326 \end{bmatrix}\begin{bmatrix} 1 \\ 1 \end{bmatrix}}{\begin{bmatrix} 1 & 1 \end{bmatrix}\begin{bmatrix} 5539.84888 & -2353.600749 \\ -2353.600749 & 12439.6326 \end{bmatrix}\begin{bmatrix} 1 \\ 1 \end{bmatrix}}$$

$$\boldsymbol{w} = \begin{bmatrix} 0.24233 \\ 0.75766 \end{bmatrix}$$

The results of the weight calculation were derived using the formula presented in Equation (12). From the outcomes of the weight assessment, it is evident that the allocation of funds for investment in AKRA stocks constitutes 24.23%, while ICBP stocks account for 75.77% of the total capital available. Following the determination of the weight assigned to each stock, the subsequent step involves the compilation of a portfolio based on the derived weights, after which the portfolio return or expected portfolio return is calculated. The computations for portfolio return entail multiplying the return of each stock by its respective portfolio weight and then aggregating the results, whereas the anticipated portfolio return can be ascertained utilizing the formula delineated in Equation (3).

$$E\left(R_p\right) = \Sigma_{i=1}^{2} w_i\, E\left(R_i\right)$$

$$E(R_p) = 0.00035$$

A comprehensive overview of portfolio return calculations and the anticipated return on the portfolio is presented in Table 5. The computation of the portfolio's Semivariance value is executed utilizing Equation (4).

$$\varphi_p^2 = \Sigma_{i=1}^{N}\Sigma_{j=1}^{N} w_i w_j \varphi_{ij}$$

Based on the results of the calculations, the portfolio's semivariance is valued at 0.0000748. The square root of the semivariance quantifies the portfolio's risk, yielding a result of 0.00864. Consequently, it can be deduced that the risk associated with the mean-semivariance portfolio that has been constructed is 0.00864.

Table 5. Calculation of Portfolio Return Values and Portfolio Return Expectations

t	$R_{1,t}$	$R_{2,t}$	$R_{1,t}$ according to weight	$R_{2,t}$ according to weight	Portfolio Return
1	0.011105	0.014670	-0.002652	-0.001966	0.000686
2	0.025320	0.023980	0.006076	0.011723	0.017799
3	-0.007170	-0.043590	-0.001720	-0.011723	-0.013443
…	…	…	…	…	…
242	0.000000	0.003100	-0.001644	0.000000	-0.001644
243	-0.009500	0.002820	-0.004160	-0.007221	-0.011381
Sum	0.057570	0.079450			0.074196
Expected Return	0.000310	0.000360			0.000350

The assessment of portfolio performance utilizing the Sharpe Index was executed through the application of the formula delineated in Equation (12).

$$Sharpe = \frac{E(R_p) - R_f}{\sigma_p} = 0.02295 \quad (12)$$

The calculated value of the Sharpe Index stands at 0.02295. This positive Sharpe Index indicates that the mean-semivariance portfolio demonstrates commendable performance, thereby making it advisable for investors to allocate their funds in accordance with the established portfolio weights.

V. CONCLUSION

Based on the findings of the preceding discourse, it can be deduced that, in the endeavor of analyzing the construction of a portfolio with minimal risk through the mean-semivariance methodology on equities listed in the Jakarta Islamic Index (JII) over the past decade, the optimal composition is derived from two stocks: AKRA and ICBP. The strategic allocations for each stock within the portfolio are established at 24.23% and 75.77%, respectively, yielding an anticipated return of 0.00035 alongside a risk level of 0.00864. This optimal portfolio generates a commendable Sharpe Index value of 0.02295, signifying robust performance, thereby rendering it a prudent recommendation for investors to allocate their capital in accordance with the delineated portfolio weights.

REFERENCES

1. Antika, R., Satyahadewi, N. and Perdana, H. (2022) "Analisis Pembentukan Portofolio Optimal Menggunakan Model Black Litterman Dengan Pendekatan ARCH/GARCH," Equator: Journal of Mathematical and Statistical Sciences, Vol. 1, No. 1, p. 31, doi: 10.26418/ejmss.v1i1.59119.
2. Estrada, J. (2008). "Mean-Semivariance Optimization: A Heuristic Approach," Journal of Applied Finance, vol. 18, no. 1.
3. Herlianto, D. (2013). Manajemen Investasi Plus Jurus Mendeteksi Investasi Bodong. Gosyen Publishing.
4. Jorion, P. (2014). Financial Risk Manager Handbook. John Wiley and Sons.
5. Maruddani, D.A.I. (2019). Value at Risk untuk pengukuran Risiko Investasi Saham : Aplikasi dengan program R. Wade.
6. Markowitz, H. (1952). "Portfolio Selection," J Finance, vol. 7, no. 1, pp. 77–91, doi: 10.2307/2975974.
7. Markowitz, H. (1959). Portfolio Selection: Efficient Diversification of Investments. Yale University Press.
8. Nuzula, N.F. and Nurlaily, F. (2020). Dasar-Dasar Manajemen Investasi. UB Press.
9. Suyasa, N. K. N. S., Dharmawan, K. and Sari, K. (2021). "Perhitungan Portofolio Optimal Denga Metode Mean-Semivariance Dan Mean Absolute Deviation," E-Jurnal Matematika, vol. 10, no. 2, p. 65, doi: 10.24843/MTK.2021.v10.i02.p322.
10. Tandelilin, E. (2010). Portofolio dan Investasi: Teori dan aplikasi. Kanisius.
11. Vasant, J., Irgolic, L., Kruger, R. and Rajaratnam, K. (2014). "A Comparison of Mean-Variance And Mean-Semivariance Optimisation on The JSE," Journal of Applied Business Research (JABR), vol. 30, no. 6, p. 1587, doi:10.19030/jabr.v30i6.8876.