

FORMATION OF AN EFFICIENT SYARIAH STOCK PORTFOLIO USING THE MARKOWITZ MODEL ON THE JAKARTA ISLAMIC INDEX

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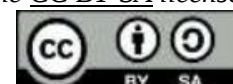
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ABSTRACT

This study analyses the formation of an efficient sharia stock portfolio using the Markowitz Model on banking stocks in the Jakarta Islamic Index (JII) in 2025, namely BRIS (Bank Syariah Indonesia Tbk), BTPS (Bank BTPN Syariah Tbk), and BANK (Bank Aladin Syariah Tbk), with daily closing stock price data from the IDX and Yahoo Finance processed using R Studio to calculate historical returns, expected returns, risk (standard deviation), covariance, and correlation; The results show that BTPS has the highest expected return (0.10795%) but the highest risk (0.0283), while BANK is the most stable (risk 0.0183%), with moderate correlation between stocks (0.09-0.46), resulting in an optimal portfolio in the form of the highest risk portfolio (100% BTPS, return 0.03%, risk 2.87%) and the lowest risk (22% BRIS, 16% BTPS, 62% BANK, return 0.04%, risk 1.51%), so that the Markowitz Model is proven to be effective in balancing risk-return through diversification for sharia investors.

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INTRODUCTION

Investment is an investor's decision to allocate funds to an instrument with the goal of achieving future profits. Stocks are a popular investment instrument due to their potentially high returns compared to other instruments. In recent years, the Indonesian capital market has shown rapid growth and plays a significant role in the national economy, both as a means of raising funds for companies and as a platform for the public to invest. With the majority of Indonesia's population being Muslim, the need for investment instruments compliant with Sharia principles is increasing, thus driving the development of the Sharia capital market in Indonesia (Rambe & Riski, 2022; Tandirerung et al., n.d.).

One important instrument in the Islamic capital market is Islamic stocks, which provide benefits in the form of dividends and capital gains while remaining based on Islamic sharia principles. The Jakarta Islamic Index (JII) is one of the first Islamic stock indices introduced in Indonesia and serves as a benchmark for the performance of Islamic stocks. The JII consists of 30 stocks

selected based on sharia criteria, as well as certain levels of liquidity and market capitalization. Although the stocks in the JII have undergone a rigorous selection process in accordance with the standards of the Indonesia Stock Exchange and the Indonesian Ulema Council (MUI) and are considered to have relatively strong fundamentals, investors remain uncertain regarding the level of returns they will receive (Kusumah & Megawati, 2024).

In stock investing, price fluctuations are unavoidable and directly impact risk and return levels. Risk and return have a direct relationship, with the greater the risk an investor takes, the greater the expected return. However, rational investors focus not only on achieving high returns but also on minimizing potential risks. Therefore, an investment management strategy is needed that optimally balances risk and return (Febriani, 2024).

One common strategy used to reduce investment risk is to build a portfolio through asset diversification. Developing an optimal portfolio is a relevant approach to addressing the uncertainty surrounding the returns generated by each asset. Investors' ability to diversify risk across correlated assets is a key factor in building an efficient portfolio. With appropriate diversification, investors are expected to be able to navigate the dynamics of fluctuating economic and market conditions (Riski & Sulistianingsih, 2024a).

The Markowitz Model is an approach in modern portfolio theory used to construct optimal portfolios. This model considers expected return, risk measured through variance or standard deviation, and covariance between assets. Through this approach, investors can determine the combination of assets capable of providing maximum return at a given risk level or minimum risk at a given expected return level. The application of the Markowitz Model is important in the context of Islamic stocks, particularly stocks included in the Jakarta Islamic Index, because each stock has different risk and return characteristics and diverse correlations (Rahmah & Sulistianingsih, 2025; Riski & Sulistianingsih, 2024a).

Research (Riski & Sulistianingsih, 2024a) shows that the Markowitz Model is an effective method for forming an optimal portfolio by considering Expected Return, risk (variance/standard deviation), and covariance between stocks. Based on the research results in the reference article, the application of the Markowitz Model is able to produce a combination of stocks that provide an optimal level of return at a certain level of risk. The study also confirms that the diversification process through calculating covariance between assets plays a crucial role in reducing portfolio risk without having to sacrifice return significantly. Thus, the Markowitz Model has been proven to be useful as an investment decision-making tool in forming an efficient stock portfolio. These findings provide a strong basis for this study to apply the Markowitz Model in forming a sharia stock portfolio on the Jakarta Islamic Index (JII) in 2025.

The 2025 research period was chosen based on the consideration that it reflects relatively recent market conditions and is relevant for investors in making investment decisions. Dynamic economic and capital market conditions during this period have the potential to impact the performance of Islamic stocks in the JII, making it interesting for further analysis. The results of this study implicitly provide guidance on the importance of investors continuously analyzing investment decisions in the future.

RESEARCH METHODOLOGY

This study applies the Markowitz Model to the optimal stock portfolio of Islamic banking stocks included in the Jakarta Islamic Index (JII) for the 2025 period. The Markowitz Model is used because it can consider two key elements in investment: return and risk. Data analysis was performed using R Studio software.

Sharia Shares

Sharia-compliant shares are shares issued by companies whose business activities do not conflict with Sharia principles (Yuliantika et al., 2024). Companies issuing Sharia-compliant shares must meet certain criteria, both in terms of their business type and financial structure. The company's business must not be related to gambling, alcohol, interest-based banking, or other activities prohibited by Islam.

Furthermore, Islamic stocks must meet certain financial ratio criteria, such as limits on the level of interest-based debt to total assets (Yuliantika et al., 2024). Stocks that meet these requirements will be included in the Islamic Securities List (DES), which is periodically published by the Financial Services Authority (OJK) (Ilmiyati et al., 2023). Islamic stocks have become a popular investment instrument because they combine financial goals with adherence to Islamic values.

Jakarta Islamic Index (JII)

The Jakarta Islamic Index (JII) is a sharia-compliant stock index consisting of the 30 most liquid and large-cap sharia-compliant stocks listed on the Indonesia Stock Exchange (www.idx.co.id and www.bi.go.id). The JII was established as a benchmark for the performance of sharia-compliant stocks and as a guide for investors seeking to invest in accordance with sharia principles (Izzat Firdausi, 2023).

The selection of stocks included in the JII is carried out through a rigorous selection process, including adherence to sharia principles and liquidity criteria, as well as market capitalization. The JII stock composition is evaluated periodically to ensure the index continues to represent the conditions of the sharia stock market. In this study, stocks listed in the JII in 2025 were used as research objects in forming an efficient sharia stock portfolio (<https://finance.yahoo.com/> & www.idx.co.id, www.bi.go.id).

Population and Sample

A population is the entire object or subject of research that has certain characteristics and is determined by the researcher to be studied and conclusions drawn (Sugiyono, 2014). The population in this study is all stocks included in the Jakarta Islamic Index (JII) in 2025.

A sample is a portion of a population selected to represent the characteristics of that population (Sugiyono, 2014). Sampling in this study was conducted using purposive sampling, a method of determining samples based on specific criteria that align with the research objectives. The criteria used were shares of Islamic banking companies listed on the Jakarta Islamic Index (JII) in 2025. Based on these criteria, the sample of this study consists of PT Bank Syariah Indonesia Tbk (BRIS), PT Bank BTPN Syariah Tbk (BTPS), and PT Bank Aladin Syariah Tbk (BANK).

Data Analysis Technician

The data analysis in this study was conducted using the Markowitz Model to determine the optimal stock portfolio. All calculations and data processing were performed using R Studio software. This model is used to analyze the relationship between return and risk to determine the most efficient stock combinations and investment proportions.

Next, to obtain an optimal stock portfolio, the analysis is carried out through several systematic steps. These steps include calculating stock returns, expected returns, risk levels, relationships between stocks, and determining the combination of stocks and fund proportions that form the optimal portfolio based on the Markowitz Model.

1. Collecting daily closing price data for shares of Islamic banking companies listed on the Indonesia Stock Exchange (IDX) and included in the Jakarta Islamic Index (JII) during the research period of 2025 .
2. Calculate the realized return of individual shares using the following equation :

$$R_{it} = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Information :

- R_{it}
- P_t
- P_{t-1}

3. Calculate the expected return of individual stocks as the average realized return over the observation period . Expected return is used to estimate the expected level of profit from each stock .

$$E(R_i) = \frac{\sum_{t=1}^n R_{it}}{n}$$

Information :

- $E(R_i)$ = Expected return saham ke- i
- R_{it}
- n

4. Calculate individual stock risk measured using variance and standard deviation .

Variance :

$$\sigma_i^2 = \frac{\sum_{t=1}^n (R_{it} - E(R_i))^2}{n}$$

Standard deviation :

$$\sigma_i = \sqrt{\sigma_i^2}$$

Information :

- σ_i^2
- σ_i

5. Calculate the covariance between stocks to determine the relationship between return movements between stock pairs in the portfolio .

$$\sigma_{ij} = \frac{\sum_{t=1}^n (R_{it} - E(R_i))(R_{jt} - E(R_j))}{n}$$

Information :

- σ_{ij}

6. Calculate the correlation coefficient between stocks to determine the strength of the relationship between stock returns .

$$\rho_{ij} = \frac{\sigma_{ij}}{\sigma_i \sigma_j}$$

or should be calculated using the Pearson formula :

$$\rho = \frac{n \sum XY - \sum X \sum Y}{\sqrt{(n \sum X^2 - (\sum X)^2)(n \sum Y^2 - (\sum Y)^2)}}$$

The correlation coefficient value ranges from -1 to +1. The lower the correlation between stocks, the greater the opportunity to gain diversification benefits in forming a portfolio .

7. Determine the proportion of funds (portfolio weight) for each share using the Solver facility in Microsoft Excel with the aim of maximizing expected returns or minimizing risk according to the constraints set .
8. Calculate the expected return of the portfolio using the following equation :

$$E(R_p) = \sum_{i=1}^n W_i E(R_i)$$

Information :

- $E(R_p)$ = Expected return portofolio
- W_i

9. Calculate portfolio risk using portfolio variance and standard deviation .
For a portfolio consisting of many stocks :

$$\sigma_p^2 = \sum_{i=1}^n W_i^2 \sigma_i^2 + 2 \sum_{i=1}^{n-1} \sum_{j=i+1}^n W_i W_j \sigma_{ij}$$

Portfolio standard deviation :

$$\sigma_p = \sqrt{\sigma_p^2}$$

Information :

- σ_p^2
- σ_p
- $W_i i$
- $\sigma_i^2 i$
- $\sigma_{ij} ij$

Based on the stages of the analysis , the combination of stocks that make up the optimal portfolio along with the proportion of funds in each stock is obtained so as to be able to produce an optimal level of return with a minimal level of risk according to the Markowitz Model approach .

RESEARCH RESULTS AND DISCUSSION

Data and Research Objects

This research uses the daily closing price data of sharia banking companies registered in the Jakarta Islamic Index (JII) in 2025. The stocks analyzed include PT Bank Syariah Indonesia Tbk (BRIS) , PT Bank BTPN Syariah Tbk (BTPS) , and PT Bank Aladin Syariah Tbk (BANK) . Data is obtained from the Indonesian Stock Exchange (BEI) and Yahoo Finance as secondary data sources . All the data that has been collected is then processed using R software to calculate stock return , expected return, risk, covariance, correlation, and form an optimal portfolio with the Markowitz Model .

Expected Return Saham Perusahaan Perbankan di JII 2025

Expected Return is an investor's expectation of the return on an investment, whether in the form of profit or loss, based on the stock's historical performance. Data from the calculation of banking stocks listed on the JII Index in 2025 shows:

Table 1 Expected Stock Returns of Banking Companies Listed on the JII Index 2025

Company	Expected Return, E(Ri)
Bank Syariah Indonesia (BRIS)	-0.00000938
BTPN Syariah Bank (BTPS)	0.00107952
Aladin Syariah Bank (BANK)	0.00070476

Table 4.1 shows that Bank BTPN Syariah has the highest expected return of 0.1079%, indicating that this stock has the greatest profit potential compared to other banking stocks in the JII. Bank Aladin Syariah also showed a positive return of 0.0705%, while Bank Syariah Indonesia experienced a negative return (-0.00000938), indicating the potential for losses, albeit very small. This illustrates that although the banking sector generally offers profitable investment opportunities, there are variations in performance between stocks that investors should be aware of.

Risk (Standard Deviation) of Banking Company Stocks in JII 2025

Stock investment risk can be measured using standard deviation, a measure of the dispersion of stock return data from its average. The greater the standard deviation, the higher the volatility, thus increasing the risk borne by investors. Conversely, a low standard deviation indicates a stock tends to be stable with lower risk .

Table 2 Standard Deviation of Stocks of Banking Companies Listed on the JII 2025 Index

Company	Standard Deviation σ
Bank Syariah Indonesia	0,02561184
BTPN Syariah Bank	0,02826050
Bank Aladin Syariah	0,01831395

These results indicate that Bank BTPN Syariah has the highest risk (2.83%), while Bank Aladin Syariah has the lowest risk (1.83%). Bank Syariah Indonesia is in the middle position (2.56%). Investors with an aggressive profile tend to choose high-risk stocks due to the potential for greater returns, while conservative investors prefer low-risk stocks to minimize potential losses.

Covariance Between Banking Company Stocks in JII 2025

Covariance is a statistical measure that shows the relationship between the movements of two stocks. If the covariance is positive, the stocks tend to move in the same direction; if it is negative, they move in the opposite direction. Investors use this information to construct portfolios that maximize returns while minimizing risk through diversification.

Table 3 Covariance Between Banking Company Stocks Listed on the 2025 JII Index

Company	Sharia Bank Indonesia	BTPN Bank Sharia	Bank Aladin Sharia
Bank Syariah Indonesia	0,000655966	0,00033070	0,00004942
BTPN Syariah Bank	0,00033070	0,00079866	0,00004698
Bank Aladin	0,00004942	0,00004698	0,00033540

These results indicate that the majority of banking stocks have positive covariance, meaning they tend to move in the same direction. This indicates that while the portfolio has the potential for maximum returns, investors must also be prepared for the risk of a decline in share prices across the sector.

Correlation Between Banking Company Stocks in JII 2025

The correlation between stocks indicates the strength of the relationship between stock movements. A value of +1 indicates a perfect positive correlation , -1 a perfect negative correlation , and 0 no correlation . Correlation is important for portfolio diversification because

less correlated stocks can reduce overall risk.

Table 4 Correlation Between Banking Company Shares Listed on the JII 2025 Index

Company	Bank Syariah Indonesia (BRIS)	BTPN Syariah Bank (BTPS)	Aladin Syariah Bank (BANK)
Bank Syariah Indonesia (BRIS)	1.000		
BTPN Syariah Bank (BTPS)		1.000	
Aladin Syariah Bank (BANK)			1.000

A medium correlation between several stocks indicates some movement in the same direction, but not too high. Investors can leverage this to diversify their portfolios, reducing risk without sacrificing expected returns.

Portfolio Optimal Markowitz untuk Saham Perbankan di JII 2025

The Markowitz model helps investors construct optimal portfolios based on return and risk preferences. High-risk portfolios typically provide higher returns with higher volatility, while low-risk portfolios reduce risk with more stable returns.

Table 5 Markowitz Optimal Portfolio of Banking Companies Listed on the JII Index 2025

Portofolio Optimal	Highest Risk	Lowest Risk
Bank Syariah Indonesia	0,00%	22%
BTPN Syariah Bank	100%	16%
Bank Aladin Syariah	0,00%	62%
Total Investasi	100%	100%
Risk Level	2,87%	1,51%
Expected return	0,03%	0,04%

From this table, investors with an aggressive character can choose a high-risk portfolio to get greater returns, while conservative investors choose a low-risk portfolio to minimize volatility.

Conclusion

Based on research on Islamic banking stocks included in the Jakarta Islamic Index (JII) in 2025, it can be concluded that each stock has a different level of expected return and risk. Stocks with higher potential returns are generally accompanied by greater risk, while stocks with lower risk tend to provide more stable returns. The relationship between stocks tends to move in the same direction, but the application of the Markowitz Model can create an efficient Islamic stock portfolio through the appropriate combination and allocation of funds, allowing investors to tailor portfolio choices to suit their investment objectives and risk tolerance.

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