The Optimum Portfolio of Sharia Stocks in Indonesia

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ABSTRACT

This research investigates whether optimizing stock portfolios aligns with prudence in Sharia-compliant stock investment. It compares the portfolio optimization analysis between Sharia-compliant securities and the Jakarta Islamic Index. Each group is structured with its optimal portfolio composition to achieve the highest expected return for various possible risks. Two efficient frontiers are derived from both optimal portfolios. A slight intersection is found in the efficient frontier between these two portfolio groups, justifying that taking high risks in one group results in a low-risk choice in the other portfolio group. The Sharia-compliant investment is realized by choosing an optimal portfolio with low risk while still tolerating investment selections with higher risk, as long as they are aligned with Islamic principles. The findings of this optimal portfolio offer practical guidance for investment decisions and significantly contribute to advancing the field of Islamic finance and investment practices.

Keywords: *Optimum Sharia Stocks Portfolio, Risk and Return, Coefficient of Variance*

A. INTRODUCTION

Investing in stocks in Islam is permissible. Transactions of shares and stock exchanges in Islam are halal, proven by the existence of MUI Fatwas as supporters(Selasi, 2018). The study on utilizing virtual currency and blockchain technology also opens opportunities to be conducted by Sharia principles (Ayu Effendi & Hadji Latif, 2023). This notion reflects the idea that Islamic society can leverage the latest technologies and knowledge currently in use when engaging in financial transactions. Investing in stocks is preferably done not in individual

stocks but allocated into a portfolio, a combination of multiple stocks. The primary goal of a stock portfolio is to mitigate the risk of potential losses. The composition or proportion of each stock that can pose a risk at a level accepted by the investor can be predicted using the mean-variance theory developed by Markowitz (Markowitz, 1952).

The Markowitz model poses mathematical complexity when the number of stocks forming a portfolio is significant. Consequently, several simplified models have emerged, such as the Capital Asset Pricing Model, Sharpe-Lintner-Black Model, Fama and French Model, and Arbitrage Pricing Model (Black, 1993; Sharpe, 1989). The utilization of information technology helps to solve complex mathematical problems more simply. Portfolio selection can be directly done using the basic portfolio theory, namely Markowitz's Mean-Variance Model (E-V Model). Microsoft Excel, widely used in various business and academic circles, can be employed to assist in calculating linear programming models within the E-V Model using the SOLVER add-in.

Markowitz formulated optimal portfolio selection as an investor's choice from a set of investment outcomes at an inevitable, expected return, aiming for the highest portfolio scheduled to return at a given level of variance (risk). This statement is appreciated as an initial concept in investment portfolio theory and remains relevant today. The highest expected return only sometimes corresponds to the lowest portfolio risk. A higher expected return is balanced with higher portfolio risk. The reduction of portfolio risk is accompanied by a reduction in the expected return.

The E-V Model imposes a limitation that the portfolio risk will decrease if it comprises stocks with negative covariance. This is evident from the factor that influences portfolio risk: covariance. Covariance represents the expected change value in two variables ranging from minus infinity to infinity. Therefore, the more negative covariance among the stocks forming the portfolio, the more significant the reduction in portfolio risk. Covariance values are more reliable when calculated from more extended data series (Black, 1993).

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When people first think of Shariah-compliant companies, they often think of those involved in Islamic banking, such as Bank Syariah Indonesia. This is due to Islamic banking services' widespread presence and impact on everyday financial transactions. The prominence of Islamic banking in public perception highlights its role in representing the broader field of Shariah-compliant finance. It sets the context to analyse other financial entities within this sector.

In 2023, the Shariah-compliant financial sector on the Indonesia Stock Exchange (IDX) includes seven key companies: Bank Syariah Indonesia, BTPN Syariah, Panin Dubai Syariah, Aladin Syariah, Asuransi Jiwa Syariah Jasa Mitra Abadi, Magna Investama Mandiri, and Saratoga Investama Sedaya. These companies have demonstrated solid performance with generally strong returns and high liquidity. Although specific performance metrics may vary, these firms reflect a positive financial outlook and underscore their relevance within the broader financial market. We will see whether the performance of these stocks is better than the top stocks in the Islamic Index.

This study will demonstrate extreme conditions when an investor limits investment choices only to financial sector stocks representing Sharia-compliant businesses. We will analyse the optimal portfolio composition of seven stocks from Shariah-compliant companies. As a comparison, we will conduct an analysis of the seven top listings in the Jakarta Islamic Index. The selected stocks will be analysed in the same period as the seven Financial Sharia Sector stocks. The comparison will be made by examining the expected return results and risk levels obtained.

We will examine whether the portfolio of stocks with low expected returns and low risk still provides a portfolio's expected return and maintains low risk.

B. THEORITICAL

According to Islamic Sharia teachings, the Indonesian Ulema Council (Majelis Ulama Indonesia) approves stock investments through a halal investment fatwa in the stock market (Selasi, 2018). When investing in Sharia-compliant stocks, several aspects include ensuring that the purchased stocks belong to companies that do not engage in usury (riba), trade in prohibited goods, or engage in unlawful transactions. Additionally, investments should align with Sharia principles, avoiding speculation (gharar) and monitoring companies for excessive debt.

The role of the National Sharia Board-Indonesian Ulema Council (DSN-MUI) in issuing fatwas on Sharia-compliant stock transactions is crucial. It serves as a guide to prevent conflicts while implementing Sharia-compliant stock investment transactions (Lutfiyah et al., 2022).

Prohibiting or restricting transactions that are not Sharia-compliant is essential to prevent investors from encountering elements of maisir, gharar, and riba (Munawiroh & Rumawi, 2022). The increasing awareness among the public about conducting transactions that align with religious Sharia principles has led to a growing interest in Sharia-compliant stock transactions in Indonesia. Sharia-compliant stocks are attractive not only to Muslim investors but also to non-Muslim investors (Toto et al., 2020).

The Financial Services Authority (Otoritas Jasa Keuangan or OJK), Indonesia's regulatory authority for financial transactions, issues the Sharia Securities List. Utilizing the reference of the Sharia Securities List from the Indonesia Stock Exchange (BEI), OJK publishes Sharia stock indexes. Currently, there are five Sharia stock indexes in Indonesia, one of which is the Jakarta Islamic Index.

The Top Seven Jakarta Islamic Index comprises seven companies which have consistently remained in the top 30 list of JII (Jakarta Islamic Index) companies for ten years (Kurnia Nadya, 2023). Meanwhile, the JII is a stock

index that includes the most liquid stocks on the Indonesia Stock Exchange (BEI) and is evaluated every six months.

Investors create a stock portfolio to aim for an inevitable return with an acceptable level of risk. Building a portfolio involves choosing and spreading investments across multiple stocks, not just relying on one. Markowitz, the pioneer of modern portfolio theory, played a pivotal role in shaping contemporary investment portfolio strategies by offering an optimal balance between risk and return, allowing investors to tailor their returns based on their risk preferences (Markowitz, 1952).

The Markowitz Model or E-V Model remains relevant today, mainly due to its ability to construct an efficient frontier. The composition of a stock portfolio can be demonstrated effectively for risk-tolerant investors and those seeking to avoid risks. Using computer applications opens up numerous analysis opportunities previously limited to solving portfolios with only a few stock options. Utilizing algorithms translated into computer programming using Python can facilitate the analysis of optimal portfolio calculations (Li, 2023).

The principle of caution in Sharia transactions can be aligned with the risk-averse behavior in modern portfolios. Nevertheless, the behavior of confident investors who boldly take high risks to pursue greater profits is not necessarily reckless but stems from their convictions based on experience and technical analysis (Irton et al., 2021).

Islamic investment portfolios, particularly those focused on equities, often employ the Mean-Variance Optimization model to balance risk and return while adhering to Sharia principles. This model allows for the construction of portfolios that exclude non-compliant sectors, such as alcohol, gambling, and interest-based financial services while aiming to maximize returns for a given level of risk. Recent studies highlight the effectiveness of this approach in creating Shariah-compliant portfolios that remain competitive with conventional ones (Abderrazak F. & Talla, 2016). Their research underscores that by optimizing portfolios within the boundaries of Islamic law, investors can achieve financial

performance comparable to conventional portfolios while adhering to ethical guidelines.

In addition, newer research has pointed out the importance of refining traditional portfolio optimization models to suit the unique characteristics of Shariah-compliant assets better. Discussion on how traditional risk measures and portfolio construction methods might require adjustments when applied to Islamic finance has given the distinct risk profiles associated with Shariah-compliant investments (Khan S. & Maroney, 2020). They suggest that adapting these models is crucial to accurately reflect Islamic portfolios' performance and risk characteristics compared to conventional ones.

C. METHODOLOGY

The research method used is the analysis of an optimal portfolio using the Mean-Variance Optimization model. This model seeks a portfolio composition that provides the highest expected return at a certain level of risk. Assuming investors dislike risk, the results will only show the highest expected return at the lowest risk. We call this methodology a descriptive quantitative method.

The calculation of the optimal portfolio is based on the daily expected return from the daily closing index of stock from seven Sharia Stocks in finance sectors. The selected stock is from PT Bank BTPN Syariah Tbk. (BTPS), PT Bank Panin Dubai Syariah Tbk (PNBS), PT Bank Aladin Syariah Tbk. (BANK), PT Bank Syariah Indonesia Tbk (BRIS), PT Asuransi Jiwa Syariah Jasa Mitra Abadi Tbk (JMAS), PT Magna Investama Mandiri Tbk (MGNA) and PT Saratoga Investama Sedaya Tbk (SRTG) (Otoritas Jasa Keuangan, 2023). Data were collected from 1st of February 2021 to the end of September 2023 because one share (BANK) was just listed on the stock exchange on 1st February 2021.

The benchmark stocks among the top seven consistently featured in the Jakarta Islamic Index (JII) are PT Adaro Energy Indonesia 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) dan PT Unilever Indonesia Tbk

(UNVR). All of the data are collected from the Indonesia Stocks Exchange website.

The formulation for calculating the expected return of the portfolio is:

$$E\left(\tilde{R}_p\right) = \sum_{i=1}^{n} x_i \mu_i \qquad (I)$$

With:

x_i = proportion of the i-th portfolio component

μ_i = expected return of the i-th portfolio component.

Portfolio risk is expressed as the square root of:

$$Var\left(\tilde{R}_p\right) = \sum_{i=1}^{n} x_i^2 \sigma_i^2 + \sum_{i=1}^{n-1} \sum_{j=i+1}^{n} 2x_i x_j \sigma_{ij} \qquad (2)$$

continuing the symbols in equation (I),

σ_{ij} = covariance of the i-th and j-th portfolio components.

The above formulation is a simple mathematical formula that can be easily applied in Microsoft Excel or other spreadsheet applications. Linear programming calculations to find the proportions of portfolio components that minimize risk are simplified using the iteration feature in the add-in SOLVER application. The applied algorithm is straightforward, determining the cell option containing the risk formula as the one to search for its minimum value. Iteration choices for varying values are given to (n-I) cells that hold the proportions of portfolio components. Another proportion is set to 100% minus the sum of the proportions of portfolio components obtained from the SOLVER application. The constraints for the varied proportions are values between 0 and 100%.

The differences observed between the two compared portfolio groups lie in terms of expected return and minimum risks. This comparison is based on the coefficient of variance results, which represent the comparison of returns and risks for each portfolio. Stocks with a negative expected return are not included in the portfolio.

D. RESULTS AND DISCUSSION

After collecting the daily closing prices for all seven stocks, we calculated each one's daily stock return. The result is shown in Table 1.

Table 1. Daily Return of The Syaria Financial Sectors Stocks

	Bank Syariah Indonesia	BTPN Syariah	Panin Dubai Syariah	Aladin Syariah	Asuransi Jiwa Syariah Jasa Mitra Abadi	Magna Investama Mandiri	Saratoga Investama Sedaya
Mean (%)	-0,0351	-0,0806	0,0308	0,4124	-0,0102	-0,0272	0,1103
Standard Deviation	0,0269	0,0269	0,0363	0,0471	0,0526	0,0051	0,0292
Coefisien of Variance	-76,7325	-33,3480	117,9871	11,4125	-516,6495	-18,6468	26,4658

Source: Indonesia Stocks Exchange, calculated

Daily returns vary but tend to be small; only three stocks show positive returns. Among these positive returns, Aladin Syariah stock has the highest value and the lowest risk. The rest exhibit returns that are significantly smaller and entail considerably higher risks. Their income rates are notably low and detrimental in the return with negative returns, while the associated risks are also higher than those with positive returns.

Meanwhile, for the top seven listed in the Jakarta Islamic Index, we calculated the returns in Table 2. Note that, consistent with their character as top-listed in JII, the returns of each stock are generally favorable, with only one yielding a negative return, namely, PT Unilever Indonesia. Despite being a top-listed stock, Unilever Indonesia is currently experiencing significant pressure in the market, both in terms of competition in the fast-moving consumer goods industry and due to the pressure of boycotting products affiliated with Israel.

The stock that had provided the highest return was AKRA. It operates in the trade and distribution of Fuels (BBM) and Basic Chemicals. AKRA also has the most negligible investment risk, as viewed from the coefficient of variance.

Table 2. Daily Return of The Top Seven JII Stocks

	Adaro Energy Indonesia	AKR Corporindo	Indofood CBP Sukses Makmur	Kalbe Farma	Telkom Indonesia	United Tractors	Unilever Indonesia
Mean (%)	0,1380	0,1533	0,0335	0,0329	0,0375	0,0137	-0,0750
Standard Deviation	0,0267	0,0249	0,0158	0,0187	0,0156	0,0224	0,0203
Coefisien of Variance	19,3587	16,2605	47,2687	56,7491	41,7677	163,4363	-27,1227

Source: Indonesia Stocks Exchange, calculated

The statistical results that we discussed would be the basis for analyzing portfolios using the E-V Model. After creating these portfolios, a detailed comparison revealed necessary information about the risk and return of both groups. Despite the simplicity of our initial analysis, the expected returns from the Sharia-compliant financial group might be lower than those of the top seven stocks in the JII.

The E-V Model will help us better to understand a portfolio's returns and risks. Investors who are cautious about risks prefer options with the least risk but still offer the highest returns.

Table 3. Portfolio Outcomes by Risk Level

Top Seven JII	Lowest Risk	One-Eight Risk	1st Quarter Risk	Three-Eights Risk	Middle Risk	Five-Eights Risk	3rd Quarter Risk	Seven-Eights Risk	Highest Risk
Standard Deviation	0,0088	0,0108	0,0128	0,0149	0,0169	0,0189	0,0209	0,0229	0,0249
Expected Return (%)	0,0501	0,0878	0,1047	0,1188	0,1316	0,1441	0,1498	0,1518	0,1533
Variance	0,0001	0,0001	0,0002	0,0002	0,0003	0,0004	0,0004	0,0005	0,0006
Coeficient of Variation	7,6224	12,3382	12,2694	12,5054	12,8224	13,1057	13,9502	15,0983	16,2605
Syaria Financial Sectors									
Standard Deviation	0,0213	0,0245	0,0278	0,0310	0,0342	0,0374	0,0406	0,0438	0,0471

Expected Return (%)	0,1366	0,2197	0,2581	0,2902	0,3189	0,3445	0,3682	0,3907	0,4124
Variance	0,0005	0,0006	0,0008	0,0010	0,0012	0,0014	0,0017	0,0019	0,0022
Coeficient of Variation	5,5971	11,1678	10,7518	10,6718	10,7218	10,8603	11,0349	11,2225	11,4125

Source: Indonesia Stocks Exchange, calculated

The first portfolio, which incorporates the Sharia-compliant financial sector, exhibits the composition and the risk and return outcomes, as outlined in the first part of Table 3. The following part presents the portfolio outcomes for the top seven Jakarta Islamic Index.

Note that the portfolio results table above begins by seeking the highest expected return that provides the lowest risk from various compositions of constituent stocks in each stock group. Subsequently, it seeks the highest expected return that incurs the highest risk. The range from the lowest to the highest risk is then divided into eight intervals, resulting in seven other risk levels from the lowest to the highest. For each risk level within these intervals, the highest expected return which is achievable is determined by varying the composition of each constituent stock. The result aligns with what was done by (Laila et al., 2019), although their composition involved composing investment products within each bank. The development of the efficient frontier in determining the optimal portfolio composition that we conducted is quite simple, not utilizing second-order standard deviation approaches, let alone third-order standard deviation (Liesiö et al., 2023).
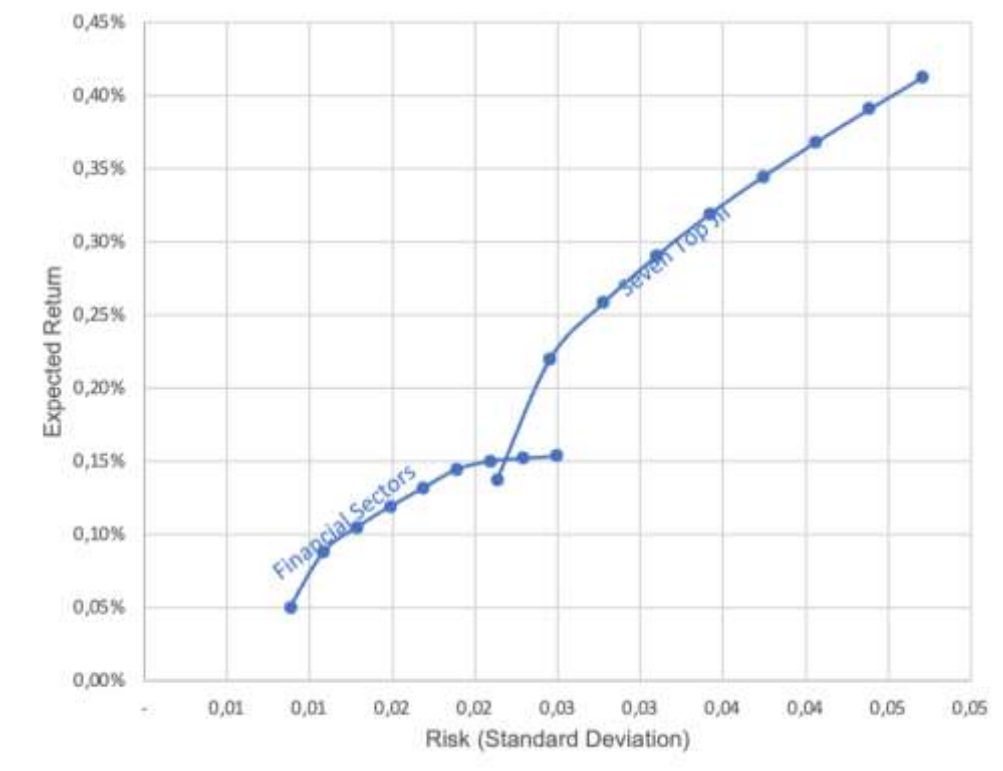
Figure I. Efficient Frontier

The results from Table 3, filled with numerical data, have been simplified into Figure 1 for better understanding. The graph illustrates that the optimal portfolio within the financial sector group has lower risk than the optimal portfolio within the top seven JII group. The two groups have an overlapping region of risk and expected return. However, this overlap reinforces that holding stocks from the top seven groups provides a better-expected return at the same risk level as the financial sector group. (Saxena, 2013) explains that when independent, two sets of efficient frontiers do not have any intercept between them. Non-intersecting efficient frontiers indicate different risk preference levels between the two portfolio groups.

The first focus is to the expected return of the two portfolio groups. The portfolio from the financial sector group consistently provides an overall lower expected return compared to the top seven JII group. Despite a slight intersection in expected returns, it is minimal, ranging from 0.14% to 0.15% per day. This

range of returns represents the maximum expected return in the financial sector group and the minimum expected return in the top seven JII groups. We did not conduct a mean return difference test between the two groups (Afriyanti et al., 2021). However, from comparing the coefficient of variance with significant values, it could already be observed that the portfolio selection does not differ between the two portfolio groups.

It is crucial to remember that when considering expected returns, attention should be given to the coefficient of variance. Our study measures portfolio performance using this coefficient. To ensure, we remained mindful of risk while assessing expected returns. The coefficient of variance for the financial sector portfolio group, at the intersection with the seven top JII portfolio groups, yields a higher value. The higher yields indicate that the risk of the financial sector portfolio group is greater at the same expected return. Choosing a portfolio group at the lowest risk level provides a better and less risky portfolio outcome. Comparing two portfolio compositions is conducted by comparing the coefficient of variance, even though not between two stock groups but with different portfolio calculation models (Lukmanul Hakim et al., 2023). This opinion is further supported when a simulation of increased risk results in the highest expected return (Jana & Rosadi, 2023).

Another important consideration is that the coefficient of variance provides relatively uniform values ranging from the lowest to the highest risk. The similarity indicates that portfolios consisting of stocks with various expected returns and risks can mitigate. At least, it can be inferred that there is the relative risk of investment which is equal to the expected return for optimal protfolio. It is reiterated here that the understanding of selecting an optimal portfolio composition is to obtain a composition that yields the highest expected return at a risk level acceptable to the investor. Quoting the development of an artificial intelligence model utilizing the Genetic Algorithm developed using the Sharpe model (Adebiyi et al., 2022), it was found that it only determines how stock compositions should be allocated to achieve optimum returns with the lowest risk. The search for portfolio compositions at various risk levels is a method that broadens the alternatives for portfolio choices and aligns with investors'

preferences for accepting a certain level of risk. The expected return will increase proportionally with the rising acceptable risk with the relatively constant coefficient of variance.

As a point of awareness, choosing a portfolio with low risk and low expected return reflects caution and sustainability, values in line with Sharia teachings. The foundation of the Qur'an and Hadith guides us to be prudent in our actions, such as in financial management and business. These two main guidelines for Muslims are reinforced by findings from research on stock investment in Kuwait (Alotaibi et al., 2022), Malaysia (Amin et al., 2023), and Morroco (Bousalam & Hamzaoui, 2016). Regarding the efficient frontier generated, the choice is to opt for the lowest risk in the financial sector portfolio group. Nevertheless, the option at the lowest risk of the top seven JII portfolio groups aligns with the principle of prudence.

Meanwhile, the decision to have a portfolio with higher risk but a better-expected return can manifest entrepreneurial spirit and courage as long as it aligns with Sharia principles. The Qur'an and Hadith also offer guidance on the importance of striving with complete reliance on Allah without compromising ethics and Islamic values. Therefore, investing in high-risk stocks is permissible if they adhere to Sharia principles and have been carefully calculated using reliable methods (Bousalam & Hamzaoui, 2016). It is crucial to note that every step in investment should consider Sharia principles, avoiding interest (riba) and transactions involving excessive uncertainty (gharar).

E. CONCLUSION

The conclusion drawn from this study is that a portfolio group originating from stocks with low expected returns can consistently yield returns smaller than the portfolio group consisting of stocks with higher expected returns. The risk choice in a portfolio is positively related to the expected return that the investor obtained. The coefficient of variance provides a relatively stable measure of an efficient frontier for stock portfolio groups. Choosing a portfolio with low risk is highly recommended in Islam, but taking calculated risks according to Islamic

principles is not prohibited. This research provides valuable insights into the performance, risks, and potential benefits of Islamic portfolios thereby guiding investment decisions and contributing to the development of Islamic finance and investment practices.

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