Jurnal Maneksi (Management Ekonomi Dan Akuntansi)
e-ISSN: 2597-4599
Volume 14 No.04, December 2025
Journal Home Page: https://ejournal-polnam.ac.id/index.php/JurnalManeksi
DOI: https://doi.org/10.31959/jm.v14i4. 3474
Page: 2381-2398

THE EFFECT OF BETA DETERMINATION ON THE PERFORMANCE OF SHARIA AND NON-SHARIA STOCK PORTFOLIOS USING THE REWARD TO DIVERSIFICATION APPROACH: A STUDY OF THE INDONESIAN STOCK EXCHANGE

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ARTICLE HISTORY
Received:
September 5, 2025
Revised
November 5, 2025
Accepted:
November 5, 2025
Online available:
November 28, 2025

Keywords:
Systemic risk, Return, Stock Portfolio Performance

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ABSTRACT

Introduction*: Islamic finance is growing rapidly worldwide, as evidenced by the performance of sharia-compliant indices in countries such as Bangladesh and the Dow Jones Islamic Index. The number of Sharia stock investors in Indonesia is also increasing; therefore, it is important to understand the performance of Sharia stock portfolios and the systemic risks that affect them. The purpose of this study is to examine the effect of beta on the performance of Sharia and non-Sharia stock portfolios in Indonesia.*

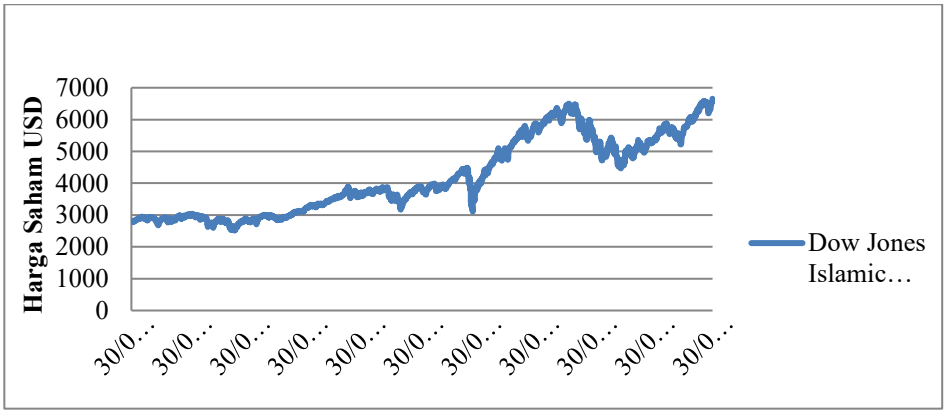
Methods: *The research method used is quantitative, with data sources from Yahoo Finance and the IDX website. Beta is a systematic risk that determines the level of portfolio return. The betas used are market beta, accounting beta, fundamental beta, and macroeconomic beta.*

Results: *The simultaneous multiple linear regression indicates that beta has a significant effect on stock portfolio performance. Meanwhile, partially, accounting beta and fundamental beta affect the performance of Sharia stock portfolios and fundamental beta and macroeconomic beta affect the performance of non-Sharia stock portfolios. The difference test between the two performances shows that there is no significant difference between Sharia and non-Sharia stocks.*

INTRODUCTION

Islamic finance is growing rapidly around the world and has reached $2004 billion by the end of 2015. A study using daily data from 15 countries during the period from September 1, 2019 to April 30, 2020 showed that the yield of the sharia index began to be positive, while the yield of the conventional index remained negative throughout the period (Nomran and Haron 2021). The performance of Shariah indices in Bangladesh outperforms and dominates conventional indices based on risk-adjusted rates of return (Aarif, Rafiq, and Wahid 2021), Islamic stock indices are also less volatile than conventional stock indices (Hassan et al. 2020).

Chart 1.1 Dow Jones Islamic Index Developments



The Dow Jones Islamic Index has increased over the past ten years (spglobal 2024)**.** This shows the continued demand for stocks that are in accordance with Islamic law. Muslim and non-Muslim investors show increased interest in Islamic financial institutions (Ahroum and Achchab 2021). Like conventional indices, sharia stock indices provide several opportunities for Muslim and non-Muslim investors. In fact, they are spread all over the world even in conventional markets that are already developed such as the United States and European markets.

The number of sharia stock investors in Indonesia continues to increase, marked by an increase in the trading volume of sharia stocks (Indonesia 2023). At the end of December 2020, there were 85,891 investors invested in sharia stocks, which is 5.5% of all investors on the IDX. Investor interest in investing in Islamic stocks has increased rapidly, increasing by 1,650 percent in the past five years. Of the 51 new shares listed on the IDX, 38% are sharia shares, or 74.5%. Stock market prices can be used to predict risk in stock investments. Risks in stock investment consist of two, namely systemic and non-systemic risks. Nonsystemic risks can be eliminated by forming diversification, while systemic risks can be predicted. The existence of sentiment-based mispricing in the valuation of stock market prices leads to other alternative factors that can be used to predict this systemic risk.

Capital Asset Pricing Model (CAPM) is a model for valuing an asset based on market price as a benchmark. CAPM describes the relationship between systematic risk and the expected return on an asset (Fama 1970). Then CAPM continues to be tested on a return prediction model based on beta values. In the CAPM model systemic risk is measured using Beta, which is predicted by market prices. In various studies, Beta is not only predicted by market prices, but also by accounting data in the form of profits (Brown and Ball, 1969) fundamental data in the form of Dividend Payout Ratio*,* Asset Growth, Leverage, Liquidity, Asset Size, Profit Variability, Beta Accounting obtained from the financial statements of each company (Beaver, Kettler and Scoles, 1970)(Beaver et al. 2016). In addition, beta can also be predicted from macroeconomic factors such as inflation, exchange rates, interest rates (Abell and Krueger 1989). Sharia beta in this study is defined as beta in addition to using market prices, namely using accounting data and macroeconomic data.

The high risk of stock investment can be lowered by diversifying the stock portfolio. Traditional portfolio theory before 1950 carried out stock selection in a random way. Nowadays it has been known as a modern portfolio since Harry M. Markowitz published his writing, namely *"Portfolio Selection"*. In addition, it is strengthened by the

William Sharpe model which uses mathematical and statistical approaches in calculating *expected return*. Portfolios are a way of investing long-term that is in accordance with sharia, sharia stock investors avoid sharia.Hort selling which is usually prohibited in sharia. As a result, Muslim investors can invest in long-term strategies into their portfolios (Ahroum and Achchab 2021). Portfolio optimization alone is not enough, it is necessary to measure its performance with a clear size. The optimal portfolio needs to be measured to know the performance of the portfolio. The gauge is *reward to diversification (RDIV)*. This performance meter is a portfolio performance measure that can show the amount of diversification that should be done which in reality the portfolio does not. RDIV performance measures have never been used in previous studies therefore this study has a level of data validity and is important to implement (Hartono 2013b).

The novelty in this study is that there is still no research on the right beta merger to predict the performance of sharia and non-sharia stock portfolios in Indonesia. In addition, there has never been a study that directly measures sharia beta to predict the performance of stock portfolios with RDIV performance measures. The purpose of this study is to use market beta, accounting beta, fundamental beta and macroeconomic beta as risk measurement tools in sharia and non-sharia stock portfolios in Indonesia. This study aim to analysis influence of market beta, accounting beta, fundamental beta and macroeconomic beta as risk measurement tools for sharia and non-sharia stock portfolios in Indonesia.

LITERATURE REVIEW

The theory used in examining the problem in this study is the Efficient Market Theory (FAMA 1976) That is, how investors respond to information related to stocks. The faster the investor response, the more efficient the capital market conditions will be. The second theory is the Markowitz Modern Portfolio Theory. This modern theory studies how the differentiation of data can lower portfolio risk, the more stocks included in the protofolio, the lower the risk (Markowitz 1991).

Third, the Theory of Market Equilibrium in Risk Conditions *(A Theory of Market Equilibrium Under Conditions of Risk)* namely the theory that underlies the existence of the CAPM equation (Sharpe, 1964). The fourth is the Arbitrage Pricing Theory *(The Arbitrage Pricing Theory)*, The arbitrage pricing theory (APT) proposed by Ross (1976) is a plausible alternative to the simple one-factor CAPM. The appeal of APT may stem from its implication that compensation for bearing risk may consist of multiple risk premiums, rather than just one risk premium as in CAPM. Roll and Ross (1979) claim to have found empirically at least three and possibly four factors assessed from 1962 to 1972. However, Roll and Ross do not offer an economic interpretation of these factors and admit that their testing is weak (Reinganum, 1981).

Market Beta

There is a high level of relationship between accounting measurement and market risk. More precisely, portfolio selection and rating strategies based on accounting risk measures are essentially equivalent to the same portfolio rating strategies based on market-defined risk measures (Beaver, 1970)(Beaver et al. 2016). The unbiased Beta model estimation based on instrumental variables with the first step of the filter is a block sampler, i.e. with a non-overlapping window indicating that the quarterly beta has a strong autocorrelation of about 0.95 (Ghysels, 2006).

Accounting Beta

Accounting beta calculated using ROA and ROE significantly represents market beta and is a satisfactory solution for calculating the equity cost of unlisted companies. It deals with the cost of capital by reinforcing the role of beta accounting as a solution to determine the cost of equity and therefore create value for the organization (Faiteh and Aasri 2022). In addition, Ethics of Counting *Downside Accoounting Beta* (DAB) using *Return on Assets (ROA)* and *Return on Equity (ROE)* There is a positive correlation with market beta. Investors, owners and managers can use DAB to systematically calculate the risk of companies that are not listed on the stock market and consequently to identify the level of risk associated with companies within the sector (Anna and Pyke 2017).

Fundamental Beta

Beta can be measured by company size, book-to-market, operating leverage, and financial leverage (Cosemans et al. 2016). Our selection of company-specific instruments is based on the investor-based asset pricing literature. Gomes, Kogan, and Zhang (2003) obtained an explicit relationship between market beta and company size and book-to-market in general equilibrium settings. They show that the size of a company reflects the systematic risk component related to its growth options, whereas the book-to-market ratio is a measure of the risk of a company's existing assets. Carlson, Fisher, and Giammarino (2004) argue that the value of a firm is riskier than the growth of a company because they are more affected by negative aggregate shocks due to higher operating leverage. Zhang (2005) proposed a model in which expensive capital reversibility makes it difficult for companies to reduce the scale of their operations in a recession. As a result, the company's value has a countercyclical beta, while stock growth is procyclical.

Macroeconomics Beta

Beta can be predicted by interest rates, budget deficits, trade deficits, inflation, and oil prices (Abell and Krueger 1989). These findings extend the beta model of the variables Gosenberg et al (1973, 1975) to include the influence of macroeconomic activity on portfolio beta changes. Interest rates, budget deficits, trade deficits, inflation, and oil prices are among the most important macroeconomic descriptors found to significantly affect beta changes. This information allows for smarter portfolio management rather than just focusing on the beta of a single index market model. Variable beta models have been shown to predict future betas more accurately than Market Beta models assuming that historical SIMM-based betas continue to be the only systematic measure. Finally, it was also shown that the beta variable technique was quite successful in predicting the direction of beta change from the past to the future of the period (Abell and Krueger 1989).

Beta dan Return

The realized Beta and Return have a close relationship, as expected, insignificant and consistent with the findings of Fama and French (1992) which documented, among other things, no significant positive relationship between risk and return (Theriou et al. 2010). Other research has produced a significant positive relationship between beta and returns in periods of rising markets (excess positive market returns) but a significant negative relationship in downmarket periods (excess negative market returns). Beta can predict returns with strong results for both monthly and weekly returns as well as for two different proxies of the world market portfolio. Other research shows that beta is still a useful measure of risk for portfolio managers in making optimal investment decisions (Tang and Shum 2003).

Sharia Stock Portfolio Performance

Beta is modified to predict the performance of an Islamic stock portfolio with RL-Beta seeing that there are situations where the theoretical value of RL-beta will be similar to traditional measurements based on CAPM. For cases where the return has a normal distribution, it is shown that the RL-beta is reduced exactly to the conventional beta or none. Therefore, it is estimated that the modified size will be useful for portfolios that have an asymmetrical distribution of returns. The theoretical modification properties of beta are proposed by Leland (1999) and based on the work of Rubinstein (1976). It is further called RL-Beta (Adcock, 2007).

There is also a limitation of the CAPM theory, the portfolio with the highest risk does not provide the highest return. This alleged result is due to the limitations of the CAPM (frictionless market) theory and everyone has a risk averse profile. This creates a phenomenon of low-risk anomalies in the Indonesian stock market where low-risk portfolios can provide higher returns and contractive monetary policies magnify the difference in portfolio performance (Kusno, 2019). The beta is modified using Smart Beta by implementing four portfolios. Although smart beta has many definitions, our definition is that smart beta is a portfolio management strategy that involves (Minimum Variance, Cap Weight, Economies of Scale) where we combine them and create a dynamic beta portfolio (Mahdi, 2015), (Raza, 2018).

Sharia Stocks

The return of sharia stocks using the Alpha Jensen performance measure shows that the return of sharia equities dominates the return of conventional equities during the full sample period. However, the period before the crisis was dominated by higher rates of return on conventional equity, regardless of the size of return used. During the GFC, ESDC, and post-crisis period, Islamic equity yields dominated compared to conventional instruments (Al-Yahyaee et al. 2020), (Foglie, 2020). The same thing also shows that the performance of sharia stocks outperforms conventional stocks both before the Covid-19 Pandemic and during the Covid-19 Pandemic, but the difference is not statistically significant (Amelia, Fany Alfarisi, and Rahim 2022). In the United States, the Dow Jones Islamic index outperformed the conventional Dow Jones index in terms of risk-adjusted returns during Covid-19 and post-Covid-19 crisis. In the same trend, the results of the Echarch model confirm that the conventional DJI stock index is more volatile than the sharia DJII stock (MOUTAHADDIB, 2023).

Although there is no significant difference in simple averages between the two indices, the performance of sharia indices outperforms conventional indices based on risk-adjusted rates of return. The two indices are only related in the long term, while no cause-and-effect relationship is seen between them. The overall results show that the Sharī indexʿah dominating conventional indices in Bangladesh (Aarif et al. 2021). There is also a relationship between the growth of Islamic finance and Islamic real estate finance, the first common finding is that Islamic stock indices are less volatile than conventional stock indices, most empirical studies on the relationship between Islamic finance and growth focus on the impact of the banking sector on growth and ignore other segments of the Islamic finance market, based on our review of existing research, there is no agreed model for Islamic home financing in the United States. Islamic banks (Hassan, 2020)(Hassan et al. 2020).

The above phenomena show the importance of investing in Islamic indices. Based on performance measures, some sharia indices outperform conventional indices. Academic work differs in terms of better or worse performance than the Islamic index. It is true that stock market indices and Islamic investment funds, apart from Sukuk, are the main tools for Islamic financial offerings in the financial markets (Agouram et al. 2021). The ASEAN sharia stock index shows clustered volatility. However, only three countries, namely Malaysia, Thailand and Singapore, showed the effect of leverage. In addition, the influence of market sentiment on the return of the sharia stock index was observed in the Indonesian and Malaysian markets, which are the two largest sharia markets with predominantly Muslim populations in ASEAN. These findings imply that the trading behavior of Muslim investors in the sharia market is the same as their behavior in the conventional market, i.e. disobedience to the Sunnah (Aloui et al. 2022).

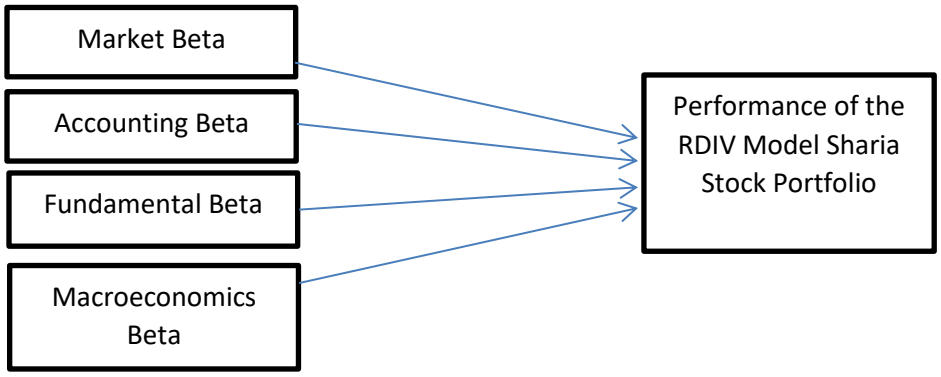
ISPs provide higher returns with lower systematic risk compared to CSPs in different sectors; however, ISPs and CSPs perform equally in the market. The non-parametric stochastic dominance approach shows that ISPs are better than CSPs for portfolio returns without considering risk for all sectors except property; further, ISPs outperform CSPs in market conditions (Hoque et al. 2020). Mispricing occurs in both sharia and non-sharia stocks. Therefore, both types of stocks can be exposed by pricing errors. Second, Islamic stocks are less exposed to sentiment-based mispricing than non-Islamic stocks. The reason behind this phenomenon is that Islamic values, such as interest bans, speculative transactions and uncertainty, as well as excessive leverage, arguably reduce sentiment-based mispricing (Umar et al. 2021).

Overall mispricing of shares (mispricing) in Islamic stocks is less exposed to sentiment-based mispricing than non-Islamic stocks. The results are consistent with our resilience tests, for which we estimate the equation model across industries and portfolios. Ultimately, our findings imply diverse insights for investors and policymakers (Al Hashfi, Naufa, and Munawaroh 2021). Short Selling is prohibited in sharia. As a result, Muslim investors cannot invest in both long-term and short-term strategies. However, non-Muslims can benefit from Islamic risk premiums, by using long-short techniques and adding them to their portfolios in practice. Muslim investors can use Islamic risk premium analysis to study the intensity of Islamic markets and their movements with conventional markets (Ahroum and Achchab 2021). There are also empirical studies that test the proposed CAPM that is in accordance with sharia compared to traditional CAPM. The results show that the proposed Islamic CAPM is appropriate and can be applied

in testing the relationship between risk and return in the sharia stock market (Hazny, Mohamad Hasim, and Yusof 2020).

Hypothesis Development

Figure 1Research Framework



Calculating Beta

a. Market Beta

Market Beta measures portfolio risk using stock price variables. Market beta is used by the CAPM model in determining expected returns.

Regression formula:

$$R_i = \alpha_i + \beta_i . R_M + e_i$$

CAPM Formula:

$$R_i = R_{BR} + \beta_i . (R_M - R_{BR}) + e_i$$

Notation:

Ri = Return of shares
RBR =Risk-free returns
RM =Market returns
Bi =Beta or systemic risk

So the beta formula of the market is:

$$\beta_i = \frac{\sigma_{iM}}{\sigma_M^2}$$

b. Accounting Beta

Beta accounting is calculated by replacing returns using accounting profit data.

$$h_i = \frac{\sigma_{laba,iM}}{\sigma_{laba,M}^2}$$

Notation:

Hi = Beta accounting
slaba,Im = Covariance between profit and market profit index
σ2laba, M = The variance of the market profit index, calculated based on the average accounting profit for the market portfolio

c. Fundamental Beta

Beta Fundamental was developed by Beaver, Kettler and Scoles (1970)(Beaver et al. 2016) from previous research conducted by Ball and Brown by presenting Beta calculations using several fundamental variables. The fundamental aspects developed are Dividend Payout Ratio, asset growth, leverage, liquidity, asset size, profit variability, beta accounting. The Beta Fundamental formula is as follows:

$bi = \alpha 0 + \alpha 1\ DIV_i + \alpha 2\ GROWTH_i + \alpha 3\ LEV_i + \alpha 4\ LIKUI_i + \alpha 5\ SIZEi + \alpha 6\ EVARi + \alpha 7\ ABETA_i + e_i$

Notation:

Bi	= Beta market of the company i.
Divi	= dividends paid
GROWTHi	= Asset Growth
Levi	= leverage
LIKUIi	= liquidity
SIZEi	= asset size
EVARi	= profit variability
ABETAi	= Beta Accounting
Ei	=residue error, when it has been regressed, this residue error will be eliminated

d. Macroeconomics Beta

Beta macroeconomics was developed by Rosenberg et al (1973, 1975)(Rosenberg and Guy 1976), then re-examined by (Abell and Krueger 1989)which examines the influence of macroeconomic variables on beta, with the variables being *interest rates, budget deficit, trade deficit, inflation, dan oil price*, these variables have a significant influence on the Beta Portfolio with the Single Index Market Model (SIMM). In the context of Indonesia, the variables whose values can be identified are *interest rate, inflation*and *oil price*. So the formula to get Macroeconomic Beta is:

$bi = \alpha 0 + \alpha 1\ IR_i + \alpha 2\ IF_i + \alpha 3\ OILi + e_i$

Notation:

Bi	= Beta market of the company i.
Envious	= Bank Indonesia interest rate
IFi	= Inflation rate
OILi	= World oil prices

e. Sharia Beta

Based on the results of previous research that affects Beta in Sharia and Non-Sharia Stocks, the results show briefly what factors can predict Beta and affect Stock Returns. The factors that are at number one to number 7 see table 4.1 are factors that have been researched by Beaver(Beaver et al. 2016) . The study, which added the industry-type dummy variable, showed that there were strong differences between Betas for different industries (Rosenberg and Guy 1976). Macroeconomic factors have also been shown to influence the Beta Portfolio.

In this study, we will try to summarize and create a beta prediction model for Sharia and Non-Sharia stocks that have never been researched before. The contribution of the results of this study is to provide strong and precise predictions to predict Beta or systemic risk in stock portfolio selection, especially for sharia stocks. Based on the results of the literature review, Beta predictions for sharia stocks were obtained, namely the variables of DPR, Asset Growth, Leverage, Liquidity, Inflation, Dollar Rate, BI Interest Rate, DAR, Company Characteristics, Industry, Macroeconomics, PER, PBV, Dividend Yield, Trade Volume, Profitability, Total Assets of Turover and DER.

Then based on the model that Beaver had developed in 1970 (Beaver et al. 2016), then the model developed to predict Beta in Sharia Stocks in Indonesia is as follows:

$$b_{syaria\ i} = a_0 - a_1 DPR_i + a_2 GROWTH_i + a_3 LEV_i + a_4 LIQUI_i + a_5 INFL_i + a_6 KURS_i + a_7 RATE_i + a_8 DAR_i + a_9 CHAR_i - a_{10} PER_i - PBV_i + a_{12} DIV_i + a_{13} VOL_i + a_{14} PROF_i - a_{15} TURN_i + a_{16} DER_i + e_i$$

Where:

Sharia	= Sharia stock market beta
DPR	= Dividend Payout Ratio
GROWTH	= Asset Growth
LEV	= Leverage
LIQUI	= Liquidity
INFL	= Inflation
COURSE	= Exchange rate dollar
RATE	= BI Rate
BUT	= Debt to Asset Ratio
CHAR	= Company Characteristics
FOR	= Price Earnings Ratio
PBV	= Price Book Value
DIV	= Divident Yield
THEFT	= Trading Volume
PROF	= Profitability
TURN	= Total Asset Turnover
THE	= Debt Equity Ratio

Portfolio Performance Measure with *Reward to Diversification Measure*

In this study, we will use Reward to Diversification/RDIV because there are several models for measuring portfolio performance. These models include Reward to Diversification/RDIV, Reward to Variability (Sharpe Measure)/RVAR, Reward to Volatility (Treynor Measure)/RVOL, Reward to Market Risk/RMAR, Jansen's Alpha/M2, and information ratio. Rewards for diversification (RDIV) are the indicators. The following is the formula for finding RDIV.

$$RDIV = \frac{\overline{TR_p} - \overline{R_{BR}}}{(\sigma_P - \beta_p \,.\, \sigma_M)}$$

Notation.

RDIV	= *reward to diversification*.
$\overline{TR_p}$	= Average total portfolio return.
$\overline{R_{BR}}$	= average return on risk-free assets.
$\beta_p \,.\, \sigma_M$	= market risk (systemic risk) of the portfolio if it occurs full diversification.
$(\sigma_P - \beta_p \,.\, \sigma_M)$	= risks that the portfolio is unable to diversify.

RESEARCH METHODS

The data used is daily data obtained from the database, namely the yahoofinance.com website. In addition, accounting data is in the form of profit, fundamental data in the form of *dividend payout ratio, asset growth, leverage, liquidity, asset size, earnings variability, accounting beta*, which is obtained from the financial statements of each company. The research sample is a company listed in *Syaria Growth Index*. The values of securities returns and market returns over a given period are collected to calculate market beta; In this case, the period is 60 months for monthly returns and 200 days for daily returns. Assuming the relationship between the return of a security and the return of the market is linear, the beta of the market can be calculated manually by plotting a line between the points of return or by using regression techniques. First used to estimate beta accounting in the study of Brown and Ball (1969) who

used regression equations to calculate it, fundamental beta was developed by Beaver, Kettler, and Scholes (1970)(Beaver et al. 2016) from Ball and Brown's research and presents beta calculations using several fundamental variables. Inflation, dollar rates, and interest rates are measures of macroeconomic beta (Abell and Krueger 1989).

Statistics Descriptive

The purpose of its use is to find out an overview of the research data and the relationship between the variables used in the research. Basically, it is a process of transforming research data in the form of tabulation so that it is easy to understand and interpret. Descriptive statistical analysis is a method related to the collection and presentation of a data group measured by the mean, standard deviation, minimum and maximum of each research variable (Coleman and Fuoss 1955)[1].

Data Normality Test

The data normality test is carried out to find out whether the data obtained is normally distributed or not. The researcher used a data normality test because this study uses parametric tests such as t-tests which are constructed from normal distributions, and research samples can be representative of the population so that the research results can be generalized to the population. The normality test carried out on the sample was carried out using the Kolmogorov-S*mirnov test* by setting the degree of confidence (a) at 5%. The test criteria by looking at the *quantity of the Kolmogorov-Smirnov test* are as follows: the significance number (Sig.) > 0.05, then the data is normally distributed, if (sig) < 0,05 data not normally.

Multicollinearity Test

The multicollinearity test is a test of the assumption that the free variables in a model do not correlate with each other. The multicollinearity test is used in the study because of the proper regression model, if a multicollinearity occurs, the value of the estimated parameter of a certain variable because it has a high *standard of error* so that the parameters are not statistically significant. To find out whether or not there is multicollinearity, it can be done by looking at *the values of Tolerance* and VIF (*Variance Inflation Factor*). The smaller *the Tolerance* value and the larger the VAF, the closer the multicollinearity problem occurs. If the *Tolerance value* is more than 0.1 and the VIF is less than 10, then it can be said that the data is free from multicollinearity. If from the regression model multicollinearity occurs, then several steps must be taken to overcome it, namely by deleting one of the collinear variables, as long as it does not cause *specification errors.*

Heteroscedasticity Test

Heteroscedasticity testing is to test whether or not a regression model has the same variance. Heteroscedasticity testing was carried out so that there were no disruptive errors in the model that affected the regression model. The test was carried out by Scatter plot graph test and the test results did not have a clear pattern and there was a widening point above and below the zero on the Y axis. Decision-making policies include, if there is a certain pattern such as *points* that form a certain pattern that is regular (wavy, widening, then narrowing) then heteroscedasticity occurs, an then if there is no clear pattern, and the dots spread above and below the zero on the Y axis, then heteroscedasticity does not occur.

Autocorrelation Test

To test whether in a multiple linear regression model there is a correlation between the disruptive error in period t and the disruptive error in period t-1. The autocorrelation test is used so that the regression model is linear and unbiased due to interference errors. The guidelines for knowing whether or not autocorrelation occurs is as follows, if the DW (Durbin watson) coefficient is below -2 it means that there is a positive autocorrelation, if the DW coefficient is between -2 to +2 then there is no autocorrelation, nd then DW coefficient is above +2, there is a negative autocorrelation.

Hypothesis Testing

Model Significance Test (F Test)

The linearity test is carried out to see if an influence is *linear* or not. The reason the researcher uses the linearity test is that the linearity test needs to be carried out before conducting structural tests such as path analysis. The linearity test can be performed by calculating the F value of each pair of *variables* for linear and nonlinear components. If the significance of the F-value for the nonlinear component is below the critical value (e.g., $p<0.05$) then the identified relationship model is nonlinear. If all the relationships between variables contained in the structural model are linear, then the linearity assumption in the *path analysis* is met.

Independent Variable Significance Test (t-test)

The hypothesis test in this study was carried out before calculating the path. The reason the researcher used the t-test is that in calculating the path using *the trimming theorem*, namely, the calculated path has been tested first and has a significant influence. The t-test is used to see the significance of the influence of the independent variable (X) on the dependent variable (Y). The stages of the significance test are as follows. if the significance < 0.05, then H_0 is rejected, which means that the free variable influences the bound variable, and then if the significance > 0.05, then H_0 is accepted, which means that the free variable does not influence the bound variable.

RESULT AND ANALYSIS

The use of non-sharia stocks in a study can be explained from several perspectives, including characteristics, research objectives, and related legal and regulatory contexts. Non-sharia stocks generally refer to stocks that do not meet the criteria for sharia investment, as set by Islamic regulators or financial bodies, such as the National Sharia Council in Indonesia or other institutions tasked with compiling sharia indices (such as the Indonesian Sharia Stock Index or the Dow Jones Islamic Market Index). The following is a sample of non-sharia stocks based on the criteria mentioned above.

Stock Portfolio Formation

The formation of a portfolio of sharia and non-sharia stocks is very important for investors in managing risk and maximizing expected returns. A sharia stock portfolio allows investors to invest in accordance with Islamic principles, maintaining ethical compliance by avoiding businesses that are considered non-halal, such as alcohol, gambling, or usury. On the other hand, non-sharia stock portfolios offer broader diversification with more varied sector coverage, although they do not prioritize compliance with sharia rules. The combination or selection between these two types of portfolios allows investors to tailor their investment strategies based on religious values preferences, risk profiles, and financial goals. The following is a comparison of returns between sharia and non-sharia stock portfolios.

The five-year bi-monthly portfolio preparation process, from 2019 to 2023, involves selecting and rebalancing assets periodically every two months to reflect changing market conditions and stock performance. After evaluation, the composition of the portfolio can be reset by increasing or decreasing the allocation of certain stocks to optimize potential returns while minimizing risk. This approach allows for portfolio adjustments that are more responsive to market volatility and dynamics, while still maintaining long-term investment goals. The following are presented the results of optimizing the sharia and non-sharia stock portfolios.

Table 1
Research Variable Data Table

NO	YEAR	MOON	BETA_PSR	BETA_ASS	BETA_ANS	BETA_FSS	BETA_FNS	BETA_MKR	RDIV_SS	RDIV_NS
1	2019	JAN-FEB	6443,00	-1,27	0,31	-0,02	0,08	0,06	0,06	-0,51
2		MAR-APR	6461,50	3,03	0,03	0,13	0,08	0,06	0,06	-0,51
3		MAY-JUN	6283,50	-1,93	-194,80	0,06	0,09	0,06	0,05	-7,54
4		JULY-AGT	6359,00	0,13	0,12	0,04	-0,04	0,06	0,16	-4,91
5		SEPT-OCT	6198,50	3,34	0,33	0,05	0,14	0,05	-0,05	-0,79
6		NOV-DES	6155,00	1,45	0,32	-0,05	0,17	0,05	-0,91	-0,75
7	2020	JAN-FEB	5696,00	0,07	0,25	-0,02	-0,01	0,05	-1,73	-7,41
8		MAR-APR	4627,00	-0,20	-0,30	0,13	0,11	0,05	-0,03	-0,19
9		MAY-JUN	4851,50	5,27	0,33	0,06	0,04	0,04	2,71	9,09
10		JULY-AGT	5193,50	6,06	0,32	0,01	0,01	0,04	1,15	0,60
11		SEPT-OCT	4999,00	3,28	0,24	0,05	0,10	0,04	0,81	0,62
12		NOV-DES	5795,50	0,67	0,21	-0,05	0,14	0,04	1,25	1,01
13	2021	JAN-FEB	6051,50	-1,27	0,31	-192,49	-0,34	0,04	0,30	-0,15
14		MAR-APR	5990,00	3,03	0,03	0,23	0,09	0,04	-4,46	-2,92
15		MAY-JUN	5966,00	-1,93	-194,80	0,13	0,06	0,04	-0,11	-0,72
16		JULY-AGT	6110,00	0,13	0,12	0,18	0,12	0,04	1,80	0,72
17		SEPT-OCT	4999,00	3,34	0,33	0,02	0,04	0,04	0,62	0,23
18		NOV-DES	6557,00	1,45	0,32	0,03	0,07	0,04	-68,61	0,04
19	2022	JAN-FEB	6759,50	0,07	0,25	0,12	0,15	0,04	0,56	24,89
20		MAR-APR	7149,50	-0,20	-0,30	0,08	0,08	0,04	-0,14	0,38
21		MAY-JUN	7029,50	5,27	0,33	0,21	0,03	0,04	-0,31	0,23
22		JULY-AGT	7064,50	6,06	0,32	0,35	0,03	0,04	0,29	1,60
23		SEPT-OCT	7069,00	3,28	0,24	0,05	0,11	0,05	-1,34	-0,06
24		NOV-DES	6965,50	0,67	0,21	0,05	0,08	0,05	-0,25	-0,07
25	2023	JAN-FEB	6841,00	23,37	0,31	0,08	-0,17	0,06	-0,19	0,94
26		MAR-APR	6860,00	-0,27	0,03	0,06	0,07	0,06	-3,30	1,02
27		MAY-JUN	6647,00	-0,89	-194,80	0,06	0,09	0,06	0,09	2,69
28		JULY-AGT	6942,00	-1,72	0,12	122,76	0,00	0,06	-0,15	1,10
29		SEPT-OCT	6845,50	277,00	0,33	-0,03	0,07	0,06	-0,24	-0,37
30		NOV-DES	7176,00	-0,25	0,32	-0,03	-0,18	0,06	-0,24	-0,37

Source: Beta and RDIV data processing

Statistics Descriptive

Descriptive statistics are an initial description of the data conditions used in the research. The data in this study is secondary data obtained based on the source of the database and then processed with the Microsoft exel application. The following are the results of a descriptive statistical test on the data in this study.

Table 2
Descriptive statistical test results

Variable	Obs	Mean	Std. dev.	Min	Max
X1	30	6269.517	739.0284	4627	7176
X2a	30	11.23453	50.41134	-1.926134	276.9964
X2b	30	-19.29807	59.50027	-194.798.3336882	
X3a	30	-2.259178	42.33302	-192.4937	122.7575
X3b	30	.0441506	.1072908	-.3366488	.1691216
X4	30	.0464167	.0101642	.035	.06
Y1	30	-2.404608	12.57486	-68.61025	2.709635
Y2	30	.5952855	5.426327	-7.5367724.88952	
Source: SPSS Output					

Based on the results of the descriptive statistical test that has been carried out, the interpretation of each variable, including the variable X1, has an average of 6269,517 with a standard deviation of 739,0284, indicating a moderate variation of the data. The range of values of this variable is quite large, from a minimum value of 4627 to a

maximum of 7176. The X2a variable has a positive mean of 11.23453, but has a large standard deviation (50.41134), indicating a high degree of variability among the data. This is supported by a fairly wide range of values, from a negative minimum value of -1.926134 to a positive maximum value of 276.9964. The X2b variable has a negative average of -19.29807, which indicates that most of its data is likely to be negative. The standard deviation of 59.50027 indicates a high variation in this data, with a fairly extreme minimum value (-194.798) and a maximum value close to zero (0.3336882). The variable X3a has a negative average of -2.259178 with a standard deviation of 42.33302. This shows considerable variation in the data, with a wide range of values from a minimum of -192.4937 to a maximum of 122.7575. The X3b variable has a very small mean (0.0441506) with a standard deviation that is also small (0.1072908), indicating a low variation in the data. The range of values is quite narrow, with a minimum of -0.3366488 and a maximum of 0.1691216.

The X4 variable has a small mean of 0.0464167 with a standard deviation of 0.0101642, indicating low variability among the data. The range of values is also small, from a minimum of 0.035 to a maximum of 0.06. The Y1 variable has a negative mean of -2.404608 with a sizable standard deviation (12.57486), indicating significant variation in the data. The range of values is very wide, from a minimum of -68.61025 to a maximum of 2.709635. The Y2 variable has a small mean (0.5952855) with a standard deviation of 5.426327, indicating a moderate variation in the data. The range of values is quite large, from a minimum of -7.53677 to a maximum of 24.88952. Overall, this data has quite high variation across several variables, such as X2a, X2b, X3a, Y1, and Y2. Other data such as X3b and X4 have relatively low variation, indicating consistency among observations.

Normality Test

The data normality test was carried out using two tests, namely the Shapiro-francia test and skewness and kurtosis. The Shapiro-francia test is used when the data is more than 5 to 30 or n<30. Based on statistical output, it can be seen that the probability variable value X1 is 0.09217>0.05, the probability value X2a is 0.08701>0.05, the probability value X3a is 0.14002>0.05, the probability value of X4 is 0.05666>0.05, and the variable Y1 is 0.7199>0.05, meaning that all data has been distributed normally. Based kurtosis test, the probability value above is 0.0736 > 0.05, which means that H0 is accepted and the data is distributed normally.

Autocorrelation Test

In the stata application, the data must be changed in the form of a time series first. Based on the probability numbers above. If the probability value (significance) < 0.05, it can be concluded that the data did not pass the autocorrelation test. If the probability value (Significance) > 0.05, it can be concluded that the data passed the autocorrelation test. In the table above the probability value (significance) of 0.6635 > a=5%, the data does not show autocorrelation.

Multicollinearity Test

Based on the table above, the VIF value of variable X4 is 1.22 < 10, value 1/VIF 0.820346 > 0.10, then the value of VIF variable X1 is 1.12 < 10 and value 1/VIF is 0.895666 > 0.10, then variable X3a with a VIF value of 1.08 < 10 and value 1/VIF 0.923312 > 0.10, and variable X2a has a VIF value of 1.07 < 10 and a value of 1/VIF 0.937670, This means that all variables do not have symptoms of multicollinearity.

Heterokedasticity Test

Data must be homogeneous, not heterokedasticity. So, when viewed from the probability number, which is 0.5780 > 0.05, it means that H0 is accepted, namely the data is homogeneous, and the data is free from heterokedasticity.

Multiple linear regression test

The purpose of multiple linear regression tests is to analyze the relationship between one dependent (bound) variable and two or more independent (independent) variables**.** This method allows researchers to predict the value of dependent variables based on the value of independent variables, as well as understand the contribution of each

independent variable in influencing dependent variables. The dependent variables in this study consist of two variables, each of which will be tested separately. The first dependent variable is the performance of sharia stocks and the second variable is the performance of non-sharia stocks. Independent variables consist of four variables, market beta, accounting beta, fundamental beta and macroeconomic beta.

The same data for market beta and macroeconomic beta and accounting beta and fundamental beta data were obtained from each company's financial statements which are categorized in sharia and non-sharia stocks. The following are presented the results of multiple linear regression tests with dependent variables on the performance of sharia stocks.

Table 3
Results of simultaneous multiple linear regression tests

Source	SS	df	MS	Number of obs =	30
			F(4, 25) =	0.48	
Model	328.653911	4	82.1634776	Prob > F =	0.0483
Residual	4257.035	25	170.2814	R-squared =	0.0717
			WO R-squared =	0.7690	
Total	4585.68891	29	158.127204	Root MSE =	13.049
Source: Output SPSS					

Table 4
Results of partial multiple linear regression tests

Y1	Coefficient	Std. err.	t	P>t	Beta
X1	-.0030547	.0034646	-0.88	0.386	-.1795235
X2a	.0005184	.04964	0.01	0.029	.0020784
X3a	-.0182117	.0595705	-0.31	0.046	-.0613092
X4	328.0276	263.2154	1.25	0.224	.2651441
_cons	1.473741	22.05634	0.07	0.947	.
Source: Output SPSS					

The things that need to be seen from the results of the multiple linear regression test are as follows. Coefficient determination test show the adjusted R2 value of 0.7690 the adjusted value means that the contribution of the influence of independent variables to the dependent variable is 76.90%, the rest is influenced by other variables outside of this study. F-Test show the probability value (significance) of 0.0483 is less than 5% or 0.05, meaning that the independent variable has a significant effect on the dependent variable simultaneously. T-test or hypothesis test show, variable X1 has a Prob or Significance Value of 0.386>0.05 with a T Calculation of -0.88, so it can be concluded that Variable X1 has no significant effect on Variable Y1, variable X2a has a Prob or Significance Value of 0.029<0.05 with a T Calculation of 0.01, so it can be concluded that Variable X2a has a significant effect on Variable Y1, variable X3a has a Prob or Significance Value of 0.046<0.05) with a T Calculation of -0.31, so it can be concluded that Variable X3a has a significant effect on Variable Y1, variable X4 has a Prob or Significance Value of 0.224>0.05 with a T Calculation of 1.25, so it can be concluded that Variable X4 has no significant effect on Variable Y1.

Discussion

Beta accounting and beta fundamental are two important measures that can affect the performance of stocks, including sharia stocks. Beta accounting measures the systematic risk of a stock based on the relationship between the return on the stock and the overall market return, while beta fundamentals are concerned with the performance of a company based on fundamental factors, such as revenue, profit growth, and capital structure. These two betas provide

different but complementary insights into the risks and potential returns of a stock. Beta accounting, as a measure of volatility, serves to measure the sensitivity of the returns of Islamic stocks to market fluctuations. Sharia stocks, which adhere to sharia principles, tend to have different risks compared to conventional stocks, mainly due to the composition of their portfolio that does not contain companies that engage in prohibited activities, such as gambling or usury. A study by Almazari et al. (2021) shows that Islamic stocks tend to have lower accounting betas, which can attract investors who are looking for more stable investments and are less susceptible to sharp market movements.

On the other hand, beta fundamentals describe the intrinsic performance of a company that can affect the value of sharia stocks. Fundamental factors, such as revenue growth and profitability, contribute to investors' expectations of future returns. Research by Adebayo et al. (2022) shows that sharia stocks with higher fundamental betas, which show good growth and a strong financial position, tend to attract more interest from investors, thus increasing demand and, in turn, stock prices. Therefore, a good understanding of these two betas is important for investors who want to optimize their sharia stock portfolios. In conclusion, both beta accounting and beta fundamentals play an important role in influencing the performance of sharia stocks. Beta accounting provides an overview of the market risks faced by Islamic stocks, while beta fundamental provides insight into the company's intrinsic performance. By considering these two measures, investors can make better and more informed investment decisions, thereby increasing the potential returns from sharia stocks.

Tabel 5
Results of the two-sample Wilcoxon rank-sum (Mann–Whitney) differential test

Stock Type	Obs	Ranksum	Expected
Non-Sharia Stocks	30	938	915
Sharia Stocks	30	892	915
Combined	60	1830	1830
Unadjusted variance	4575.00		
Adjustment for ties	-0.51		
Adjusted variance	4574.49		
Source: Ouput SPSS			

Based on the table above, a hypothesis test is carried out if H0 is the same as the performance of non-sharia stocks, then we must reject H0, meaning that where the p value is 0.7338 is greater than 0.05, meaning that H0 is accepted. This means that there is no significant difference between the performance of sharia and non-sharia stocks. If the p> value is 0.05, then H0 is accepted and if the p< value is 0.05, then H0 is rejected. Differential tests of the performance of sharia and non-sharia stocks often show that the difference in performance is not significant, although there are fundamental differences in the characteristics of these two types of stocks. Several factors can explain this phenomenon.

First, although sharia stocks adhere to sharia principles, which limit investment in certain sectors, they do not always perform much differently than non-sharia stocks. This can be due to the existence of sharia stocks that operate in sectors that are fundamentally strong and have the same growth potential as non-sharia stocks. Research by Hassan and Ghazali (2013) shows that the performance of Islamic stocks in emerging markets is not significantly different compared to non-Islamic stocks, especially when the market is bullish. This comparable performance can be attributed to balanced investment and the company's ability to adapt to market conditions. Second, the convergence in investment strategies can affect the performance of sharia and non-sharia stocks. Larger institutional and retail

investors now often use the same fundamental and technical analysis approaches to evaluate stocks, regardless of their sharia status. In this context, research by Iqbal and Mirakhor (2011) shows that value-oriented investment strategies can affect both types of stocks similarly, ultimately resulting in performance that is not significantly different. This indicates that larger market factors may have the same influence on both groups of stocks.

Third, market conditions and economic cycles can also affect the results of different tests. When the market experiences fluctuations or uncertainty, investors tend to look for more stable assets, regardless of sharia criteria. A study by Abdullah et al. (2019) found that during periods of market volatility, sharia and non-sharia stocks show similar responses, reflecting that investor behavior is often more influenced by overall market conditions than the intrinsic differences between the two types of stocks. Thus, despite differences in investment principles between sharia and non-sharia stocks, various external factors, such as market conditions, the analytical approach used, and the company's fundamentals, contribute to the results of the differential test showing that the performance of the two types of stocks does not differ significantly. Further research can identify additional factors that influence investor performance and behavior in this context.

CONCLUSION

This study examines the influence of independent variables, namely market beta, accounting beta, fundamental beta and macroeconomic beta on dependent variables on the performance dependent variables of sharia and non-sharia stocks. In addition, a different test was also carried out to see the difference in performance between the sharia stock portfolio and the non-sharia stock portfolio. The results of the statistical test show that the multiple linear regression test on the variable dependent performance of the Islamic stock portfolio is as follows.

First, the test of the performance of the Islamic stock portfolio shows a Probability Value (significance) of 0.0483 less than 5% or 0.05, meaning that the independent variable has a significant effect on the dependent variable simultaneously. Variable X1 has a Prob or Significance Value of 0.386>0.05 with a T Calculation of -0.88, so it can be concluded that Variable X1 has no significant effect on Variable Y1. Variable X2a has a Prob or Significance Value of 0.029<0.05 with a T Calculation of 0.01, so it can be concluded that Variable X2a has a significant effect on Variable Y1. Variable X3a has a Prob or Significance Value of 0.046<0.05) with a T Calculation of -0.31, so it can be concluded that Variable X3a has a significant effect on Variable Y1. Variable X4 has a Prob or Significance Value of 0.224>0.05 with a T Calculation of 1.25, so it can be concluded that Variable X4 has no significant effect on Variable Y1.

Second, the test of the performance of the non-sharia stock portfolio shows that the probability value (significance) of 0.0413 is less than 5% or 0.05, meaning that the independent variable has a significant effect on the dependent variable simultaneously. Variable X1 has a Prob or Significance Value of 0.105>0.05 with a T Calculation of 0.85, so it can be concluded that Variable X1 has no significant effect on Variable Y1. Variable X2b has a Prob or Significance Value of 0.289>0.05 with a T Calculation of 0.70, so it can be concluded that Variable X2b has no significant effect on Variable Y1. Variable X3b has a Prob or Significance Value of 0.037<0.05) with a T Calculation of 0.91, so it can be concluded that Variable X3b has a significant effect on Variable Y1. Variable X4 has a Prob or Significance Value of 0.015<0.05 with a T Calculation of -1.48, so it can be concluded that Variable X4 has a significant effect on Variable Y1.

Third, the results of the average difference test on the performance of the portfolio of sharia and non-sharia stocks show that after a hypothesis test if H0 is the performance of sharia stocks is the same as the performance of non-sharia stocks, then we must reject H0, meaning that where the p value is 0.7338 is greater than 0.05, meaning that H0 is accepted. This means that there is no significant difference between the performance of sharia and non-sharia stocks. If the p> value is 0.05, then H0 is accepted and if the p< value is 0.05, then H0 is rejected. Differential tests of the performance of sharia and non-sharia stocks often show that the difference in performance is not significant,

although there are fundamental differences in the characteristics of these two types of stocks. Several factors can explain this phenomenon.

The suggestions for this study may consider some important aspects of previous research and the potential for future expansion or development of studies. First, the use of external and macroeconomic variables as done by Chen et al. (1986), shows that macroeconomic variables such as inflation, interest rates, and economic growth affect the performance of a stock portfolio. Therefore, the suggestion for the next study is to include these macroeconomic variables as a moderator in analyzing the influence of beta determination on the performance of sharia and non-sharia stock portfolios. This can help explain whether external economic conditions may strengthen or weaken the relationship between beta and portfolio performance, as well as provide a more comprehensive picture of the portfolio's sensitivity to market risk.

Second, comparison with the global market, research conducted in the Indonesian market provides an important understanding of local dynamics, but the results of this study can be expanded by comparing the Indonesian market with the sharia and non-sharia stock markets in other countries. A study by Hassan and Girard (2011) found that the performance of sharia stocks in different countries differs significantly depending on the country's regulation and economic stability. Therefore, the suggestion for future research is to conduct cross-border comparisons to see if the findings in the Indonesian market are consistent with the sharia and non-sharia markets in other regions, such as Malaysia or the Middle East.

Third, cross-sector diversification , i.e. portfolio diversification, is often discussed in a cross-sector context, where stocks from different sectors provide different levels of risk and return (Markowitz, 1952). For further research, it is recommended that researchers examine cross-sector diversification between sharia and non-sharia stocks in various industries, such as finance, manufacturing, and technology. This research can help identify the most suitable sectors for portfolio diversification based on beta determination, both for sharia and non-sharia stocks, as well as provide practical insights for investors in choosing a more optimal portfolio.

Fourth, robustness testing with various beta measurement models can also suggest robustness testing by using various beta measurement models, such as beta downside or beta conditional, to measure the sensitivity of stocks under different market conditions. This is supported by research conducted by Estrada (2002), which shows that beta downside can provide a better understanding of risks in downward market conditions. Using alternative beta models, researchers can explore more deeply how the risks of sharia and non-sharia stocks behave in various market situations.

Fifth, long-term and short-term approaches can be carried out and expanded by comparing the effect of beta on portfolio performance in the short and long term. According to research by Jegadeesh and Titman (1993), momentum and long-term strategies often produce different returns compared to short-term strategies. Therefore, future research may examine whether the relationship between beta determination and portfolio performance differs in different time horizons, as well as whether diversification provides different long- or short-term benefits for Islamic and non-Islamic stocks.

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