



The Effect of Price Earning Ratio, Dividend Payout Ratio, and Debt to Equity Ratio on Firm Value in Non-Cyclical Consumer Companies

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Abstract: The growth in the number of sharia investors and the increase in the market capitalization of sharia stocks in Indonesia reflect a high interest in Islamic-based investments, particularly in the defensive primary consumer goods sector (non-cyclical consumer goods). Amid this trend, it is important to understand the fundamental factors that influence company value, so that investors can make more rational decisions and company management can increase their stock market value. This study aims to examine the effect of Price to Earnings Ratio (PER), Dividend Payout Ratio (DPR), and Debt to Equity Ratio (DER) on company value, proxied by Price to Book Value (PBV), in non-cyclical consumer sector companies consistently listed in the Indonesian Sharia Stock Index (ISSI) during the 2016–2020 period. The study sample consisted of 15 companies with a total of 75 panel data observations. The analysis was conducted using panel data regression with fixed effects. The results showed that DER had a significant positive effect on company value, whereas PER and DPR did not. Simultaneously, these three variables influenced company value. These results reinforce signaling theory, where a high debt structure can be perceived as an indicator of management confidence in the company's prospects. This research contributes to the growing literature on Islamic finance, focusing on strategic and stable sectors in the capital market.

Keywords: company value; debt to equity ratio; dividend payout ratio; price to earning ratio; Sharia capital market.

Introduction

The development of the Islamic capital market in Indonesia in recent years marks a crucial phase in the journey of the national financial system. Its consistent growth reflects a new dynamic in how society understands and practices investment activities. This phenomenon demonstrates the connection between modern economic needs and Islamic moral principles that emphasize balance, justice, and social responsibility. Within the framework of Islamic economics, investment is not only interpreted as an effort to accumulate wealth but also as a means of realizing broader public welfare. This establishes the Islamic capital market as an economic space driven not solely by profit but also by values of sustainability and moral integrity.

Official statistics from the Financial Services Authority (OJK) show that from 2016 to 2021, the number of Sharia-compliant stock investors surged from 12,283 to over 91,000, with

an average annual growth rate of 50 percent (Otoritas Jasa Keuangan, 2021). This significant increase reflects not only an expansion in the number of participants but also a shift in public awareness of the importance of halal, transparent, and equitable investments. This phenomenon indicates that Sharia principles are now being internalized in modern economic practices, which have previously been dominated by a capitalist paradigm. People are beginning to understand that economic success is not solely measured by returns on investment, but rather by the extent to which economic activities align with humanitarian values and social balance.

Besides the growing number of investors, another indicator strengthening the position of the Islamic capital market is its contribution to national market capitalization. Data from the Indonesia Stock Exchange (IDX) shows that more than half of the total market capitalization comes from stocks included in Islamic indices, such as the Jakarta Islamic Index (JII) and the Indonesian Islamic Stock Index (ISSI) (Indonesia Stock Exchange, 2022). This achievement indicates that Islamic-based stocks are no longer on the fringes of the national financial system but have become the backbone supporting market stability. This phenomenon illustrates a profound transformation in Indonesia's economic landscape, where Islamic values are no longer an alternative but have become part of mainstream finance, shaping the direction of investment policies and behavior.

This transformation is also intertwined with a global paradigm shift regarding ethics in finance. In countries with large Muslim populations, such as Malaysia, the United Arab Emirates, and Saudi Arabia, the Islamic finance sector is showing parallel developments with growing global awareness of sustainable and ethical investing practices. In this context, the Islamic financial system is considered an alternative model capable of bridging the need for economic efficiency with social and environmental responsibility (Čihák & Hesse, 2010). Principles such as the prohibition of usury, the necessity of risk sharing, and distributive justice are the foundations that distinguish Islamic finance from conventional financial systems, which often give rise to structural inequalities.

Indonesia's position on the global map of Islamic finance is becoming increasingly important. With the world's largest Muslim population, Indonesia has unique demographic and cultural potential to become the center of gravity for global Islamic finance. This potential is reinforced by government policies that position the Islamic economy as a pillar of national development. Strategic steps such as the establishment of the National Committee for Islamic Economics and Finance (KNEKS), the issuance of sovereign sukuk (Islamic bonds), and strengthening Islamic financial literacy demonstrate the government's commitment to building a financial ecosystem based on Islamic principles. Through this framework, the Islamic capital market serves not only as a financial instrument but also as a mechanism for equitable distribution of prosperity and economic inclusion.

From a theoretical perspective, the integration of Sharia values into the capital market changes the fundamental orientation of the financial system. The concept of profit-loss sharing replaces the logic of fixed interest rates, creating a fairer distribution of risk between investors and issuers. This principle reflects the idea that economic prosperity should grow together, not at the expense of others (Chapra, 2008). This approach aligns with the idea of a just economy that rejects exploitation and places human values at the core of economic transactions. Thus, the Sharia capital market can be viewed not merely as a financial innovation, but as a practical manifestation of Islamic economic ethics in a modern context.

From a social perspective, the increasing participation of retail investors in sharia-compliant instruments indicates a new awareness of the importance of ethical financial literacy. This phenomenon is closely related to increased access to digital technology, which allows people to interact directly with the capital market. Online investment platforms that accommodate sharia-compliant stocks provide a space for the wider community to participate in a financial system previously considered exclusive. However, this participation is not passive but is accompanied by an understanding of the moral dimensions of economic activity. In this context, the sharia-compliant capital market plays an educational role: it teaches that profits must be balanced with responsibility, and that all forms of economic growth must be rooted in distributive justice (Dusuki & Abdullah, 2007).

The involvement of increasingly diverse investors, including younger generations and

professional groups, has also transformed the psychological landscape of the capital market. Sharia-compliant investing is now understood as a new financial lifestyle that combines spiritual values and economic pragmatism. The concept of "halal investment" is no longer simply a religious choice, but rather part of a global ethical consciousness that demands transparency, sustainability, and social accountability. At this level, the Islamic capital market in Indonesia plays a dual role as a productive economic vehicle and as a symbol of moral evolution in the contemporary financial world.

The global context also strengthens Indonesia's position as a model for modern Islamic economic practices. The projected growth of the global Islamic finance industry, reaching USD 3.69 trillion by 2024, demonstrates that this system has become a vital part of the international financial architecture (Saputra & Hafil, 2020). In this context, Indonesia is not only a consumer of the Islamic financial system but also an active contributor through the development of capital market instruments such as sukuk, Islamic mutual funds, and globally recognized Islamic stock indices. The active involvement of institutions such as the Financial Services Authority (OJK), Bank Indonesia, and KNEKS demonstrates that Islamic finance in Indonesia is not simply a response to religious demands but rather a strategic economic policy aimed at strengthening national financial independence.

The integration of spiritual, social, and economic dimensions makes the Indonesian Islamic capital market a unique phenomenon in the global financial landscape. Its existence is inseparable from the dynamics of society, which continues to seek a balance between materiality and transcendental values. In this space, investment is no longer individualistic, but rather contains a social dimension that emphasizes the importance of solidarity and sustainability. The process of capital accumulation becomes a means of collective development that strengthens the socio-economic structure of the community. Thus, the Islamic capital market presents a new economic paradigm that combines rational efficiency with spiritual justice (Visser, 2019).

This phenomenon confirms that values-based economic growth is not a utopian ideal, but an ongoing empirical reality in Indonesia. When investors invest their capital in instruments that adhere to Sharia principles, they are building a more ethical and resilient economic ecosystem. Integrating the values of justice and sustainability into investment practices creates an economic order that is not only financially strong but also morally sound. In this context, the Sharia capital market serves as a synthesis between market logic and Islamic ethical teachings, which prioritize the common good over individual profit.

One sector that has attracted attention in this dynamic is the non-cyclical consumer goods sector, namely the primary consumer goods sector, which includes daily necessities such as food, beverages, and pharmaceuticals. This sector's relatively resilient nature to economic cycles makes it an attractive area for research on investor behavior and company valuation. Throughout various crises, the primary consumer goods sector has proven capable of maintaining income stability and solid capitalization (Ardhani et al., 2020). This resilience is intertwined with the principle of prudence, a core value in Islamic economics, where stability and sustainability are prioritized over speculative expansion. Companies in this sector are also frequently included in the Indonesian Sharia Stock Index (ISSI), indicating they have met Sharia compliance criteria, including prohibitions against usury, gambling (maysir), and excessive uncertainty (gharar).

Company value reflects how the market assesses the long-term prospects of a business entity. According to Brigham and Houston, company value is not solely the result of balance sheet or profit calculations, but rather a construct of market perception of the company's ability to create future value (Brigham & Houston, 2019). In the context of capital markets, a frequently used indicator to assess company value is Price to Book Value (PBV), which is the ratio between the stock market price and the book value per share. This ratio reflects the degree to which investors believe a company's assets can generate profits above their accounting value. A high PBV indicates market confidence in the company's prospects, while a low PBV indicates a perception of undervaluation or fundamental risk.

The PBV assessment does not stand alone but is shaped by various internal factors, including the Price to Earnings Ratio (PER), Dividend Payout Ratio (DPR), and Debt to Equity Ratio (DER). PER measures the relationship between stock price and earnings per share (EPS),

reflecting investor expectations of a company's future earnings growth potential (Rahayu & Sari, 2018). Gitman and Zutter explain that a high PER typically indicates market confidence that a company has sustainable profit prospects (Gitman et al., 2015). Meanwhile, DPR indicates the proportion of profits distributed as dividends to shareholders. This ratio not only reflects company policy but also sends a signal to the market about the stability and health of cash flow (Weston & Brigham, 1996). In the context of signaling theory, dividends serve as a non-verbal message that management believes in the sustainability of the company's earnings. DER, on the other hand, reflects capital structure, namely the balance between debt-based and equity-based funding. A healthy capital structure reflects the company's courage to take measured risks, but excessive debt can increase the risk of bankruptcy (Sartono, 2008).

The relationship between these three financial ratios and PBV has been a hot topic in the financial literature. Various empirical studies have shown inconsistent results. PER and DPR have a positive effect on PBV, while DER shows a significant negative effect (Listyawati & Ramadhan, 2017). A stable dividend policy can strengthen investor confidence in a company's value, particularly in low-risk sectors. The effect of financial ratios on PBV is not always significant, depending on industry characteristics and macroeconomic conditions. These inconsistent results indicate an interesting research gap that merits further study, particularly in the context of Sharia-compliant companies.

A distinctive characteristic of companies affiliated with the Islamic Financial System Association (ISSI) is that their financial decisions are guided not only by economic efficiency but also by Sharia compliance principles. Restrictions on the use of interest-bearing debt and the obligation to avoid investments in non-halal sectors create a unique financial structure. This allows for differences in leverage, dividend policy, and market perception of financial performance between Sharia and conventional companies. Sharia companies exhibit a weaker correlation between DER and PBV than conventional companies, as investors view the risk of interest-bearing debt as irrelevant in a Sharia context. PER and DPR remain key determinants of company value formation, even within a Sharia-compliant environment.

From a financial theory perspective, the relationship between these variables can be explained through three main approaches. First, Signaling Theory, developed by Spence (1973), views dividend policy, return-to-earnings ratios, and capital structure as signals sent by management to the market (Karasek III & Bryant, 2012). Asymmetric information between managers and investors encourages companies to use financial indicators as a means of communicating future prospects. Second, Trade-Off Theory explains how companies seek a balance between the benefits of using debt (such as tax savings) and the costs of bankruptcy (Campbell & Kelly, 1994). Third, Agency Theory highlights the potential conflict between managers and shareholders, where dividend policy or capital structure is used to suppress opportunistic behavior by managers and maintain firm value (Shapiro, 2005).

In the context of Islamic companies, these theories need to be reinterpreted. The principles of *maqasid al-shariah* (the purpose of protecting assets), maintaining justice, and preventing exploitation also direct companies to pursue not only short-term profits but also sustainable values. This means that PER, DPR, and DER are measured not only by financial efficiency but also by the extent to which these policies reflect a balance between profitability, risk, and ethics. Therefore, an analysis of the relationship between financial ratios and company value in Islamic entities needs to consider this normative dimension as part of the Islamic economic construct.

The non-cyclical consumer sector companies in the ISSI are an interesting focus because they present two layers of resilience: economic stability in the consumer sector and adherence to sharia principles. This combination makes the sector an ideal example for examining how market value is formed when ethical and efficiency dimensions interact. In practice, investors investing in this sector consider not only profit but also the moral legitimacy and social sustainability of the company's business activities. This makes the relationship between PER, DPR, DER, and PBV more complex than in conventional sectors.

Furthermore, post-pandemic economic changes have shifted investors' perspectives on risk and value. Global uncertainty has increased the value of stability and prudence. Under these conditions, companies that demonstrate consistent performance and adhere to Sharia principles

tend to be more trusted by the market. In other words, financial variables serve not only as a measure of efficiency but also as a symbol of moral reliability. This research is based on the view that the Sharia capital market, with its characteristic of rejecting speculative practices, offers a clearer perspective for understanding how company value is formed in an economic system based on justice.

This research is motivated by the need to empirically understand how financial ratios contribute to the formation of corporate value, particularly in the non-cyclical consumer sector, which operates under sharia principles. The primary focus is on the relationship between the Price to Earnings Ratio (PER), Dividend Payout Ratio (DPR), and Debt to Equity Ratio (DER) and corporate value, as represented by Price to Book Value (PBV). The analysis was conducted on companies listed in the Indonesian Sharia Stock Index (ISSI) during the 2016–2020 period. This timeframe was chosen because it reflects the phase of economic stability following the global slowdown, which demands ethically based financial adaptation. Therefore, this research places the issue of economic rationality within the framework of Islamic financial morality, which emphasizes the balance between profit and social responsibility in the dynamics of the capital market.

The Price-to-Earnings Ratio (PER) reflects the market's appreciation of a company's ability to generate profits. This ratio is often understood as an indicator of investor confidence in the company's future growth prospects. In the context of Islamic finance, the PER value reflects not only economic efficiency but also encompasses the moral dimension of how profits are generated in accordance with halal and fair principles. Companies with a high PER are generally considered to have good growth potential, but in Islamic-based markets, this value is also measured by the conformity of business activities to Islamic ethical norms. Thus, the PER serves not only as a market metric but also as a reflection of the balance between financial performance and adherence to Islamic principles, the foundation of economic legitimacy.

The Dividend Payout Ratio (DPR) reflects a company's policy on distributing profits to shareholders. This ratio serves as an indicator of management's confidence in the sustainability of the company's financial performance. In the Islamic financial system, the DPR has a broader meaning, as profit distribution is viewed not only as an economic mechanism but also as a form of distributive justice based on shared values. The higher the DPR, the greater the company's commitment to sharing business profits proportionally with shareholders. Therefore, this ratio symbolizes the balance between corporate and investor interests. In the context of the Islamic capital market, a prudent dividend policy is part of a strategy to maintain public trust, strengthen the company's reputation, and emphasize the principles of transparency and fairness that are core to Islamic business practices.

The Debt-to-Equity Ratio (DER) indicates a company's capital structure by comparing debt to equity. This ratio serves to assess the extent to which a company relies on external financing compared to its own capital. Within the framework of Islamic finance, DER is an important measure for assessing prudence in risk management, as Islamic principles reject usury and excessive speculation. Companies that maintain a healthy DER ratio demonstrate their ability to maintain financial stability without compromising ethical principles. A manageable debt level also reflects a long-term orientation toward business sustainability, rather than simply seeking quick profits. In the context of this research, DER is analyzed as one of the determinants that can influence company value, particularly within the context of Islamic investment ethics, which emphasizes the balance between profitability and financial responsibility.

Firm value, as proxied by Price to Book Value (PBV), serves as a proxy for how the market assesses a company's performance and future prospects. A high PBV indicates a positive market perception of the company's ability to create value beyond its net assets. In the context of Sharia-compliant companies, this value reflects not only economic efficiency but also the extent to which business activities reflect the principles of fairness and sustainability. PBV reflects the interaction between financial and moral values inherent in Islamic business practices. By linking PBV with financial ratios such as PER, DPR, and DER, this study attempts to interpret how market behavior can be influenced by a financial structure that combines ethics and economic rationality in a single empirical analysis.

This research seeks to provide a conceptual contribution to the development of Islamic finance literature by broadening the understanding of how ethically based financial structures influence market perceptions. Through an empirical approach, this research confirms that financial decision-making in the Islamic context cannot be separated from the moral dimension that underpins the Islamic economic system. The study of the relationships between variables such as PER, DPR, DER, and PBV opens up space for the development of new theories that are more contextualized to the dynamics of the modern economy. The empirical findings are expected to enrich the scientific discourse on the integration of Islamic values within the framework of financial analysis and provide a theoretical foundation for further research focusing on the balance between market efficiency and social justice in an ethical economic system.

Practically, the results of this study are expected to provide strategic input for decision-makers, both at the managerial and public policy levels. For investment managers and issuers, these findings can serve as a basis for designing financial policies that harmonize profitability and Sharia values. A balanced approach between economic and ethical aspects is expected to increase investor confidence and strengthen corporate competitiveness in the Sharia capital market. For policymakers, this study provides an empirical perspective that can be used in formulating regulations that promote transparency, accountability, and fairness in national financial practices. Therefore, the results of this study serve not only as an academic review but also as a tangible contribution to building a sustainable economic system based on moral values.

Overall, this study emphasizes the importance of synergy between modern economic theory and Islamic finance principles in understanding the dynamics of firm value. The empirical relationship between PER, DPR, DER, and PBV demonstrates that ethical and spiritual dimensions can coexist with data-driven quantitative analysis. The integration of scientific rationality and Islamic morality creates a new perspective in financial studies, where efficiency and fairness are placed within a complementary framework. By analyzing data from non-cyclical consumer sector companies during the 2016–2020 period, this study not only illustrates the relationships between financial variables but also presents insights into how Islamic economics can provide new directions for the development of science and ethical business practices amidst global economic dynamics.

Method

This research employs a descriptive-verification method with a quantitative approach. This approach is used to gain a deep understanding of the relationship between financial ratios and company value in the non-cyclical consumer sector of the Indonesian Sharia Stock Index (ISSI). The quantitative approach is considered relevant because it allows for systematic, measurable analysis based on statistically testable numerical data. In financial research, this approach provides an objective basis for identifying empirical relationships between variables and measuring the influence of one variable on another. Creswell explains that a quantitative approach serves to test previously developed theories through procedures involving numerical data collection, statistical analysis, and interpretation of results based on empirical evidence (Creswell, 2014). By using this approach, the research seeks to produce scientific understanding that can be verified and repeated by other researchers in similar contexts, maintaining the reliability and validity of the findings.

The descriptive-verification method serves two primary functions in this research: describing the observed financial phenomena and testing the validity of the relationships between variables in accordance with the formulated theoretical framework. The descriptive function is used to display the general characteristics of the company's financial data and behavior, while the verification function aims to ensure the correspondence between theory and the empirical reality found. This approach allows research not only to stop at the stage of explaining the phenomenon but also to reach a more in-depth causality test. This is in line with the view of Sekaran and Bougie, who emphasized that the descriptive-verification method serves to confirm existing theoretical models through measurable empirical data. Therefore, the research results

are expected to strengthen the scientific basis in understanding the relationship between financial ratios such as the Price to Earnings Ratio (PER), Dividend Payout Ratio (DPR), and Debt to Equity Ratio (DER) and company value, which is proxied by Price to Book Value (PBV) (Sekaran & Bougie, 2016).

The study population consisted of all non-cyclical consumer sector companies listed on the Indonesia Stock Exchange (IDX) from 2016 to 2020. Based on data obtained from the IDX, there were 90 companies included in this sector throughout the observation period. The non-cyclical consumer sector was selected due to its relatively stable characteristics against economic fluctuations and its important role in maintaining national economic resilience. This sector includes companies that produce basic necessities such as food, beverages, pharmaceuticals, and other basic consumer goods. With high demand stability, this sector is an ideal representation for observing the relationship between financial indicators and company market value. This population selection also took into account the availability of complete and consistent financial data over the five years of observation, ensuring a strong empirical basis for the analysis. Gujarati and Porter explain that the reliability of statistical analysis is greatly influenced by the quality and consistency of the data used in the study (Gujarati & Porter, 2009).

The research sample was determined using purposive sampling, a method of determining samples based on certain criteria that have been determined in accordance with the research objectives. This approach allows researchers to select the unit of analysis that is most relevant to the research context and has complete data for testing. Sugiyono stated that purposive sampling is an effective technique in quantitative research, especially when researchers require samples that meet certain requirements so that the results are methodologically unbiased (Sugiyono, 2017). In this study, the criteria used include: (1) companies listed in the consumer non-cyclical sector on the IDX during the 2016–2020 period, (2) companies continuously listed in the Indonesian Sharia Stock Index (ISSI) during that period, and (3) companies consistently distributing dividends in each observation year. Based on these criteria, 15 companies were obtained as samples, so that the total observations analyzed amounted to 75 panel data units (15 companies \times 5 years). This combination of intertemporal and intersubject data allows for more in-depth testing of variations in corporate financial behavior over time.

The data used in this study is secondary data, that is, data that is already available and published by official institutions. The primary source of data was obtained from the company's annual financial report downloaded from the official website of the Indonesia Stock Exchange (IDX). (www.idx.co.id) and the official website of each issuer. The use of secondary data has advantages in terms of time efficiency and source reliability, because the financial data used has been audited by an independent institution and compiled in accordance with applicable accounting standards. Sekaran and Bougie explain that secondary data is important in financial research because it provides access to validated historical information and can be used to test relationships between variables longitudinally. In the context of this research, secondary data provides a factual picture of the company's financial condition, which serves as the basis for calculating the financial ratio variables and company value to be tested (Sekaran & Bougie, 2016).

Data analysis was conducted using a panel data regression method, which combines time series and cross-sectional dimensions. This model was chosen because it provides stronger analytical capabilities compared to conventional regression models that utilize only one data dimension. Gujarati and Porter assert that panel data regression improves estimation efficiency and allows for more precise testing of relationships between variables, as it accounts for variations across time and between firms (Gujarati & Porter, 2009). Data processing was performed using EViews software version 12, which has high computational capabilities for processing econometric data. Prior to analysis, the data were examined and adjusted to meet statistical feasibility requirements, including outlier testing and unit-of-measure alignment to ensure accurate estimation of the regression model.

The analysis stages were carried out through several sequential statistical tests. First, a test was conducted to select the best model by comparing three alternative panel data regression models: the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). These three models were tested through a series of statistical procedures,

such as the Chow Test, the Hausman Test, and the Lagrange Multiplier (LM) Test, to determine the model that best suited the data structure used. The best model was determined based on the significance of the test results, which indicated the model's suitability to the characteristics of the research data. Second, a classical assumption test was conducted, consisting of tests for normality, multicollinearity, and heteroscedasticity. This test aims to ensure the regression model meets the BLUE (Best Linear Unbiased Estimator) characteristics, which guarantee efficient and unbiased estimation results. Wooldridge emphasized that meeting classical assumptions is a crucial prerequisite in regression analysis because it influences the validity of the resulting inferences (Wooldridge, 2016).

The final stage of quantitative data analysis is a crucial part in determining the validity of the relationships between variables in a research model. At this stage, two main forms of testing are conducted: the simultaneous significance test (F test) and the partial significance test (t test). These two tests have different but complementary functions in assessing the strength of the relationship between the independent and dependent variables. The F test is used to determine the extent to which all independent variables collectively influence the dependent variable, while the t test highlights the influence of each variable individually. This approach allows researchers to understand both the collective effect and the individual contribution of each variable. Through these test results, researchers can assess the extent to which the regression model used is able to describe the financial phenomena that occur empirically in the context of Sharia-compliant companies.

The F-test is often used as the first step in evaluating the overall significance of a regression model. By testing all independent variables simultaneously, researchers obtain a comprehensive picture of the model's strength in explaining variation in the dependent variable. When the F-test results show high statistical significance, it indicates that the independent variables collectively have a substantial influence on firm value. In the context of Islamic finance research, this test is crucial to ensure that the relationship between financial ratios and firm value is not coincidental but rather supported by a consistent empirical pattern. The use of the F-test provides scientific justification for the model's validity, which is then complemented by partial analysis to further understand the contribution of each financial ratio separately to firm value formation.

Meanwhile, the t-test is used to assess the specific influence of each independent variable on the dependent variable. This test provides information on the extent and significance of the influence of an individual financial ratio on company value. In regression analysis, the t-test results serve as the basis for determining whether an independent variable significantly contributes to explaining variations in company value. By comparing the calculated t-value with the t-table and observing the obtained significance level, researchers can quantitatively assess the strength of the relationship. Applying the t-test helps identify which variables are most influential and which variables do not contribute significantly to the model. This approach ensures that research results are more accurate, measurable, and have a strong empirical basis, especially when applied to financial data from Sharia-compliant companies.

The interpretation of the F-test and t-test results is carried out by considering the regression coefficient values generated in the panel data analysis. The regression coefficient indicates the direction of the relationship between the independent and dependent variables and measures the magnitude of the resulting influence. A positive coefficient indicates a unidirectional relationship, where an increase in the independent variable is followed by an increase in company value, while a negative coefficient indicates a reversed relationship. These coefficient values are then interpreted in an empirical context relevant to the non-cyclical consumer sector, which is known to be stable and long-term oriented. By considering the level of statistical significance and the direction of the relationship, researchers can conclude a clearer pattern of association between corporate financial policies and market perceptions of sustainable performance.

The process of interpreting test results is not only numerical but also requires a conceptual understanding of the underlying economic phenomena. Each statistical result must be interpreted carefully, taking into account the industry context, company characteristics, and applicable sharia principles. In Islamic finance-based research, coefficient analysis not only reflects the

mathematical relationships between variables but also reflects their alignment with the moral and ethical values underlying business practices. Therefore, interpreting test results is an integral part of efforts to connect empirical findings with socioeconomic realities governed by the principles of justice, balance, and transparency. This approach ensures that the analysis results have a broader meaning than mere statistics, namely as a reflection of ethical and sustainable financial behavior.

Within a quantitative research framework, the validity of analytical results is largely determined by procedural consistency and methodological accuracy. All testing stages are conducted with the principles of transparency and replicability in mind, ensuring that the research can be verified by other researchers in different contexts. This principle of replicability ensures that research results are not subjective but can be retested with similar data to obtain consistent findings. Transparency of methods includes clarity in the use of analytical tools, such as panel data regression models and the significance levels used. By prioritizing these two principles, this research not only produces valid empirical conclusions but also contributes to strengthening the scientific tradition that places methodological integrity as a primary foundation in academic research.

Simultaneous and partial significance tests are closely related to the descriptive-verifiable objectives of this research. Descriptive objectives allow researchers to empirically describe data characteristics, while verification objectives assess the validity of relationships between variables based on statistical evidence. In this context, the combination of the F-test and the t-test strengthens the findings by providing a comprehensive view of the causal and correlational relationships between financial variables. This quantitative approach was chosen because it provides scientific evidence for the observed phenomena and avoids subjective bias in the analysis. By relying on numerical data and statistical test results, this research builds a strong empirical argument, explains the relationship between financial ratios and firm value, and enriches academic discourse in modern Islamic finance studies based on measurable evidence.

The statistical analysis also reflects a systematic effort to test the theory's suitability to empirical reality. The financial theories used in this study were tested using actual data from non-cyclical consumer sector companies listed on the Islamic capital market. Through simultaneous and partial testing, researchers were able to assess the relevance of these theories in the context of Islamic finance, which emphasizes the balance between economic profit and moral values. Thus, the research results not only broaden understanding of the application of conventional financial theories within a sharia framework but also provide empirical evidence regarding the effectiveness of business ethics principles in maintaining the stability of company value. This analysis bridges the gap between theoretical conceptualizations and the economic realities faced by modern, justice-based companies.

The methodological approach used in this study refers to a panel data model, which combines the time and corporate entity dimensions within a single analytical framework. This combination offers advantages because it is able to capture the dynamics of variable changes over time while simultaneously considering differences in characteristics between companies. Thus, the test results are more comprehensive and accurate in describing the empirical relationship between financial ratios and firm value. The panel data model also improves estimation efficiency because it utilizes a wider variety of data than cross-section or single time series models. In the context of the non-cyclical consumer sector, this model is particularly relevant due to the sector's long-term stability and relatively homogeneous financial structure among the companies studied.

Each step of the analysis is carried out with the aim of maintaining continuity of scientific logic and accuracy in drawing conclusions. The research stages, from data collection to hypothesis testing, are structured according to systematic procedures to ensure academically sound results. This series of procedures not only emphasizes methodological discipline but also demonstrates a commitment to scientific honesty in research. In this context, the results of significance tests serve as a means of verifying hypotheses developed based on Islamic finance theory and previous literature. In other words, statistical analysis is not merely a mathematical procedure but also serves as an epistemological mechanism to ensure scientific truth based on

data and rational logic.

This series of analyses provides a strong empirical basis for understanding the relationship between financial variables and firm value. Findings from simultaneous and partial significance tests demonstrate a pattern of relationships that can be used to formulate financial policy strategies for Islamic companies. The interpretation of the results reflects the synergy between a scientific approach and an ethical understanding of financial management. By combining statistical precision with the principles of economic justice, this study confirms that science and morality can coexist in producing responsible business decisions. This analysis also demonstrates that a quantitative approach not only measures relationships between variables but can also interpret the value dynamics inherent in an economic system based on the principles of balance and transparency.

This research emphasizes the importance of applying scientific principles at every stage of analysis. Accuracy in selecting methods, clarity in interpreting results, and consistency in applying scientific standards are all factors that determine research quality. Using a descriptive-verification approach, this research not only explains empirical phenomena but also tests existing theories, thereby making a significant contribution to the development of Sharia-based finance literature. Through systematic analysis, this research seeks to combine scientific rigor with practical relevance, creating a bridge between academic knowledge and the real needs of the business world. Thus, the research findings are not limited to theoretical research but also have practical value in the context of modern economics.

The research approach used in analyzing the non-cyclical consumer sector reflects a deep understanding of its stable and long-term economic structure. This sector is an ideal representative for studying the relationships between financial variables because it has relatively constant demand and is not significantly affected by economic cycles. By using a quantitative design based on empirical data, this study provides a more objective picture of how financial policies influence market perceptions of company value. This approach emphasizes the role of science in clarifying complex economic phenomena and broadens insights into how Sharia principles can be harmoniously integrated into a modern, competitive yet ethical market system.

With all the analytical stages completed, this research provides a strong methodological basis for developing empirical studies in Islamic finance. The combination of statistical validity, procedural transparency, and adherence to ethical principles make the results relevant to the development of science and sustainable business practices. The findings can serve as a reference for further research, both within the same industry context and in other sectors based on Islamic principles. Ultimately, this integration of scientific analysis and moral principles strengthens the research's position as a tangible contribution to building a just, rational, and mutually beneficial economic system.

Results and Discussion

Descriptive Statistical Analysis

Descriptive statistical analysis serves as the primary foundation for understanding the characteristics of the data used in this study. Through this approach, researchers obtain a comprehensive overview of the distribution structure, central tendency, and variation between the analyzed variables. The use of descriptive statistics enables the identification of patterns and trends within empirical data, thus facilitating the interpretation of observed financial phenomena. Each variable in the study serves a representative function for different dimensions of performance and market perception. The Price to Earnings Ratio (PER) illustrates how the market assesses future profit potential, the Dividend Payout Ratio (DPR) reflects the company's profit distribution policy, the Debt-to-Equity Ratio (DER) indicates the proportion of debt-based and equity-based funding, while the Price to Book Value (PBV) serves as a proxy for the company's perceived market value. All of these variables complement each other in assessing a corporation's financial condition (Brigham & Houston, 2019).

Table 1. Descriptive Statistic

Date: 06/03/22

Time: 14:52

Sample: 2016 2020

	PBV	PER	DPR	DER
Mean	6.382800	22.04373	45.39960	0.942533
Median	1.940000	16.79000	38.07000	0.750000
Maximum	82.44000	132.8800	204.2100	3.160000
Minimum	0.700000	-23.77000	2.070000	0.170000
Std. Dev.	15.32608	18.27730	35.48133	0.755898
Skewness	3.663494	3.047410	1.932490	1.331409
Kurtosis	15.28063	19.69166	8.044561	4.038156
Jarque-Bera	639.0580	986.7445	126.2052	25.52614
Probability	0.000000	0.000000	0.000000	0.000003
Sum	478.7100	1653.280	3404.970	70.69000
Sum Sq. Dev.	17381.76	24720.41	93160.41	42.28222
Observations	75	75	75	75

Source: Processed Data Eviews-12, 2022

Data processing using EViews version 12 software yielded key statistical values representing the behavior of each variable. PBV displayed a fairly wide range of values, with a minimum limit of 0.70 and a maximum of 82.44. The average PBV of 6.38, accompanied by a standard deviation of 15.32, indicates a high level of data dispersion among the companies observed. Conceptually, a PBV above one indicates that the market overestimates the company's value compared to its book value, which can be interpreted as a form of market optimism regarding long-term prospects. In this context, an average PBV of 6.38 indicates that stocks in the non-cyclical consumer sector are trading at approximately 6.38 times their book value. This condition reflects a strong level of investor confidence in the stability and resilience of the primary consumer sector (Gitman et al., 2015).

A high PBV generally indicates a positive market perception of a business entity's growth potential and profitability. When this ratio increases, the market is optimistic about the company's ability to create added value in the future. However, a very wide range between the minimum and maximum values indicates significant disparities between companies. This disparity may be caused by variations in corporate size, capital management strategies, and varying levels of operational efficiency. In the financial literature, Brigham and Weston explain that a high PBV ratio can serve as a signal of competitive advantage and a reflection of market expectations for sustainable growth. Therefore, PBV in this sector not only indicates financial performance but also a strong market perception of the quality of corporate governance and competitiveness (Weston & Brigham, 1996).

The PER, or Price to Earnings Ratio, displays a fairly extreme range of values, with a minimum value of -23.77 and a maximum of 132.88. The average value of 22.04 with a standard deviation of 18.27 indicates significant variation in market assessments of potential earnings per share. This ratio is widely used by investors as a measure of the fairness of stock prices, whether an issuer is undervalued or overvalued. A high PER reflects investors' willingness to pay a higher price for each unit of profit due to confidence in future growth prospects. The average value of 22.04 indicates that most companies in the primary consumption sector are perceived to have promising prospects, with a high level of market confidence in earnings stability and the ability to create sustainable economic value.

In capital market analysis, a PER range of 20 to 25 times annual earnings is often used as a general benchmark for determining the fairness of stock prices. Values above this range often indicate high market enthusiasm for profit prospects, while values below this range reflect investor caution regarding potential risks. The considerable variation in PER distribution also indicates differences in corporate strategies for managing production efficiency and profit growth. Some companies are able to maintain high ratios through innovation and product diversification, while others face pressure from rising raw material costs. Therefore, PER distribution in this sector reflects a company's managerial capabilities and adaptive response to changing market dynamics.

In the context of the Islamic market, the PER not only reflects profit expectations but also indicates confidence in the principles of business ethics and economic justice. Investors in the Islamic market view this ratio as a reflection of a company's integrity and consistency in implementing Islamic financial principles. A high PER in some Islamic companies indicates confidence in governance based on moral values and transparency. However, a negative PER indicates a net loss within a specific period, usually due to significant expansion or production cost pressures. This phenomenon is considered normal as long as the company demonstrates a healthy and sustainable growth path. Therefore, the dynamics of the PER in this context are not merely financial issues but also reflect the ethical dimension of business management.

The Dividend Payout Ratio (DPR) variable describes the extent to which a company distributes its net income to shareholders. DPR values in this study ranged from 2.07 to 204.21, with an average of 45.39 percent and a standard deviation of 35.48. This figure indicates that companies in this sector generally distribute nearly half of their net income to investors, while retaining the remainder for expansion and financial stability. This ratio reflects the balance between a company's need for growth and its moral obligation to shareholders. Brigham and Houston emphasize that a proportional dividend policy is a key indicator of long-term financial health, as it demonstrates a company's ability to maintain a balance between profit distribution and capital reinvestment for business development (Brigham & Houston, 2019).

The high variation in DPR values indicates diverse corporate strategies for managing profit distribution. Companies aggressively expanding typically retain a significant portion of profits to finance new projects, while stable companies tend to distribute larger dividends to maintain investor loyalty. From a sharia economic perspective, dividend distribution also has a moral dimension, as it is considered a form of fairness in sharing business profits. The average DPR of 45.39 percent demonstrates a healthy balance between internal corporate growth and social responsibility towards shareholders. This reflects the financial stability of the non-cyclical consumer sector, which tends to be more resilient to economic shocks and changes in market demand cycles.

Meanwhile, the Debt-to-Equity Ratio (DER) showed a minimum value of 0.17 and a maximum of 3.16, with an average of 0.94 and a standard deviation of 0.75. An average value close to one indicates that most companies in this sector have a balanced capital structure between debt-based and equity-based financing. Sartono (2016) stated that an ideal capital structure is one where a company can balance risk and return appropriately through an efficient proportion of funding. A DER below one indicates a lower level of dependence on external loans, which in turn reflects good financial stability and management's ability to control financial risks. This structure is an important foundation in maintaining the sustainability of a company's operations.

The relatively low DER characteristic of most companies reflects a conservative orientation in financial management. This approach aligns with the prudential principle, which underpins Sharia-compliant corporate governance. Companies that maintain low leverage levels have a greater ability to maintain liquidity and resilience to macroeconomic changes. In the context of Sharia finance, debt limitation is an ethical measure to avoid structural imbalances and the risk of usury (*riba*). Therefore, a moderate DER not only demonstrates efficiency in managing funding sources but also demonstrates adherence to the ethical principles of Islamic finance, which emphasize balance and fairness in business activities.

Table 2. Fixed Effect Model Results

Dependent Variable: PBV
Method: Panel Least Squares
Date: 05/11/22 Time: 17:19
Sample: 2016 2020
Periods included: 5
Cross-sections included: 15
Total panel (balanced) observations: 75

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.034191	1.842521	1.104026	0.2742
PER	0.051297	0.031454	1.630876	0.1084
DPR	-0.016747	0.015932	-1.051107	0.2976
DER	4.220675	1.837509	2.296955	0.0253

Effects Specification

Cross-section fixed (dummy variables)			
Root MSE	2.866784	R-squared	0.964538
Mean dependent var	6.382800	Adjusted R-squared	0.953962
S.D. dependent var	15.32608	S.E. of regression	3.288427
Akaike info criterion	5.424259	Sum squared resid	616.3838
Schwarz criterion	5.980456	Log likelihood	-185.4097
Hannan-Quinn criter.	5.646342	F-statistic	91.19854
Durbin-Watson stat	2.853972	Prob(F-statistic)	0.000000

Source: Eviews output results 12, 2022

The results of the panel data analysis indicate that the best model obtained is the Fixed Effect Model (FEM). This model selection is based on a series of model selection tests, such as the Chow Test and the Hausman Test, which indicate the suitability of the FEM to the characteristics of the data used. Based on the estimation results, an R-squared value of 0.9645 was obtained, which means that approximately 96.45 percent of the variation in firm value (PBV) can be explained by the independent variables, namely PER, DPR, and DER. The remaining 3.55 percent is explained by other variables outside the model. The Adjusted R-squared value of 0.9539 confirms that the model has high predictive ability and consistent estimation stability, reflecting the model's accuracy in describing the empirical phenomena studied.

The partial test results indicate that the DER variable has a significant influence on PBV, while PER and DPR do not show a significant influence at the 5 percent confidence level. The DER probability value of 0.0253, which is smaller than the significance threshold of 0.05, indicates a strong relationship between funding structure and company market value. Conversely, the PER probability value of 0.1084 and DPR of 0.2976 are not strong enough to prove a significant influence on PBV. These findings indicate that in the non-cyclical consumer sector, capital structure management plays a greater role in shaping market perception than dividend policy or earnings per share performance. Efficient leverage management is seen as more decisive for company value in the long term.

The results of this study reinforce the capital structure theory proposed by Modigliani and Miller, which explains that optimal debt use can increase company value due to tax benefits on debt interest. In this view, companies that are able to utilize debt-based financing sources efficiently can optimize their cost of capital and increase market value. Conversely, excessive debt use indicates that the company may not be maximizing its available financial efficiency potential. Thus, the results of this study confirm that investors positively evaluate companies that are able to manage

their funding structure productively and measurably within the context of long-term business sustainability (Modigliani & Miller, 1958).

The phenomenon of DER's influence on PBV can also be explained through signaling theory, where a healthy level of leverage is considered a signal of management's confidence in the company's growth potential. Increased debt usage is often interpreted as a form of confidence in the company's ability to generate future profits. These results align with research that found DER to have a positive and significant effect on company value in the Indonesian financial sector. This suggests that an appropriate funding strategy can serve as an implicit communication tool between management and investors, fostering confidence in the company's direction and ability to achieve the growth targets expected by the market (Aristawati & Hariyanto, 2025).

Meanwhile, the PER test results show that this variable does not significantly influence PBV. The probability value of 0.1084, which exceeds the significance limit of 0.05, indicates that market perception of earnings was not a major factor influencing company value during the study period. This may be due to the characteristics of the primary consumer sector, which places greater emphasis on long-term earnings stability than on annual earnings fluctuations. According to Gitman, an excessively high PER can reflect excessive expectations, which could ultimately lead to price corrections in the future. Therefore, investors in this sector should be more cautious in interpreting extreme PER values and focus more on other fundamental indicators (Gitman et al., 2015).

The DPR test results show a probability value of 0.2976, which is also greater than the 5 percent significance level. This finding supports the dividend irrelevance theory, which argues that dividend distribution policy does not significantly impact firm value in efficient capital markets. Investors assess a company's ability to generate profits and manage risk rather than solely relying on the amount of dividends distributed. These results are consistent with research by Wijaya and Wibawa, which shows that the relationship between dividend policy and firm value tends to be weak in the Indonesian capital market. Thus, dividend policy is considered more of a managerial decision than a primary determinant of market value (Nirawati et al., 2022).

Overall, the empirical results show that the Debt to Equity Ratio (DER) has the strongest influence on Price to Book Value (PBV) compared to other variables. Meanwhile, the Price to Earnings Ratio (PER) and Dividend Payout Ratio (DPR) do not show a significant influence. This condition illustrates that the Indonesian capital market, particularly in the Sharia-compliant sector, highly values companies with healthy and efficient funding structures. Successfully managing leverage optimally reflects both financial efficiency and management confidence in long-term business prospects. In the context of Sharia economics, these results also reinforce the view that the balance between equity and debt is a key element in creating sustainable corporate value in accordance with the principles of Islamic economic justice.

Conclusion

This study confirms the empirical relationship between financial ratios and firm value in the non-cyclical consumer sector listed on the Indonesian Sharia Stock Index (ISSI) during the observation period. The analysis results show that the Debt-to-Equity Ratio (DER) has a significant influence on Price to Book Value (PBV), while the Price to Earnings Ratio (PER) and Dividend Payout Ratio (DPR) do not show a significant influence. This finding indicates that a healthy funding structure plays a dominant role in shaping market perceptions of firm value. In the context of Islamic finance, efficient capital management and a balance between internal and external financing reflect managerial integrity and stability.

This study also shows that the primary consumption sector has relatively stable financial characteristics, reflecting investor confidence in long-term prospects consistent with Sharia principles. The Fixed Effects model used is proven to provide an accurate representation of inter-firm variability within the observation period. Conceptually, these results strengthen modern financial theory contextualized within the framework of Islamic economic ethics, where balance, fairness, and transparency are the foundations for building sustainable corporate value. This research is expected to broaden understanding of how moral principles and financial structures intertwine in creating ethical economic value that adapts to contemporary market dynamics.

References

- Ardhani, I. A., Effendi, J., & Irfany, M. I. (2020). The effect of macroeconomics variables to Net Asset Value (NAV) growth of sharia mutual funds in Indonesia. *Jurnal Ekonomi & Keuangan Islam*, 134–148.
- Aristawati, K. A., & Hariyanto, D. (2025). The Influence of Debt to Asset Ratio, Debt to Equity Ratio, Return on Assets, and Return on Equity on Firm Value in Financial Sector Companies Listed on the Indonesia Stock Exchange. *Jurnal Manajemen Bisnis*, 12(1), 195–210.
- Brigham, E. F., & Houston, J. F. (2019). *Fundamentals of Financial Management: Concise* by Cengage. *Cengage Learning*.
- Campbell, D. E., & Kelly, J. S. (1994). Trade-off theory. *The American Economic Review*, 84(2), 422–426.
- Chapra, M. U. (2008). The Islamic vision of development in the light of Maqāsid al-sharī ‘ah. *Islamic Research and Training Institute Islamic Development Bank Jeddah, DOI*, 10.
- Čihák, M., & Hesse, H. (2010). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research*, 38(2), 95–113.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.)*. SAGE Publications.
- Dusuki, A. W., & Abdullah, N. I. (2007). Maqasid al-Shariah, Maslahah, and corporate social responsibility. *American Journal of Islamic Social Sciences*, 24(1), 25.
- Gitman, L. J., Juchau, R., & Flanagan, J. (2015). *Principles of managerial finance*. Pearson Higher Education AU.
- Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics*. McGraw-hill.
- Indonesia Stock Exchange. (2022). *Indeks Saham Syariah [Sharia Stock Index]*. Indonesia Stock Exchange (IDX). [https://doi.org/\[in Indonesian\]](https://doi.org/[in Indonesian])
- Karasek III, R., & Bryant, P. (2012). Signaling theory: Past, present, and future. *Academy of Strategic Management Journal*, 11(1), 91.
- Listyawati, I., & Ramadhan, R. (2017). Analisis pengaruh rasio keuangan terhadap nilai perusahaan [Analysis of the influence of financial ratios on company value]. *MAKSIMUM: Media Akuntansi Universitas Muhammadiyah Semarang*, 7(2), 1–10. [https://doi.org/\[in Indonesian\]](https://doi.org/[in Indonesian])
- Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, 48(3), 261–297.
- Nirawati, L., Samsudin, A., Pradanti, A. P., Ayu, A. W., Jahzy, C. A., Saputri, I. D. I., & Prisichella, A. (2022). Analisis Pengaruh Kebijakan Dividen Terhadap Nilai Perusahaan [Analysis of the Influence of Dividend Policy on Company Value]. *SINOMIKA Journal: Publikasi Ilmiah Bidang Ekonomi Dan Akuntansi*, 1(2), 189–196. [https://doi.org/\[in Indonesian\]](https://doi.org/[in Indonesian])
- Otoritas Jasa Keuangan. (2021). *Laporan Perkembangan Keuangan Syariah Indonesia 2021 [2021 Indonesian Islamic Finance Development Report]*. Otoritas Jasa Keuangan (OJK). [https://doi.org/\[in Indonesian\]](https://doi.org/[in Indonesian])
- Rahayu, M., & Sari, B. (2018). Faktor-faktor yang mempengaruhi nilai perusahaan [Factors that influence company value]. *IKRA-ITH HUMANIORA: Jurnal Sosial Dan Humaniora*, 2(1), 69–76. [https://doi.org/\[in Indonesian\]](https://doi.org/[in Indonesian])
- Saputra, A., & Hafil, M. (2020). *Prediksi Keuangan Syariah Global 2024, Indonesia Teratas [Global Islamic Finance Predictions for 2024: Indonesia Tops the Charts]*. REPUBLIKA.CO.ID. [https://doi.org/\[in Indonesian\]](https://doi.org/[in Indonesian])
- Sartono, A. (2008). *Manajemen keuangan, teori dan aplikasi [Financial management, theory and application]*. [https://doi.org/\[in Indonesian\]](https://doi.org/[in Indonesian])

- Sekaran, U., & Bougie, R. (2016). *Research methods for business: A skill building approach*. John Wiley & Sons.
- Shapiro, S. P. (2005). Agency theory. *Annu. Rev. Sociol.*, 31(1), 263–284.
- Sugiyono. (2017). *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D [Educational Research Methods Quantitative, Qualitative, and R&D Approaches]*. Alfabeta. <https://doi.org/>[in Indonesian]
- Visser, H. (2019). *Islamic finance: Principles and practice*. Edward Elgar Publishing.
- Weston, J. F., & Brigham, E. F. (1996). *Essentials of managerial finance*.
- Wooldridge, J. M. (2016). *Introductory econometrics a modern approach*. South-Western cengage learning.



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