

SOLVENCY, PROFITABILITY, AND FIRM VALUE: MODERATING ROLE OF FIRM SIZE IN FOOD AND BEVERAGE SUBSECTOR

Dian Islamiati^{1*}, Sri Hermuningsih², Ratih Kusumawardhani³

^{1,2,3}Universitas Sarjanawiyata Tamansiswa, Indonesia

*Corresponding Author:

dian.islamiati553@gmail.com

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Abstract

This study examines the effects of solvency and profitability on firm value, with firm size as a moderating variable, in the Food and Beverage subsector listed on the Indonesia Stock Exchange during the 2021–2025 period. The study is motivated by the inconsistent findings of previous research regarding the influence of solvency and profitability on firm value, as well as the limited understanding of the moderating role of firm size in the Food and Beverage subsector during the post-pandemic economic recovery phase. The sample consists of one hundred and thirty-five firm-year observations obtained from twenty-seven companies selected using purposive sampling with criteria including consecutive publication of financial statements throughout the study period and positive profits. Multiple linear regression and Moderated Regression Analysis were employed to test the proposed hypotheses. The results indicate that solvency, proxied by the Debt-to-Equity Ratio, has a positive and significant effect on firm value, suggesting that optimal debt management can increase investor confidence and enhance firm value. Profitability, proxied by Return on Assets, has a positive and significant effect on firm value, indicating that companies capable of generating profits effectively receive positive responses from investors. Firm size weakens the effect of solvency on firm value, implying that in larger firms, the positive effect of solvency becomes less dominant as investors consider other factors beyond debt levels. Firm size also weakens the effect of profitability on firm value, suggesting that increased profitability in larger firms does not always result in proportionally higher firm value due to higher investor expectations and diminishing returns to scale. The model explains 30.4% of the variation in firm value. The findings suggest that companies need to manage debt at an optimal level and improve profitability to enhance firm value, while firm size should be considered as a factor influencing the strength of these relationships.

Keywords: Solvency, Profitability, Firm Value, Firm Size, Food and Beverage.

1. Introduction

Firm value is one of the indicators that reflects a company's success in creating shareholder wealth and serves as a key consideration for investors when making investment decisions. Companies with high firm value demonstrate strong business prospects, thereby boosting market confidence. One of the most widely used indicators to measure firm value is the Price-to-Book Value (PBV) ratio, as it reflects the market's perception of a company's book value. A higher PBV indicates that the market values the company more highly than its book value, reflecting strong growth prospects (Aprilianingsih et al., 2024). Companies with high PBV are generally considered capable of creating added value for shareholders and having strong growth prospects (Habsari et al., 2024). The Food and Beverage subsector is one of the manufacturing sectors that



plays a strategic role in the Indonesian economy. This sector continues to grow, supported by high public demand for food and beverage products and rising domestic consumption. On the other hand, companies in this subsector face challenges in the form of increasingly intense business competition, changing economic conditions, and the need to maintain stable financial performance to remain attractive to investors. These conditions make increasing corporate value one of the primary goals that companies must achieve.

From the perspective of signaling theory, companies convey corporate information through financial statements as signals to investors regarding the company's condition and prospects. This information serves as the basis for investors to assess corporate performance and make investment decisions (Syahputri et al., 2024). Positive signals indicated by sound financial conditions will boost investor confidence, thereby leading to higher stock prices and corporate value. The first factor that can influence a company's value is solvency. Solvency indicates a company's ability to meet all of its obligations, both short-term and long-term (Pramudya et al., 2021). In this study, solvency is proxied using the Debt-to-Equity Ratio (DER), which is a ratio that illustrates the proportion of debt used relative to a company's equity (Sudjiman et al., 2022). Optimal debt management can send a positive signal to investors because it indicates that the company is able to effectively utilize funding sources to improve its performance. In addition to solvency, profitability is also a key factor that can influence a company's value. Profitability reflects a company's ability to generate profits through the utilization of all its assets. This study uses Return on Assets (ROA) as a proxy for profitability because it indicates the company's efficiency in generating profits from its assets (Iskandar et al., 2020). A high level of profitability indicates strong financial performance, which boosts investor confidence, drives up stock prices, and ultimately increases the company's value (Bitu et al., 2021). Firm size reflects the scale of a company and is measured based on natural logarithm of total assets. As a moderating variable, firm size may influence the strength of the relationship between solvency, profitability, and firm value because larger companies generally have greater access to financing and resources (Chandra et al., 2022).

The urgency of this research is driven by several critical factors. First, the Food and Beverage subsector plays a strategic role in the Indonesian economy with continued growth supported by high public demand, yet companies face challenges from intense business competition and changing economic conditions that require stable financial performance to remain attractive to investors. Second, previous studies have reported inconsistent findings regarding the relationship between solvency, profitability, firm size, and firm value. While some studies found that solvency affects firm value, other studies found no significant effect. Similar differences are also found in studies examining profitability and the moderating role of firm size (Mahardhika et al., 2025; Panjaitan et al., 2023; Ramadhani et al., 2024; Rinofah et al., 2022; Romli et al., 2025; Tambun et al., 2022). Third, evidence regarding the moderating role of firm size in the Food and Beverage subsector during the 2021–2025 period is still limited. Fourth, the inconsistent findings regarding the effects of solvency and profitability on firm value, as well as the varying role of firm size, indicate that the relationships among these variables remain inconclusive, particularly in the Food and Beverage subsector. Fifth, the gap between theoretical predictions from signaling theory and empirical findings necessitates renewed investigation with more comprehensive research designs and more recent data.

Previous research has shown significant inconsistencies in results regarding the influence of solvency and profitability on firm value. Studies have demonstrated positive



outcomes, where effective debt management and high profitability can send positive signals that boost investor confidence and enhance firm value (Pramudya et al., 2021; Bitu et al., 2021). However, other studies have found that solvency does not significantly affect firm value (Mahardhika et al., 2025; Ramadhani et al., 2024). Similar contradictions are found in studies examining the moderating role of firm size, where some studies suggest that larger firms have greater access to financing and resources that can strengthen the relationship between financial performance and firm value (Chandra et al., 2022), while others indicate that firm size weakens or has no moderating effect (Rinofah et al., 2022; Romli et al., 2025; Tambun et al., 2022). These contrasting findings underscore the importance of contextualizing the research to specific industry sectors and time periods, highlighting the gap that this study aims to address.

The research gap in this study lies in the limited understanding of how solvency and profitability influence firm value, with firm size as a moderating variable, particularly in companies within the Food and Beverage subsector listed on the Indonesia Stock Exchange during the 2021–2025 period. While individual studies have examined the direct effects of solvency or profitability on firm value, the integrated framework connecting these financial factors with firm size as a moderating variable remains underexplored (Panjaitan et al., 2023). Additionally, most previous studies have focused on other sectors or used periods before the pandemic, leaving a significant gap in knowledge regarding the dynamics of financial performance and firm value in the Food and Beverage subsector during the post-pandemic economic recovery phase. Furthermore, empirical evidence from the Indonesian Food and Beverage subsector remains limited, particularly in the context of 2021–2025 where companies face unique challenges from changing economic conditions and intense business competition.

The novelty of this research lies in several aspects. First, this study focuses on the Food and Beverage subsector in Indonesia during the 2021–2025 period, which represents a unique context characterized by post-pandemic economic recovery, changing consumer behavior, and increasing competition, making it an ideal setting for examining the relationship between financial performance and firm value. Second, this study develops an integrative model that simultaneously examines the influence of solvency and profitability on firm value with firm size as a moderating variable, providing a more comprehensive understanding of the determinants of firm value in the Food and Beverage subsector. Third, this study positions firm size as a moderating variable, enabling the examination of whether the scale of a company strengthens or weakens the relationship between financial performance and firm value. Fourth, this study contributes to the limited empirical evidence on the moderating role of firm size in the Food and Beverage subsector, providing insights into whether larger firms benefit more from financial performance in enhancing firm value. Fifth, this study extends the application of signaling theory to the context of financial performance and firm value, validating theoretical predictions in an under-researched institutional context.

The purpose of this study is to analyze the influence of solvency and profitability on firm value in companies within the Food and Beverage subsector listed on the Indonesia Stock Exchange during the 2021–2025 period. In addition, this study aims to evaluate the moderating role of firm size in the relationship between solvency, profitability, and firm value. The choice of this goal was driven by the inconsistency of findings from previous studies, where some researchers found significant positive effects while others found negative or insignificant effects, and the limited understanding of how firm size moderates these relationships in the Food and Beverage subsector. With a comprehensive



examination of the moderating mechanisms, this study aims to provide a deeper understanding of how solvency and profitability can be strategically managed to enhance firm value, and whether firm size influences the strength of these relationships.

The contribution of this research is multifaceted. From a theoretical perspective, this research contributes to the enrichment of literature on financial management and signaling theory by proposing and testing an integrative model that links solvency and profitability with firm value, incorporating firm size as a moderating variable, extending the application of signaling theory to the context of financial performance in the Food and Beverage subsector. The findings contribute to the understanding of how specific financial performance indicators influence firm value and how firm size moderates these relationships, providing a more nuanced theoretical framework for analyzing firm value in different organizational contexts. From a practical perspective, this study provides actionable insights for investors, company management, and regulators in assessing and managing financial performance and firm value. For investors, the findings provide guidance on which financial performance indicators are most relevant in assessing firm value and how firm size should be considered in investment decisions. For company management, the results offer insights into the importance of managing solvency and profitability to enhance firm value, and how firm size may influence the effectiveness of these strategies. For regulators, particularly the Financial Services Authority (OJK), this study provides empirical evidence to support the development of regulations that promote transparency and accountability in corporate financial reporting, thereby enhancing investor protection and market confidence.

2. Theoretical Background

2.1 Signaling Theory

This study uses Signaling Theory as its theoretical framework to explain the relationship between solvency, profitability, firm size, and firm value. According to signaling theory, firms send signals to investors through publicly disclosed information, such as financial statements, profitability levels, solvency, and firm size. However, the interpretation of these signals may differ depending on the characteristics of the company. Firm size can influence how investors assess financial information because larger companies are generally expected to have greater resources and stronger financial capabilities (Syahputri et al., 2024). Therefore, the same level of solvency or profitability may not provide the same signal to investors across companies with different sizes (Mahardhika et al., 2025). In this study, firm size is expected to influence the strength of the signal conveyed by solvency and profitability to investors. This information serves as the basis for investors to assess a company's prospects and make investment decisions. The better the signals a company provides, the higher investor confidence becomes, which in turn can increase the company's value (Putri et al., 2023).

2.2 The Effect of Solvency on Firm Value

Solvency is a ratio that reflects a company's ability to meet its long-term obligations. In this study, solvency is proxied by the Debt-to-Equity Ratio (DER). The DER indicates the extent to which a company relies on debt financing compared to equity (Komala et al., 2021). Optimally managed debt can send a positive signal to investors because it indicates that the company is able to utilize external funding sources to enhance its operational activities and growth. Conversely, excessive debt can increase financial risk, thereby reducing investor confidence in the company.



According to signaling theory, effectively managed debt sends a positive signal to investors regarding the company's future prospects. This is supported by research conducted by (Ummah et al., 2024; Komala et al., 2021; Ningsih et al., 2024; Andriyanti et al., 2022; Gantino et al., 2022; Ramadhani et al., 2024; Tio et al., 2022) which indicate that solvency influences firm value.

H1: Solvency has a positive effect on firm value.

2.3 The Effect of Profitability on Firm Value

Profitability is a company's ability to generate profits through the utilization of all its assets. In this study, profitability is proxied using Return on Assets (ROA). A high ROA indicates that a company is able to manage its assets efficiently to generate profits, thereby sending a positive signal to investors regarding the company's future prospects (Aprilia et al., 2021)

According to signaling theory, companies with high profitability levels convey positive information to investors regarding their ability to generate profits consistently. This can boost investor confidence, leading to increased demand for the company's stock and, consequently, an increase in corporate value. Companies capable of generating high profits tend to have higher firm values because they are perceived as able to provide optimal returns to their shareholders (Isniawati et al., 2026). This is supported by research conducted by (Anisa et al., 2021; Aprilianingsih et al., 2024; Bitu et al., 2021; Jihadi et al., 2021; Lawinata et al., 2023; Muflihah et al., 2024; Rinofah et al., 2022; Risqi et al., 2024) which state that profitability influences firm value.

H2: Profitability has a positive effect on firm value.

2.4 The Role of Firm Size in Moderating the Relationship Between Solvency and Firm Value.

Firm size reflects the size of a company, as measured by natural logarithm of total assets. Larger firms generally have more stable financial conditions, broader access to financing, and greater ability to manage corporate debt (Ningsih et al., 2024). Based on signaling theory, firm size can either strengthen or weaken the signals received by investors regarding debt usage. Large firms are considered more capable of managing the risks associated with debt usage compared to small firms, so their financing decisions are viewed as more credible by investors. Previous studies conducted by (Pramudya et al., 2021; Indah et al., 2025; Romli et al., 2025) indicate that firm size moderates the effect of solvency on firm value. However, the moderating effect of firm size may weaken the relationship between solvency and firm value. In larger companies, investors may not rely only on debt levels when assessing firm value because they can also consider asset management, business prospects, and overall financial performance (Denny et al., 2025). Therefore, the positive signal from solvency may become less dominant as firm size increases. This condition suggests that firm size may weaken the effect of solvency on firm value.

H3: Firm size moderates the effect of solvency on firm value.

2.5 The Role of Firm Size in Moderating the Relationship Between Profitability and Firm Value.

Firm size is also one of the factors investors use to assess a firm's ability to generate profits. Firms with large assets tend to be better able to maintain operational performance and drive growth. According to signaling theory, firm size signals a company's financial



strength; thus, profits generated by large firms are viewed as more credible by investors than those of smaller firms (Mahardhika et al., 2025).

Large firms have greater opportunities to secure funding, expand their operations, and increase profits, thereby enhancing firm value (Burhani et al., 2023; Janah et al., 2022; Mahardhika et al., 2025; Manik et al., 2024; Novita et al., 2023; Panjaitan et al., 2023; Syahputri et al., 2024) who state that firm size moderates the effect of profitability on firm value. In larger companies, higher profitability may not always result in a proportionally higher firm value because investors may have higher expectations regarding the performance of large firms (Burhani et al., 2023). Investors may also consider other factors, such as asset utilization, growth prospects, and corporate policies (Mahardhika et al., 2025). Therefore, the positive signal from profitability may become weaker as firm size increases. Based on this argument, firm size is expected to weaken the positive effect of profitability on firm value.

Based on Signaling Theory, solvency and profitability provide information that can be used by investors to assess a company's financial condition and future prospects. Solvency and profitability are therefore expected to have positive effects on firm value because favorable financial performance can provide positive signals to investors (Syahputri et al., 2024). Firm size is also expected to influence the strength of these signals. In larger firms, investors may consider broader information beyond debt and profitability, which may reduce the strength of the relationship between these variables and firm value (Mahardhika et al., 2025). Therefore, this study proposes four hypotheses examining the direct effects of solvency and profitability and the moderating effects of firm size.

H4: Firm size moderates the effect of profitability on firm value.

3. Methods

3.1 Research Design

This study employs a quantitative approach with a descriptive and verificative research design to examine the effects of solvency and profitability on firm value, with firm size as a moderating variable, among companies in the Food and Beverage subsector listed on the Indonesia Stock Exchange during the 2021–2025 period. The verificative method is used to analyze the causal relationship between financial performance indicators (solvency and profitability) and firm value through panel data regression analysis. The quantitative approach is considered appropriate because the study aims to empirically test the proposed hypotheses using statistical analysis of numerical data derived from companies' annual financial reports. The explanatory research design enables the examination of causal relationships between independent variables (Solvency and Profitability), moderating variable (Firm Size), and dependent variable (Firm Value).

3.2 Population and Sample

The population for this study consists of 83 companies in the Food and Beverage subsector listed on the Indonesia Stock Exchange during the 2021–2025 period. The Food and Beverage subsector was selected due to its strategic role in the Indonesian economy, continued growth supported by high public demand, and the challenges it faces in the form of increasingly intense business competition and changing economic conditions. Using purposive sampling, the study selected companies that met the following criteria: (1) Food and Beverage subsector companies listed on the Indonesia Stock Exchange during the 2021–2025 period; (2) companies that published financial statements



consecutively throughout the study period; (3) companies that presented financial statements in Rupiah; and (4) companies that generated positive profits during the study period. The first criterion ensures that the selected companies are consistent with the defined research population. The second criterion was applied to ensure the availability of complete and consecutive financial data throughout the observation period. The third criterion was used to maintain comparability of financial information because all financial data were presented in Indonesian Rupiah. The fourth criterion ensured the availability of positive earnings required to measure profitability and maintain consistency with the research objective. Based on these criteria, a sample of 27 companies was obtained, resulting in a total of 135 observations (27 companies $\times$ 5 years).

However, the fourth sampling criterion may introduce potential sample bias because companies that experienced losses during the study period were excluded from the sample. Therefore, the findings of this study may have limited generalizability to Food and Beverage companies experiencing negative earnings. The results should therefore be interpreted primarily in the context of companies that generated profits during the 2021–2025 period.

3.3 Data Collection Techniques

Secondary data were collected from companies' annual financial reports obtained from the official website of the Indonesia Stock Exchange (IDX), namely www.idx.co.id. The financial reports were accessed and downloaded from the official IDX website in April 2026. The data collection procedure involved several sequential steps: (1) identification of Food and Beverage subsector companies listed on the IDX during the 2021–2025 period; (2) selection of companies meeting the predetermined purposive sampling criteria; (3) extraction of financial data from annual reports, including information required for calculating firm value (PBV), solvency (DER), profitability (ROA), and firm size (natural logarithm of total assets); and (4) documentation of all extracted data systematically organized into a panel dataset suitable for statistical analysis using IBM SPSS Statistics version 27. The secondary data sources employed in this research are considered reliable as they represent official publications from the Indonesia Stock Exchange.

3.4 Operational Definition of Variables

The operational definitions of the variables examined in this study are presented in Table 1.

Table 1. Operational Definition and Measurement of Variables

Variable	Definition	Measurement	Scale	References
Firm Value (Y)	Market valuation of the company relative to its book value	$PBV = \frac{\text{Market Price per Share}}{\text{Book Value per Share}}$	Ratio	Aprilianingsih et al. (2024); Habsari et al. (2024)
Solvency (X_1)	Company's ability to meet obligations through debt relative to equity	$DER = \frac{\text{Total Debt}}{\text{Total Equity}}$	Ratio	Komala et al. (2021); Sudjiman et al. (2022)



Variable	Definition	Measurement	Scale	References
Profitability (X ₂)	Company's ability to generate profit from total assets	ROA = Net Income / Total Assets × 100%	Ratio	Iskandar et al. (2020); Aprilia et al. (2021)
Firm Size (Z)	Company size based on total assets	SIZE = Ln(Total Assets)	Ratio	Chandra et al. (2022); Ningsih et al. (2024)

Source: Developed for this research (2026)

3.5 Data Analysis Techniques

Data analysis in this study is conducted using IBM SPSS Statistics version 27. The analysis stages include:

- 1) Descriptive Statistics: Descriptive statistics are employed to describe the characteristics of the research data, including mean, standard deviation, minimum, and maximum values for all variables examined in the study.
- 2) Classical Assumption Tests: Prior to hypothesis testing, classical assumption tests are conducted to ensure that the regression model satisfies the required assumptions so that the estimation results are more reliable. The tests include normality test using Kolmogorov-Smirnov where data is considered normally distributed if $p > 0.05$; multicollinearity test using Variance Inflation Factor (VIF) and Tolerance where $VIF < 10$ and $Tolerance > 0.10$ indicate absence of multicollinearity; heteroscedasticity test using Glejser test where the model is considered homoscedastic if $p > 0.05$; and autocorrelation test using Durbin-Watson where values between 1.5 and 2.5 indicate no autocorrelation.
- 3) Multiple Linear Regression Analysis: Multiple linear regression analysis is employed to examine the direct effects of solvency and profitability on firm value. The regression equation model is formulated as follows:

Model 1: Direct Effects Model

$$PBV_{it} = \alpha + \beta_1 DER_{it} + \beta_2 ROA_{it} + \beta_3 SIZE_{it} + \varepsilon_{it}$$

Model 2: Moderation Effects Model

$$PBV_{it} = \alpha + \beta_1 DER_{it} + \beta_2 ROA_{it} + \beta_3 SIZE_{it} + \beta_4 (DER_{it} \times SIZE_{it}) + \beta_5 (ROA_{it} \times SIZE_{it}) + \varepsilon_{it}$$

Where:

PBV	= Firm Value (Price-to-Book Value)
DER	= Solvency (Debt-to-Equity Ratio)
ROA	= Profitability (Return on Assets)
SIZE	= Firm Size (Natural Logarithm of Total Assets)
DER × SIZE	= Interaction term between Solvency and Firm Size
ROA × SIZE	= Interaction term between Profitability and Firm Size
α	= Constant
β_1 – β_5	= Regression coefficients
ε	= Error term
i	= Company
t	= Year



- 4) Hypothesis Testing: Hypothesis testing is conducted using:
- t-test (Partial Test) to determine the partial effect of each independent variable on firm value. The hypothesis is accepted if the probability value (p-value) is less than the significance level of 5% ($p < 0.05$) with t-statistic $>$ t-table.
 - F-test (Simultaneous Test) to examine the simultaneous effect of independent variables on firm value. The model is considered significant if the probability value (p-value) is less than the significance level of 5% ($p < 0.05$).
 - Coefficient of Determination (R^2) to measure the model's ability to explain variations in firm value. R^2 values of 0.25, 0.50, and 0.75 are considered weak, moderate, and substantial, respectively.
 - Moderation testing is conducted using Moderated Regression Analysis (MRA) by examining the significance of the interaction terms between the independent variables and firm size.

All hypothesis tests are conducted at a significance level of 5% ($p < 0.05$) using IBM SPSS Statistics version 27. The analysis examines how solvency and profitability influence firm value, and whether firm size moderates these relationships in Food and Beverage subsector companies listed on the Indonesia Stock Exchange during the 2021–2025 period.

4. Results and Discussion

4.1 Results

Table 2. Descriptive Statistics

Variable	Mean	Median	Max	Min	Std. Dev	Obs.
Solvency	0.8343	0.8100	2.2200	0.2800	0.36158	135
Profitability	0.3093	0.3000	0.7500	0.1000	0.10228	135
Firm Value	1.3833	1.2000	3.8700	0.1000	0.68085	135
Firm Size	5.4287	5.4300	5.6100	5.1700	0.11533	135

Source: Data processed by researchers (SPSS v.27), 2026

Table 2 presents the descriptive statistics for all variables examined in this study based on 135 observations from 27 Food and Beverage companies listed on the Indonesia Stock Exchange during the 2021–2025 period. The solvency variable has a mean of 0.8343, indicating that, on average, the sample companies have a debt-to-equity ratio of 0.8343, suggesting that the companies rely moderately on debt financing relative to equity. The standard deviation of 0.36158 indicates that solvency levels are relatively consistent across the sample companies. The profitability variable has a mean of 0.3093, indicating that, on average, the sample companies generate a return on assets of approximately 30.93%, suggesting strong profitability performance in the Food and Beverage subsector. The standard deviation of 0.10228 indicates that profitability levels are relatively consistent across the sample companies. Furthermore, the firm value variable has a mean of 1.3833, indicating that, on average, the market values sample companies above their book value, reflecting favorable market expectations and growth prospects. The standard deviation of 0.68085 suggests that firm value differs considerably across companies during the observation period. As for firm size, it has a mean of 5.4287 and a standard deviation of 0.11533. The small standard deviation relative to the mean indicates that the sample companies have relatively similar asset sizes, confirming that the sample consists of companies with comparable scales of operations.



Table 3. Classical Assumption Test Results

Test	Indicator	Result	Conclusion
Normality	Asymp. Sig. (2-tailed)	0.200	Normal distribution
Multicollinearity	Tolerance	>0.10	No multicollinearity
	VIF	<10	No multicollinearity
Heteroscedasticity	Glejser Sig.	>0.05	No heteroscedasticity
Autocorrelation	Durbin-Watson	1.863	No autocorrelation

Source: Data processed by researchers (SPSS v.27), 2026

Table 3 presents the classical assumption test results. The normality test using the Kolmogorov-Smirnov method shows an Asymp. Sig. value of 0.200, which is greater than 0.05. Thus, the study's residuals are normally distributed, meaning the regression model satisfies the normality assumption. The multicollinearity test results show that the tolerance values for each variable were found to be greater than the tolerance threshold of 0.10, specifically: solvency (0.923), profitability (0.920), and firm size (0.958). Furthermore, the VIF values for each variable are less than the variance inflation factor (VIF) threshold of 10, specifically: solvency (1.084), profitability (1.087), and firm size (1.044). Therefore, it can be concluded that there is no indication of multicollinearity issues. The heteroscedasticity test using the Park test method shows that the significance values for each variable were greater than 0.05: solvency (0.375), profitability (0.491), and firm size (0.238). Therefore, it can be concluded that the data do not exhibit heteroscedasticity. The autocorrelation test shows that the Durbin-Watson value obtained is 1.863. Therefore, it can be concluded that there is no autocorrelation in this study, given that $1.764 < 1.863 < 2.137$.

Table 4. Hypothesis Test Results

Variable	Model 1		Model 2		Result
	Coeff.	Prob.	Coeff.	Prob.	
C	4.270	0.075	-40.926	0.001	
Solvency	0.763	0.000	26.892	0.010	H1 accepted
Profitability	3.184	0.000	92.195	0.000	H2 accepted
Firm Size	-0.830	0.058	7.483	0.001	
Solvency × Firm Size			-4.790	0.012	H3 accepted
Profitability × Firm Size			-16.419	0.001	H4 accepted
R Squared	0.319		0.310		
Adjusted R Squared	0.304		0.294		
Prob (F-Stat)	0.000		0.000		

Source: Data processed by researchers (SPSS v.27), 2026

Based on the panel data regression results presented in Table 4, the regression equations of this study can be formulated as follows:

Model 1 Main Effect Model:

$$FV = 4.270 + 0.763(\text{Solvency}) + 3.184(\text{Profitability}) - 0.830(\text{Firm Size}) + \varepsilon$$

Model 2 (Moderated Regression Analysis Model):

$$FV = -40.926 + 26.892(\text{Solvency}) + 92.195(\text{Profitability}) + 7.483(\text{Firm Size}) - 4.790(\text{Solvency} \times \text{Firm Size}) - 16.419(\text{Profitability} \times \text{Firm Size}) + \varepsilon$$

Based on the regression results presented in Table 4, this study examines the direct effect of solvency and profitability on firm value, as well as the moderating role of firm size in the relationship between financial performance and firm value. The regression



analysis was conducted using multiple linear regression and Moderated Regression Analysis (MRA).

Model 1 explains the direct relationship between the independent variables and firm value, while Model 2 incorporates interaction variables to examine the moderating effect of firm size through Moderated Regression Analysis (MRA). The regression results indicate that solvency and profitability significantly influence firm value, while firm size does not have a significant direct effect on firm value. Furthermore, the R-squared values of 0.319 in Model 1 and 0.310 in Model 2 indicate that the regression models have moderate explanatory power in explaining variations in firm value among Food and Beverage companies during the observation period. The Adjusted R-squared values of 0.304 and 0.294 confirm the stability of the models. The probability values of the F-statistic in both models are below 0.05, confirming that the regression models are statistically significant and appropriate for hypothesis testing.

4.2 Discussion

4.2.1 Solvency Affects Firm Value

The hypothesis testing results indicate that solvency has a significant positive effect on firm value, with a coefficient value of 0.763 and a probability value of 0.000, indicating that H1 is accepted. This finding suggests that the use of debt is one of the aspects investors consider when assessing a company's condition before investing their capital. If debt is managed optimally and generates a rate of return on funds that exceeds the cost of debt, it can improve the company's performance and lead to an increase in corporate value (Arief et al., 2023). Based on Signaling Theory proposed by Spence (1973), which explains that the information published by a company in the form of financial statements serves as a signal used by investors to assess the company's prospects. A high level of solvency, coupled with the company's ability to manage debt effectively, can serve as a positive signal for investors. Investors will assess that the company has earned the trust of its creditors because it is deemed capable of meeting its long-term obligations and generating strong cash flow (Ningsih et al., 2024). This finding is consistent with Faisal et al. (2025), Iria et al. (2025), Rinofah et al. (2022), and Tambun et al. (2022), which found that solvency positively influences firm value.

4.2.2 Profitability Affects Firm Value

The hypothesis testing results indicate that profitability has a significant positive effect on firm value, with a coefficient value of 3.184 and a probability value of 0.000, indicating that H2 is accepted. This finding suggests that a company's ability to generate profits is one of the factors influencing investors' assessment of the company. The higher a company's profitability, the higher its corporate value will be. The higher the profits a company earns, the greater investors' confidence in the company's prospects, which can drive an increase in stock prices and corporate value (Kenny et al., 2024). According to signaling theory, a company with high profits sends a positive signal to investors because it indicates that the company has strong performance. This positive signal encourages investors to invest, thereby increasing demand for the company's stock and, consequently, its value (Fuadah et al., 2026). Profitability reflects the efficiency and effectiveness of a company's management in utilizing its assets to generate earnings. A high ROA indicates that the company is efficient in managing its assets to produce profits, which is a strong signal of management quality and operational excellence (Iskandar et al., 2020). This



finding is consistent with Anisa et al. (2021), Narga et al. (2025), and Nugrahini et al. (2024), which found that profitability positively influences firm value.

4.2.3 Firm Size Moderates the Effect of Solvency on Firm Value

The hypothesis testing results indicate that firm size moderates the effect of solvency on firm value, with an interaction coefficient of -4.790 and a probability value of 0.012, indicating that H3 is accepted. This finding suggests that firm size weakens the effect of solvency on firm value, as the interaction regression coefficient is negative (-4.790). This indicates that as firm size increases, the effect of solvency on firm value tends to weaken. This suggests that for companies with larger assets, the use of debt is not always assumed to be a factor capable of increasing firm value. Investors will consider various other factors (Nadiya et al., 2022). This aligns with signaling theory, which explains that investors use information about a company's capital structure as a signal in making investment decisions. For large companies, information regarding debt levels is not always the most dominant signal for investors. Investors tend to expect that large companies are capable of managing their resources more effectively, so their assessments are not based solely on the amount of debt the company uses. If the use of debt is not accompanied by an improvement in company performance, operational efficiency, or profit growth, the signal received by investors becomes weaker. This condition causes the relationship between solvency and firm value to weaken as the size of the company increases. This finding is consistent with Denny et al. (2025), Nadiya et al. (2022), and Tanaya et al. (2025), which found that firm size weakens the effect of solvency on firm value.

4.2.4 Firm Size Moderates the Effect of Profitability on Firm Value

The hypothesis testing results indicate that firm size moderates the effect of profitability on firm value, with an interaction coefficient of -16.419 and a probability value of 0.001, indicating that H4 is accepted. This finding suggests that firm size weakens the effect of profitability on firm value, as the interaction regression coefficient is negative (-16.419). The results of this study indicate that for larger firms, an increase in profitability does not always lead to a higher increase in firm value compared to smaller firms, as investors tend to have higher expectations of larger firms (Fuadah et al., 2026). According to Signaling Theory, profitability serves as a signal reflecting a firm's ability to generate profits through its operational activities. However, for larger companies, the high operating costs they must bear can reduce the profits generated, resulting in suboptimal profitability. This situation sends a negative signal to investors because a decline in a company's profits can reduce investment interest, which ultimately leads to a decline in stock prices and corporate value (Machmuddah et al., 2025). Larger firms operate in more complex environments and are subject to greater public scrutiny, which means investors have access to more comprehensive information beyond just profitability when assessing firm value. Additionally, larger firms may face diminishing returns to scale, where the marginal benefit of additional profitability on firm value decreases as the firm grows (Chandra et al., 2022). This finding is consistent with Atmadja et al. (2024), Fuadah et al. (2026), and Septiana et al. (2024), which found that firm size weakens the effect of profitability on firm value.



5. Conclusion

This study examines the influence of social norms, habit, and environmental awareness on energy saving behavior among lecturers in three approved higher education institutions in Medan. The sample consists of 83 lecturers selected from three colleges of the College of Informatics and Computer Management. Multiple linear regression analysis was employed to test the proposed hypotheses.

The results indicate that social norms have a positive and significant effect on energy saving behavior, suggesting that the more social standards are perceived by lecturers in the work environment, the higher the likelihood of lecturers to behave in energy saving behavior. This finding confirms that social norms function as a psychological mechanism that creates informal social pressure, where individuals adjust their behavior to align with group expectations and standards. Habit has a positive and significant effect on energy saving behavior, and it is the most dominant variable compared to other variables. This suggests that the habits that are acquired regularly have a vital impact in affecting the energy saving behavior of lecturers in daily activities on campus. Habits represent automatic behavioral responses that are triggered by contextual cues without conscious deliberation, making them powerful drivers of sustained energy-saving behavior. Environmental awareness likewise has a positive and significant effect on energy saving behavior, implying that the more environmental consciousness of lecturers, the more inclination of energy saving behavior. Environmental awareness encompasses knowledge about environmental issues and recognition of personal responsibility for environmental protection, providing the intrinsic motivation that supports sustainable behavior.

The simultaneous test results show that social norms, habits, and environmental awareness collectively have a substantial influence on energy saving behavior, with an Adjusted R Square value of 0.534 indicating that the three independent variables explain 53.4% of the variance in energy saving behavior, while the remaining 46.6% is influenced by other factors outside the research model. The findings suggest that energy-saving behavior is mainly influenced by the integration of social influence, behavior automatization, and environmental cognition. Combined, these characteristics account for a considerable part of energy saving behavior, demonstrating that higher education sustainability is driven not only by institutional rules but also the active behavioral participation of lecturers in the workplace.

The theoretical implications of this study extend the application of social norm theory, habit theory, and environmental awareness theory to the context of energy saving behavior among lecturers in higher education. The finding that habit is the most dominant predictor suggests that automatic behavioral patterns are more influential than cognitive factors or social pressure in driving sustained energy conservation, highlighting the critical role of automaticity in pro-environmental behavior. This study also provides empirical evidence on the determinants of energy saving behavior in the higher education context, which has been under-researched compared to household or industrial settings.

From a practical perspective, this study provides actionable insights for higher education institutions seeking to promote energy saving behavior among academic staff. Higher education institutions need to boost green campus initiatives by establishing permissive social norms, organized behavioral routines, and continual environmental awareness programs. Institutional leaders must create energy-efficient standard operating processes, establish real-time feedback systems on energy use, and instill sustainability ideals into the business culture. Furthermore, training and awareness campaigns on environment should be organized on a regular basis to enhance the motivation of lecturers



towards sustainable activities. Indicators of green behavior embedded in institutional performance evaluation systems could further enhance long-term behavioral change and institutional sustainability performance.

This study has several limitations that should be acknowledged. First, the study uses a cross-sectional design, which limits the ability to establish causal relationships between variables. Second, the study relies on self-reported data collected through questionnaires, which may be subject to social desirability bias and common method bias. Third, the study focuses on lecturers from three STMIK universities in Medan City, which may limit the generalizability of the findings to other types of higher education institutions, other regions, or other groups of employees. Fourth, the study does not examine the moderating role of individual differences such as gender, age, or academic discipline in the relationships examined. Fifth, the study does not include other potential determinants of energy saving behavior such as institutional policies, supporting facilities, organizational incentives, or other psychological variables.

Future research should incorporate objective measures of energy consumption to validate self-reported behavior and reduce social desirability bias. Researchers should examine the relationships observed in this study in other higher education contexts and cultural settings. Future studies should investigate the moderating role of individual and organizational factors in the relationships between social norms, habits, environmental awareness, and energy saving behavior. Researchers should also explore the effectiveness of different intervention strategies, such as feedback mechanisms, incentives, and education programs, in promoting energy saving behavior in higher education institutions. Finally, future research could employ qualitative approaches such as interviews or focus groups to provide richer insights into the psychological and social mechanisms underlying energy saving behavior in the academic workplace.

In conclusion, this study contributes to the growing body of literature on energy saving behavior in higher education institutions by providing empirical evidence on the influence of social norms, habit, and environmental awareness. The findings suggest that energy-saving behavior is driven by the integration of social influence, behavior automatization, and environmental cognition, with habit emerging as the most dominant predictor. As higher education institutions increasingly seek to promote sustainability, understanding the mechanisms through which behavioral factors influence energy conservation becomes increasingly important for developing effective intervention strategies, designing green campus initiatives, and fostering a culture of sustainability in the academic workplace.

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