

The Effect of Women on the Board of Directors, Firm Size, and Profitability on Firm Value at PT Astra Agro Lestari Tbk for the 2015–2024 Period

Julia Pramita^{1*}, Ifa Nurmasari²

^{1,2} Faculty of Economics and Business, Pamulang University,
Indonesia.

Abstract

This study examines the associations of women's representation on the board of directors (WOBD), firm size, and profitability with firm value at PT Astra Agro Lestari Tbk during 2015–2024. Using ten annual observations, the study employs descriptive statistics and multiple linear regression. The results show that WOBD has a negative but insignificant coefficient ($\beta = -0.031$; $p = 0.146$), firm size has a negative and significant coefficient ($\beta = -4.320$; $p = 0.002$), and net profit margin (NPM) has a negative but insignificant coefficient ($\beta = -0.006$; $p = 0.773$). The overall model is significant ($F = 12.874$; $p = 0.005$), with an R^2 of 0.866. Firm size is negatively associated with firm value, whereas WOBD and NPM show no significant partial associations. These findings should be interpreted cautiously due to the small sample and limited variation in WOBD.

Keywords: Board Gender Diversity; Firm Size; Net Profit Margin; Firm Value; Price-to-Book Value.

JEL Classification: G32, G34, L25, M41.

Corresponding author's email: juliapramita922@email.com

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Introduction

Indonesia's economy heavily relies on the palm oil industry, as it is the largest contributor to export revenues. Indonesia's position as the world's leading producer and exporter of palm oil makes this industry highly important to the country. In general, the agricultural sector is one of the main pillars of Indonesia's economy, consistently ranking among the top three contributors to Gross Domestic Product (GDP). Within this sector, oil palm plantations serve as the primary driving force. As the largest exporter, Indonesia earns substantial foreign exchange revenues, which significantly support the State Budget (APBN). As evidence, palm oil export values increased from USD 16.95 billion in 2015 to USD 27.74 billion in 2022. This demonstrates the crucial and irreplaceable role of palm oil in driving Indonesia's economic growth (Statistik, 2023).

The palm oil industry plays a key role in the economy; however, it faces significant challenges in maintaining firm value stability. Firm value, which reflects how the market assesses a company's performance, often fluctuates due to external factors such as global palm oil prices and government policies. Although palm oil export volumes remained high in 2016, their total value declined sharply compared to 2015. This had a substantial impact on profitability and overall firm value. There is a notable gap between strong overall economic performance and the unpredictable performance of companies. This situation warrants further examination, particularly regarding how corporate financial practices can help mitigate external risks and maintain value stability (Faisal, 2025).

The palm oil industry is dominated by large companies, such as PT Astra Agro Lestari (AALI) and PT Sinar Mas Agro Resources and Technology (SMAR). These two companies have different competitive advantages. AALI excels due to its extensive land holdings of approximately 286,000 hectares and higher profitability, with a net profit margin of 5.26% in 2023 (www.astra-agro.co.id accessed via the 2023 Annual Report)(Sub Bagian Evaluasi dan Pelaporan and H., 2023). On the other hand, SMAR has a different strength, namely its significantly larger assets of around IDR 41 trillion compared to AALI's IDR 29.7 trillion. In addition, SMAR is also known to be more efficient in its operations, as indicated by analyses from several academic studies. These strategic differences illustrate the unique ways in which the two companies compete in the market (www.smart-tbk.com, accessed on September 13, 2025)(Devex, 2022).

PT Astra Agro Lestari Tbk has cemented its position as a key player in the national agribusiness industry. The company integrates its operational role within the palm oil supply chain to accommodate both domestic and international market demand. Amid industry shifts, ensuring strong financial performance is crucial for the company to maintain its value. Management, specifically the presence of women on the board of directors, company size, and strong profitability (net profit margin) become vital when facing external pressures. Consistent financial strength builds investor confidence, which ultimately can enhance the company's value.

Entity value indicates the level of shareholder confidence in a company's ability to generate cash flow and maintain stable performance in future periods. Key financial indicators, such as women on the board of directors, company size, and net profit margin, are not merely figures in financial reports but reflect the company's fundamental condition over time. The representation of women on the board reflects governance and diversity aspects, company size indicates operational capacity and scale, while the net profit margin reflects managerial effectiveness in converting revenue into net profit through optimal cost control. The periodic dynamics of these three ratios provide a comprehensive picture of financial health and serve as a basis for estimating trends in the company's market performance. Therefore, a thorough analysis of the relationship between financial ratios and their development over a specific period is crucial. By reviewing historical data from 2015 to 2024, researchers can observe the impact of changes in financial ratios on the company's value. This understanding is essential for identifying how managerial decisions, market movements, and external factors, such as Crude Palm Oil (CPO) prices and government regulations, affect the company's financial performance and investor confidence. PT Astra Agro Lestari Tbk faces a complex business landscape, grappling with fluctuating Crude Palm Oil (CPO) prices, climate change, and evolving environmental and social regulations. Therefore, the company must maintain a strong and efficient financial system to ensure business continuity. Financial ratios, particularly women on the board of directors, company size, and profitability (net profit margin), serve as important tools to assess its capacity to manage these risks. Through sound financial management, the company can enhance its value in the eyes of investors and other stakeholders. Stable and transparent performance fosters market confidence in its long-term prospects.

Table 1 Financial Data of PT Astra Agro Lestari Tbk for the Period 2015 – 2024

<i>Years</i>	<i>Women on Board of Directors (WOBD)</i>	<i>Firm Size (ln (Total Assets))</i>	<i>Net Profit Margin</i>	<i>Firm Value (PBV)</i>
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2015	0	30,70	5,33	2,13
2016	0	30,82	14,97	1,84
2017	0	30,85	11,96	1,35
2018	0	30,92	7,97	1,17
2019	0	30,93	1,40	1,48
2020	0	30,96	4,75	1,23
2021	0	31,05	8,50	0,86
2022	0	31,01	8,21	0,69
2023	0	30,99	5,25	0,60
2024	14,29	30,99	5,44	0,51

Source: Data processed from the financial statements of PT Astra Agro Lestari Tbk for the period 2015 – 2024

Table 1 shows that PBV declined from 2.13 in 2015 to 0.51 in 2024, while the reported firm-size measure remained within a relatively narrow range of 30.70–31.05. Net profit margin (NPM) fluctuated over the observation period, reaching 14.97% in 2016 and falling to 1.40% in 2019. Women’s representation on the board of directors (WOBD) remained at 0% from 2015 through 2023 and reached 14.29% in 2024. These patterns describe the observed data but do not, by themselves, establish that changes in any single explanatory variable caused the decline in PBV. The limited variation in WOBD and the simultaneous changes in other firm characteristics should be considered when interpreting the regression estimates.

Women’s representation on the board of directors, firm size, and profitability are important corporate characteristics to examine in relation to firm value. Data from PT Astra Agro Lestari Tbk indicate that the firm-size measure remained relatively stable, ranging from 30.70 to 31.05, while firm value declined over the 2015–2024 period. Meanwhile, NPM fluctuated considerably, peaking at 14.97% in 2016 and declining to 1.40% in 2019, indicating substantial variation in the company’s profit margin. Furthermore, WOBD was recorded only in the final year of the observation period. The coexistence of declining firm value, a relatively stable firm-size measure, fluctuating profitability, and limited variation in WOBD provides an empirical basis for examining the individual and joint statistical relationships of these variables with firm value.

Firm value is an important indicator of how the capital market evaluates a company’s financial position, governance, and future prospects. Previous studies have examined various factors associated with firm value, including board composition, firm size, and profitability. Nevertheless, empirical findings regarding these relationships remain inconsistent across firms, industries, and observation periods.

Regarding women’s representation on the board of directors (WOBD), several studies,

including Seso (2021), Hamdani and Hatane (2021), and Cahyadi and Angela (2025), reported a significant relationship between female board representation and firm value. These findings suggest that board gender diversity may be relevant to corporate governance and investor perceptions. However, Septiane and Suzan (2021) found that female representation on the board was not significantly associated with firm value. These differences indicate that the relationship between WOBD and firm value may depend on company-specific characteristics, the extent of female representation, and the broader governance context.

Previous research has also reported mixed findings concerning firm size. Anggraini and Muhammad (2024) found a significant relationship between firm size and firm value, whereas Hakim (2021) reported that firm size was not statistically significant in the partial regression analysis. Although larger firms may benefit from greater resources and operating capacity, their size does not necessarily translate into higher market valuation. Investors may also consider asset productivity, operating efficiency, profitability, and future growth prospects when assessing a company's value.

Similarly, the relationship between profitability and firm value remains an empirical question. Kurniawan and Pardistya (2024) reported a significant relationship between net profit margin (NPM) and firm value in the food and beverage subsector. In contrast, Ningsih et al. (2023) found that NPM did not have a statistically significant effect on firm value. These contrasting findings suggest that the association between profitability and market valuation may vary according to industry characteristics, business conditions, and the sustainability of earnings.

This study examines PT Astra Agro Lestari Tbk over the 2015–2024 period. The company's observed data show that its price-to-book value (PBV) declined from 2.13 in 2015 to 0.51 in 2024, while the reported firm-size measure remained within a relatively narrow range of 30.70–31.05. Meanwhile, NPM fluctuated considerably, reaching 14.97% in 2016 and falling to 1.40% in 2019. WOBD remained at 0% from 2015 through 2023 and reached 14.29% in 2024. These patterns provide a company-specific empirical context for examining the relationships among board gender representation, firm size, profitability, and firm value. However, the observed trends alone do not establish that any individual variable caused the decline in PBV.

The research gap addressed by this study lies in examining these relationships within a single-company setting in the plantation industry, where the observed variables display different patterns over the same period. Rather than assuming that the relationships are uniform across firms, this study evaluates whether the findings reported in previous research are also

observed in PT Astra Agro Lestari Tbk. Its contribution is therefore company-specific empirical evidence that may provide a basis for further comparative research. Given the single-firm design, the ten annual observations, and the limited variation in WOBD, the findings are not intended to represent the entire plantation sector or establish definitive causal relationships.

Accordingly, this study aims to examine the statistical relationships between WOBD, firm size, NPM, and firm value, measured by PBV, at PT Astra Agro Lestari Tbk during 2015–2024. Specifically, it investigates the partial associations of WOBD, firm size, and NPM with PBV and evaluates the joint statistical significance of these explanatory variables in the multiple linear regression model.

Literature Review

Firm Value

According to Rizky Pranata (2024), firm value reflects public confidence in a company from its inception to the present. Firm value is closely related to the company's stock price. A high stock price indicates a high firm value. Shareholders seek an increase in firm value because an increase in firm value also enhances shareholder wealth.

Theoretical Framework

Agency theory provides a basis for understanding the potential relationship between corporate governance and firm value. The separation between ownership and managerial control may create information asymmetry and agency costs. Board composition, including women's representation, may contribute to monitoring, deliberation, and the diversity of perspectives in corporate decision-making. Nevertheless, the presence of women on the board does not automatically guarantee a higher market valuation because its potential benefits may depend on the extent of representation, board involvement, and the company's institutional and industry context.

Signaling theory explains how investors may interpret observable corporate characteristics as signals of future prospects and risk. Firm size may convey information about operational scale, resources, and organizational capacity, but a larger asset base does not necessarily translate into higher market valuation if investors anticipate lower growth opportunities, capital inefficiency, or weak expected returns. Profitability, measured by net profit margin, may signal the firm's ability to convert sales into net income. However, market valuation may also reflect

expectations about future cash flows, investment requirements, commodity-price conditions, and risks that are not fully captured by current profitability.

Taken together, agency theory and signaling theory provide complementary explanations for the potential associations between WOBD, firm size, profitability, and firm value. Agency theory emphasizes monitoring and decision-making, whereas signaling theory emphasizes how corporate characteristics may be interpreted by investors. These theories motivate the hypotheses examined in this study, but they do not predetermine the empirical direction or statistical significance of the estimated relationships.

Hypothesis Development

Women on the Board of Directors and Firm Value

Agency theory suggests that board diversity may broaden monitoring perspectives and improve the quality of corporate decision-making. Furthermore, signaling theory suggests that the representation of women on the board of directors (WOBD) may influence investor perceptions of corporate governance and, consequently, firm value. However, the presence of women on the board does not necessarily result in higher firm value, as the relationship may depend on the proportion of female directors, their actual involvement in strategic decisions, and the company's governance context. Previous empirical studies have reported mixed findings. Seso (2021), Hamdani and Hatane (2021), and Cahyadi and Angela (2025) reported a significant relationship between WOBD and firm value, whereas Septiane and Suzan (2021) found no significant effect. These differences indicate the need to examine the relationship in the context of PT Astra Agro Lestari Tbk.

Accordingly, the following hypothesis is proposed:

H1: Women's representation on the board of directors is significantly associated with firm value.

Firm Size and Firm Value

Firm size represents the scale of a company's operations and is commonly measured using total assets or the natural logarithm of total assets. Larger firms may benefit from greater resource availability, broader operating capacity, and better access to external financing. These characteristics may strengthen investor confidence and contribute to higher firm value. Nevertheless, a larger asset base does not automatically result in a higher market valuation, because investors may also consider asset productivity, operating efficiency, profitability, financing decisions, and future growth prospects. Previous studies have reported differing results regarding the relationship between firm size and firm value. Rizqia and Muharramah (2021) and Mildawati (2021) reported a significant relationship, whereas Hakim (2021) found

that firm size was not statistically significant in the partial regression analysis. These inconsistent findings warrant further examination in a specific corporate and industry setting.

Accordingly, the following hypothesis is proposed:

H2: Firm size is significantly associated with firm value.

Profitability and Firm Value

Profitability reflects a company's ability to generate earnings from its business activities. In this study, profitability is measured using the net profit margin (NPM), calculated as net income divided by total sales. A higher NPM indicates that a company generates more net profit from each unit of sales, potentially reflecting effective cost management and operational performance. Strong profitability may increase investor confidence and support firm value. However, the relationship may also depend on the sustainability of earnings, market expectations, business risks, and the company's future growth prospects. Previous empirical findings are not uniform. Nadiya and Afrizon (2023) reported a significant relationship between NPM and firm value, whereas Ningsih et al. (2023) found no statistically significant effect. Therefore, the relationship between profitability and firm value requires further empirical examination.

Accordingly, the following hypothesis is proposed:

H3: Net profit margin is significantly associated with firm value.

The Joint Relationship of WOBD, Firm Size, and Profitability with Firm Value

Women's representation on the board of directors, firm size, and profitability reflect different aspects of a company's governance structure, organizational scale, and financial performance. Although each variable may have a distinct relationship with firm value, their combined contribution can be assessed through the overall significance of a multiple linear regression model. The joint test evaluates whether WOBD, firm size, and NPM collectively provide statistically significant explanatory information about firm value. This hypothesis concerns the joint statistical significance of the explanatory variables rather than implying that each variable must be individually significant.

Accordingly, the following hypothesis is proposed:

H4: Women's representation on the board of directors, firm size, and net profit margin are jointly statistically associated with firm value.

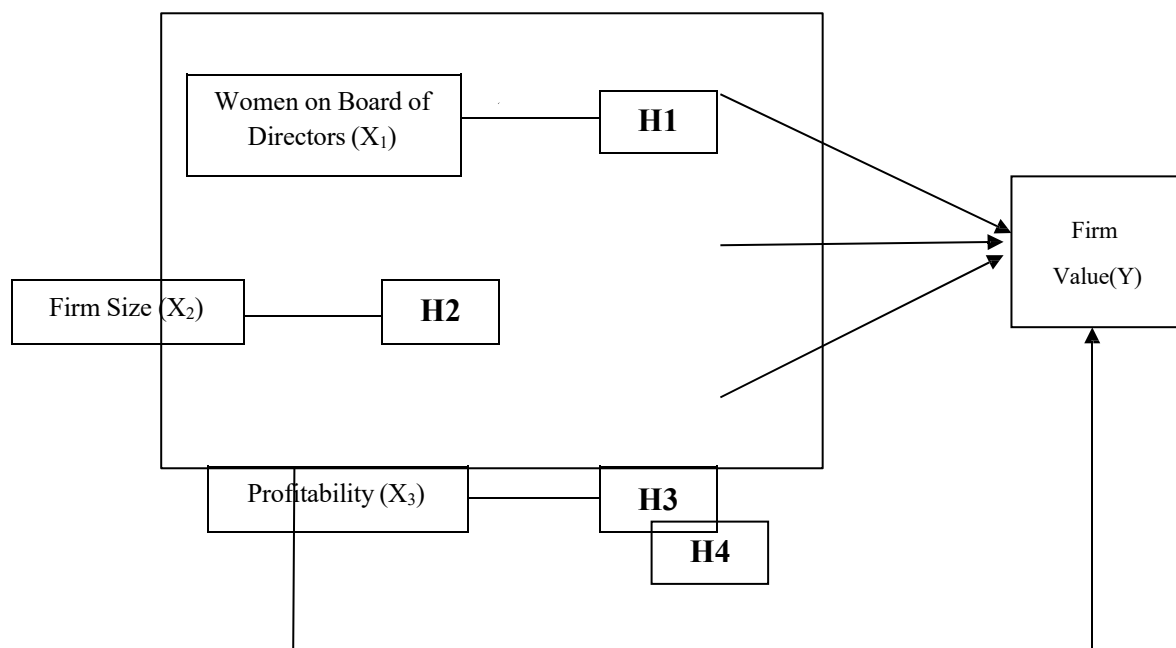


Figure 1 Research Conceptual Framework

Research Methods

Type of Research and Research Approach

According to Sugiyono (2019), associative research is a research problem formulation that seeks to examine the relationship between two or more variables. In this study, the independent variables tested are Women on the Board of Directors (X_1), Company Size (X_2), and Profitability (Net Profit Margin – X_3), while the dependent variable is firm value (Price to Book Value, Y). The research object is PT Astra Agro Lestari Tbk, with data covering the period 2015–2024.

This study employs a quantitative, observational, single-company design using annual secondary data from PT Astra Agro Lestari Tbk for the period 2015–2024. The data were obtained from the company's published financial statements, annual reports, and relevant stock-market information available through the Indonesia Stock Exchange and the company's official disclosures. The dependent variable is firm value, measured by price-to-book value (PBV), while the explanatory variables are women's representation on the board of directors (WOBD), firm size, and net profit margin (NPM).

The study uses multiple linear regression to examine the partial statistical associations between the explanatory variables and firm value, as well as the overall significance of the estimated model. Because the analysis covers only ten annual observations from one company, the results are exploratory and company-specific. The small sample limits statistical power, increases sensitivity to individual observations, and restricts the reliability of conventional statistical inference. Consequently, the regression results are interpreted cautiously and should not be generalized to other companies or the broader plantation industry without further evidence..

Study Location

The object of this study is PT Astra Agro Lestari Tbk. The company data required for this research, namely the financial statements, were obtained from the Indonesia Stock Exchange (IDX) through their official website, www.idx.co.id for the observation period from 2015 to 2024.

Operational Variables

The dependent variable in this study is firm value, measured using the Price-to-Book Value (PBV) ratio. The independent variables are women's representation on the board of directors (WOBD), firm size, and profitability. WOBD is measured as the proportion of women among the members of the board of directors, expressed as a percentage. Profitability is measured using net profit margin (NPM), calculated as net income divided by net sales and

multiplied by 100%. Firm size is measured using the natural logarithm of total assets. The measurement formula, unit, and data source for each variable should be applied consistently throughout the study. The dataset consists of ten annual observations for PT Astra Agro Lestari Tbk covering 2015–2024.

Table 2 Operational Variables

Variable	Type	Operational Definition	Measurement Formula	Scale
Firm Value (PBV)	Dependent (Y)	Market valuation relative to book value of equity	Market Price per Share / Book Value per Share	Ratio
Women on Board of Directors (WOBD)	Independent (X1)	Proportion of female directors on the board	(Number of Female Directors / Total Number of Directors) × 100%	Ratio
Firm Size (SIZE)	Independent (X2)	Company scale based on total assets	Ln(Total Assets)	Ratio
Net Profit Margin (NPM)	Independent (X3)	Ability to generate net income from sales revenue	(Net Income / Net Sales) × 100%	Ratio

Source: Compiled by the authors based on the operational definitions used in this study.

Techniques for Data Analysis

The analysis comprises descriptive statistics, diagnostic assessments of the regression model, multiple linear regression, individual coefficient tests, an overall model significance test, and the coefficient of determination. Diagnostic results are interpreted as evidence concerning specific model assumptions rather than as proof that the model is free from all potential problems. Given the annual time-series structure and the limited number of observations, the reliability of the diagnostic tests and conventional significance levels must be considered carefully. The reported estimates are therefore treated as conditional statistical associations within the observed sample rather than definitive causal effects.

Research Design Limitations

The empirical design has three important limitations. First, the sample consists of only ten annual observations from a single company, leaving six residual degrees of freedom in a

regression model with three explanatory variables and an intercept. Second, WOBD is recorded as zero from 2015 to 2023 and increases to 14.29 only in 2024. This restricted variation makes it difficult to distinguish the relationship between board gender representation and firm value from other changes occurring during the same period. Third, the model does not explicitly control for potentially relevant factors such as crude palm oil prices, leverage, liquidity, dividend policy, and broader market conditions. These limitations reduce the precision, external validity, and causal interpretability of the findings. Future research should consider a longer observation period, a panel of comparable plantation companies, and additional theoretically justified control variables where reliable data are available.

Results and Discussions

Results

Analysis of Descriptive Statistics

Table 3 Descriptive Statistics Test Results

	N	Minimum	Maximum	Mean	Std. Deviation
WOBD	10	.00	14.29	1.4290	4.51889
Firm Size	10	30.70	31.05	30.9220	.10528
NPM	10	1.40	14.97	7.3780	3.88810
Firm Value	10	.51	2.13	1.1860	.53614
Valid N (listwise)	10				

Source: SPSS Version 27 Output, Secondary Data Processed

Based on the results of the descriptive statistical test above, the data distribution obtained by the researcher can be described as follows the *Women on Board of Directors* variable (X_1) has a minimum value of 0 and a maximum value of 14.29, with a mean of 1.4290 and a standard deviation of 4.51889, indicating considerable data variation. The Firm Size variable (X_2) ranges from 30.70 to 31.05, with a mean of 30.9220 and a standard deviation of 0.10528, suggesting relatively low variation. The Profitability variable (Net Profit Margin/ X_3) has a minimum value of 1.40 and a maximum value of 14.97, with a mean of 7.3780 and a standard deviation of 3.88810, indicating a fairly significant level of dispersion. Meanwhile, the Firm Value variable (Y) ranges from 0.51 to 2.13, with a mean of 1.1860 and a standard deviation of 0.53614, reflecting variation in the observed data.

Test of Classical Assumptions

Test of Normality

According to Jessika & Nurmasari (2025), the normality test is part of the classical assumption testing aimed at ensuring that the residuals in the regression model are normally distributed, thereby guaranteeing the validity of the parameter estimates. A normal or approximately normal data distribution constitutes an important prerequisite for establishing a regression model that is statistically appropriate and interpretable. In this study, the normality test was conducted using the Kolmogorov–Smirnov method with the assistance of SPSS version 27, as presented in the following table:

Table 4 Results of the Normality Test

One-Sample Kolmogorov–Smirnov Test

Test Parameters	Value
Unstandardized Residual	—
N	10
Normal Parameters^{a, b}	—
Mean	0.0000000
Std. Deviation	0.19660087
Most Extreme Differences	—
Absolute	0.173
Positive	0.129
Negative	–0.173
Test Statistic	0.173
Asymp. Sig. (2-tailed) ^c	0.200 ^d
Monte Carlo Sig. (2-tailed)^e	—
Sig.	0.535
99% Confidence Interval	—
Lower Bound	0.522
Upper Bound	0.548

Notes:

^a Test distribution is normal.

^b Calculated from data.

^c Lilliefors significance correction.

^d This is a lower bound of the true significance.

^e Lilliefors' method based on 10,000 Monte Carlo samples with starting seed 2,000,000.

Source: SPSS Version 27 output, secondary data processed.

The results presented in the table from the Kolmogorov-Smirnov normality test indicate that the significance value (p-value) obtained is 0.200. Since this p-value exceeds the established significance level ($\alpha = 0.05$), the null hypothesis stating a normal distribution cannot be rejected. Thus, it can be concluded that the residuals used in this study meet the

assumption of normal distribution. In addition, it should be emphasized that the improvement of infrastructure facilities and resources is also an essential requirement.

Test of Multicollinearity

Table 5 Results of the Multicollinearity Test

Coefficients ^a								
Model		Unstandardized		Standardized		Collinearity		VIF
		B	Std. Error	Beta	t	Sig.	Tolerance	
1	(Constant)	134.850	24.739		5.451	.002		
	WOBD	-.031	.018	-.259	-1.669	.146	.933	1.072
	Firm Size	-4.320	.799	-.848	-5.405	.002	.910	1.099
	NPM	-.006	.021	-.047	-.301	.773	.930	1.075

a. Dependent Variable: Firm Value

Source: SPSS Version 27 Output, Secondary Data Processed

Based on the results of the multicollinearity test, the Tolerance values for the variables are as follows: Women on the Board of Directors (WOBD) = 0.933, Firm Size = 0.910, and Net Profit Margin (NPM) = 0.930. Meanwhile, the Variance Inflation Factor (VIF) values for each variable are 1.072 for WOBD, 1.099 for Firm Size, and 1.075 for NPM. All Tolerance values are greater than 0.10, and all VIF values are less than 10.

This condition confirms that the linear relationships among the independent variables are minimal or can be considered independent of each other. Therefore, the variables WOBD, Company Size, and NPM meet the non-multicollinearity assumption and can be incorporated simultaneously into the regression model to estimate their effects on the Firm Value of PT Astra Agro Lestari Tbk for the 2015–2024 period without causing distortion or biased parameter estimates. Additionally, improvements in infrastructure facilities also remain an essential requirement.

Test for Heteroskedasticity

Table 6 Results of the Glejser Heteroskedasticity Test

Coefficients ^a	
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		Standardized				
		B	Std. Error	Beta		
1	(Constant)	-9.925	9.504		-1.044	.337
	WOBD	-.014	.007	-.645	-2.024	.089
	Firm Size	.327	.307	.343	1.065	.328
	NPM	-.001	.008	-.025	-.078	.940

a. Dependent Variable: ABS_RES

Source: SPSS Version 27 Output, Secondary Data Processed

The decision criterion used in the Glejser test is that if the significance value (Sig) > 0.05, it can be concluded that the regression model does not exhibit signs of heteroskedasticity. Based on the implementation of this test, the significance values obtained for each independent variable are as follows: Women on the Board of Directors (WOBD) Sig = 0.089, Company Size (Firm Size) Sig = 0.328, and Profitability (Net Profit Margin) Sig = 0.940, all of which consistently exceed 0.05. This indicates that independent variables do not significantly affect the absolute residuals. Therefore, the regression model is declared free from heteroskedasticity, indicating that the residual variance is constant (homoskedasticity), and the model is suitable for further analysis of the effects of Women on the Board of Directors, Company Size (Firm Size), and Profitability (Net Profit Margin) on the Firm Value of PT Astra Agro Lestari Tbk for the 2015–2024 period.

Test for Autocorrelation

The autocorrelation test aims to identify the presence of a correlation between the error term (residual) in one period and that in another period within a linear regression model. Autocorrelation symptoms generally occur in time series data and can invalidate the regression model because they violate the assumption of independence among residuals. One of the diagnostic methods used to detect this phenomenon is the **run test**. In this study, the run test was applied to detect signs of autocorrelation.

Table 7 Results of the Autocorrelation Test

Runs Test	
	Unstandardized
Test Value ^a	-.03234
Cases < Test Value	5
Cases >= Test Value	5

Total Cases	10
Number of Runs	6
Z	.000
Asymp. Sig. (2-tailed)	1.000

a. Median

Source: SPSS Version 27 Output, Secondary Data Processed

Based on the results of the Run Test, the significance value obtained was 1.000 (1.000 > 0.05). This finding indicates that the regression model is free from signs of autocorrelation. Thus, the autocorrelation issue, which could not be definitively resolved using the Durbin–Watson test, has been addressed by the Run Test, allowing the regression analysis to proceed validly.

Multiple Linear Regression Analysis

Table 8 Results of the Multiple Linear Regression Analysis

Coefficients ^a								
		Unstandardized		Standardized			Collinearity	
		Coefficients		Coefficients			Statistics	
Model		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	134.850	24.739		5.451	.002		
	WOBD	-.031	.018	-.259	-1.669	.146	.933	1.072
	Firm Size	-4.320	.799	-.848	-5.405	.002	.910	1.099
	NPM	-.006	.021	-.047	-.301	.773	.930	1.075

a. Dependent Variable: Firm Value

Source: SPSS Version 27 Output, Secondary Data Processed

Based on the data presented in the table above, the multiple linear regression model can be formulated using the values in the unstandardized coefficients column as follows:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3$$

$$Y = 134,850 - 0,031 x_1 - 4,320 x_2 - 0,006 x_3$$

The estimated regression coefficients indicate that WOBD has a coefficient of −0.031 ($p = 0.146$), firm size has a coefficient of −4.320 ($p = 0.002$), and NPM has a coefficient of −0.006 ($p = 0.773$). At the 5% significance level, the estimated association for firm size is statistically significant and negative, whereas the coefficients for WOBD and NPM are not statistically significant. These results describe conditional associations within the estimated model and should not be interpreted as evidence of causation.

Hypothesis Testing

Partial Test (t-test)

Table 9 Results of the Partial Test (t-test)

Coefficients ^a		Unstandardized		Standardized Coefficient		Collinearity Tolerance	
		B	Std. Error	Beta		ce	VIF
1	(Constant)	134.850	24.739		5.451	.002	
	WOBD	-.031	.018	-.259	-1.669	.146	.933
	Firm	-4.320	.799	-.848	-5.405	.002	.910
	Size NPM	-.006	.021	-.047	-.301	.773	.930

a. Dependent Variable: Firm Value

Source: SPSS Version 27 Output, Secondary Data Processed

The Effect of Women on the Board of Directors (X1) on Firm Value (Y)

Based on the partial t-test results, the Women on the Board of Directors (WOBD) variable has a calculated t-value of -1.669 and a significance value of 0.146 . With 6 degrees of freedom and a critical t-value of 2.44691 at the 5% significance level (two-tailed test), the absolute calculated t-value (1.669) is lower than the critical t-value (2.44691). Furthermore, the significance value of 0.146 exceeds 0.05 . Therefore, H_{a1} is rejected, indicating that WOBD does not have a statistically significant partial association with firm value at PT Astra Agro Lestari Tbk during the 2015–2024 period.

The Effect of Firm Size (X2) on Firm Value (Y)

The partial t-test results show that the Firm Size variable has a calculated t-value of -5.405 and a significance value of 0.002 . The absolute calculated t-value (5.405) exceeds the critical t-value of 2.44691 , while the significance value of 0.002 is below 0.05 . Therefore, H_{a2} is accepted, indicating that firm size has a statistically significant negative partial association with firm value. This result suggests that, within the estimated regression model, higher firm size is associated with lower firm value, holding the other included variables constant. However, this finding represents a statistical association and does not establish a causal relationship.

The Effect of Profitability (Net Profit Margin—X3) on Firm Value (Y)

The partial t-test results indicate that the Profitability variable, measured by Net Profit Margin (NPM), has a calculated t-value of -0.301 and a significance value of 0.773 . The absolute calculated t-value (0.301) is lower than the critical t-value of 2.44691 , and the

significance value of 0.773 exceeds 0.05. Therefore, H_{a3} is rejected, indicating that NPM does not have a statistically significant partial association with firm value at PT Astra Agro Lestari Tbk during the 2015–2024 period. This result means that the analysis does not provide sufficient statistical evidence of an independent relationship between profitability and firm value after accounting for the other variables included in the regression model.

Simultaneous Test (F-test)

Table 10 Results of the Simultaneous Test (F-test)

ANOVA ^a					
Model		Sum of Squares	df	Mean Square	F
1	Regression	2.239	3	.746	12.874
	Residual	.348	6	.058	
	Total	2.587	9		

Sig. .005^b

a. Dependent Variable: Firm Value
b. Predictors: (Constant), NPM, WOBD, Firm Size

Source: SPSS Version 27 Output, Secondary Data Processed

The overall F-test is statistically significant ($F = 12.874$, $p = 0.005$), indicating that the regression model is jointly significant under the assumptions of the test. This result does not imply that every explanatory variable is individually significant. Since $F_{hitung} 12.874 > F_{tabel} 4.76$ and the significance $0.005 < 0.05$, H_a is accepted. This means that, simultaneously, there is a significant effect of Women on the Board of Directors, Firm Size, and Profitability (Net Profit Margin) on Firm Value.

Coefficient of Determination (R-Squared)

Table 11 Results of the Coefficient of Determination Test

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.930 ^a	.866	.798	.24079	1.799

a. Predictors: (Constant), NPM, WOBD, Firm Size
b. Dependent Variable: Firm Value

Source: SPSS Version 27 Output, Secondary Data Processed

Based on the table above (Model Summary), the coefficient of determination (R^2) is 0.866. This value indicates that 86.6% ($R^2 \times 100\%$) of the variability in Firm Value can be simultaneously explained by the independent variables (Women on the Board of Directors, Company Size, and Net Profit Margin). Meanwhile, the remaining 13.4% represents variation

influenced by external factors outside the regression model under study.

Discussion

The Effect of Women on the Board of Directors on Firm Value

The regression results indicate that women on the board of directors (WOBD) have a negative but statistically insignificant association with firm value, with a coefficient of -0.031 , a t-statistic of -1.669 , and a p-value of 0.146 . Therefore, the hypothesis that WOBD significantly affects firm value is not supported by the empirical evidence in this study. This finding suggests that the presence of women on the board of directors was not statistically associated with changes in the price-to-book value (PBV) of PT Astra Agro Lestari Tbk during the 2015–2024 observation period.

This result can be compared with previous studies examining the relationship between female board representation and firm value. Hamdani and Hatane (2021) investigated the relationship between women on the board of directors, firm performance, and firm value, while Cahyadi and Angela (2025) examined the role of women on the board alongside intellectual capital and cost of capital in Indonesian technology-sector firms. Although the Indonesian Financial Review (IFR) has also published research on firm-value determinants in Indonesian companies, the IFR studies discussed in this section focus primarily on financial characteristics rather than female board representation. Therefore, they provide a broader context for understanding firm value but do not directly establish whether women's representation on boards affects market valuation.

Differences in industry characteristics, research periods, model specifications, and sample sizes may contribute to differences in empirical findings. In particular, the present study focuses on a single plantation company and uses only ten annual observations, whereas studies covering multiple firms may capture broader variation in corporate governance practices. The insignificant result should not be interpreted as evidence that women directors have no value for corporate governance. Rather, it indicates that the available data do not provide sufficient statistical evidence of a significant relationship between WOBD and firm value in this particular case.

Furthermore, WOBD in the company remained at 0% from 2015 to 2023 and increased to 14.29% only in 2024. This limited variation makes it difficult to identify a reliable statistical

relationship between female board representation and firm value over the study period. Accordingly, the result should be interpreted cautiously and should not be generalized to other companies or industries.

The Effect of Firm Size on Firm Value

Firm size exhibits a negative and statistically significant association with firm value, with a regression coefficient of -4.320 , a t-statistic of -5.405 , and a p-value of 0.002 . This finding indicates that, within the estimated regression model, higher values of the firm-size measure are associated with lower PBV. Thus, the hypothesis concerning a significant relationship between firm size and firm value is supported, although the observed direction is negative.

This finding is consistent with the results reported by Seda and Kartono (2025). Their study examined PT Ciputra Development Tbk using annual financial data for 2015–2024 and found that firm size had a significant negative association with firm value, while return on assets (ROA) and total asset turnover (TATO) were individually insignificant. The similarity is noteworthy because both studies examine a single Indonesian company over a ten-year period and report a negative, statistically significant firm-size coefficient. However, the comparison should be interpreted in light of the different industries: the present study examines a plantation company, whereas Seda and Kartono (2025) investigate a property-development company. These findings suggest that a negative association between firm size and PBV can occur in company-specific analyses, but they do not establish that the relationship is universal across industries (Seda & Kartono, 2025).

A contrasting result is reported by Sari et al. (2025). Using panel data from 35 Indonesian energy-sector companies over 2019–2023, they found that firm size and the other explanatory variables were not statistically significant individually or jointly. The difference between their findings and the present result may reflect differences in industry characteristics, sample composition, observation periods, and estimation methods. More importantly, it demonstrates that the statistical relationship between firm size and firm value may depend on the empirical context rather than follow a uniform pattern across Indonesian companies (Sari, Astuti and Peshar, 2025).

The negative association found in this study may reflect the fact that company size and market valuation do not necessarily move in the same direction. Firm size represents a measure of the scale of corporate resources or operations, whereas PBV reflects how the market values a

company's equity relative to its book value. Consequently, an increase in company size does not automatically imply a higher market valuation. However, the present regression does not establish the mechanism responsible for the negative association. Because the analysis uses only ten annual observations from one company, the result should be interpreted as a sample-specific statistical relationship rather than evidence that firm expansion causes a decline in firm value.

The Effect of Net Profit Margin on Firm Value

Net profit margin (NPM) has a negative but statistically insignificant coefficient of -0.006 , with a t-statistic of -0.301 and a p-value of 0.773 . Accordingly, the hypothesis that NPM has a significant relationship with firm value is not supported. Within the estimated model, changes in NPM do not provide statistically significant evidence of corresponding changes in PBV during the 2015–2024 period.

This result can be compared with Kurniawan and Pardistya (2024), whose study examined the effects of return on assets, return on equity, and NPM on firm value among Indonesian food and beverage manufacturing companies. Their reported findings indicate that NPM was not statistically significant individually, although the variables in their model were jointly significant. The lack of an individually significant NPM coefficient is therefore comparable to the result of the present study. However, the comparison must account for differences in industry, sample size, observation period, and model specification. Kurniawan and Pardistya examined multiple firms, whereas this study focuses on one plantation company over ten years.

Further comparative evidence is available from the *Indonesian Financial Review*. Seda and Kartono (2025) found that ROA, a profitability measure distinct from NPM, was not individually significant in explaining firm value at PT Ciputra Development Tbk. This provides a related example in which an accounting-based profitability indicator did not demonstrate a statistically significant individual association with market valuation. Nevertheless, ROA and NPM measure different aspects of profitability, so the findings should be regarded as broadly comparable rather than equivalent.

In contrast, Susilawati (2025) reported that profitability had a positive and statistically significant association with firm value in a sample of eight food and beverage companies, comprising 48 firm-year observations from 2018–2023. The difference between that result and the present study highlights the importance of considering the operational measure of profitability, the industry examined, and the sample design when comparing findings. In

particular, the present study's insignificant NPM coefficient does not contradict the broader possibility that profitability may be relevant to firm value under different empirical conditions (Susilawati, 2025).

The insignificant association may indicate that accounting profitability, as measured by NPM, does not independently explain the variation in PBV in this particular sample. Firm value may also reflect market expectations, perceived business risks, growth prospects, and other factors not captured by NPM. These explanations are possible interpretations rather than mechanisms directly tested in this study. Therefore, the result does not imply that profitability is generally irrelevant to firm value; it indicates only that the estimated NPM coefficient is not statistically significant under the current model and data limitations.

The Joint Effect of WOBD, Firm Size, and NPM on Firm Value

The F-test results show that WOBD, firm size, and NPM are jointly statistically significant in explaining variation in firm value, with an F-statistic of 12.874 and a p-value of 0.005. The model reports an R^2 of 0.866 and an adjusted R^2 of 0.798. This means that the model accounts for approximately 86.6% of the observed variation in PBV in the sample, while the adjusted R^2 is 79.8% after accounting for the number of predictors relative to the sample size.

These results can be compared with Seda and Kartono (2025), whose study in the *Indonesian Financial Review* also found that the financial predictors were jointly significant even though ROA and TATO were individually insignificant. The parallel findings illustrate the distinction between individual coefficient tests and the overall model test: a regression model may be statistically significant as a whole even when some explanatory variables do not demonstrate statistically significant individual associations with the dependent variable. Nevertheless, the studies differ in their explanatory variables, so the comparison concerns the pattern of statistical significance rather than equivalence between the models.

The significant F-test does not mean that each independent variable is individually significant. In this study, firm size is statistically significant, whereas WOBD and NPM are not. The joint result therefore indicates that the predictors, considered together, provide statistically significant explanatory information within the estimated model; it does not establish that all three variables independently affect firm value.

The R^2 should also be interpreted cautiously because the analysis is based on only ten annual

observations and three independent variables. With such a small sample, model estimates and goodness-of-fit measures may be sensitive to individual observations and the limited degrees of freedom. Although the reported R^2 indicates a high in-sample fit, it should not be interpreted as proof that the model will perform equally well in other periods or companies. The results of Sari et al. (2025), which found no statistically significant joint effect for their set of predictors in a larger, multi-company energy-sector sample, further illustrate that explanatory performance can vary across empirical settings.

Accordingly, the findings provide preliminary evidence about the relationship among WOBD, firm size, NPM, and PBV at PT Astra Agro Lestari Tbk, rather than definitive evidence that the same relationships hold across Indonesian companies. Future research could extend the observation period, include additional plantation companies, and incorporate relevant market or corporate-governance variables to assess whether the observed associations persist under alternative model specifications.

Overall, the results suggest that firm size is the only variable with a statistically significant individual association with firm value in the estimated model. WOBD and NPM do not show statistically significant individual relationships, although the three predictors are jointly significant. The comparison with studies published in the *Indonesian Financial Review* indicates that firm-value relationships may differ according to the company, industry, sample, and variables examined. These findings highlight the importance of distinguishing individual coefficient tests from the overall model test and of considering the company's specific context when interpreting firm-value determinants.

Conclusions

This study examined the statistical associations of women's representation on the board of directors (WOBD), firm size, and net profit margin (NPM) with firm value, measured by price-to-book value (PBV), at PT Astra Agro Lestari Tbk over the 2015–2024 period. The results show that WOBD has a negative but statistically insignificant coefficient ($\beta = -0.031$, $p = 0.146$). Firm size has a negative and statistically significant coefficient ($\beta = -4.320$, $p = 0.002$), whereas NPM has a negative but statistically insignificant coefficient ($\beta = -0.006$, $p = 0.773$). The overall regression model is statistically significant ($F = 12.874$, $p = 0.005$), with an R^2 of

0.866.

The main finding is that firm size is negatively associated with PBV in the estimated model, while WOBD and NPM do not exhibit statistically significant individual associations with firm value. This suggests that the scale of a company's assets should not be interpreted as a direct indicator of its market valuation. However, the analysis does not establish the mechanisms underlying this association. The WOBD result also requires cautious interpretation because female representation remained at 0% from 2015 to 2023 and increased to 14.29% only in 2024. Consequently, the available observations provide limited variation for assessing the relationship between board gender representation and firm value.

This study contributes firm-specific evidence on corporate governance, firm size, profitability, and market valuation in an Indonesian plantation company. Nevertheless, the findings should be interpreted within the context of the study's limitations, particularly its ten annual observations, limited variation in WOBD, and omission of other potentially relevant explanatory variables. Future research could extend the observation period, examine a broader sample of plantation companies, incorporate theoretically justified control variables, and conduct robustness checks using appropriate alternative model specifications.

From a managerial perspective, the findings suggest that firm size should not be assessed in isolation when evaluating market valuation. Management may also consider asset productivity, earnings sustainability, capital allocation, and market expectations. Similarly, board gender diversity should be assessed in terms of directors' participation, expertise, and contribution to governance rather than representation alone. These implications should be regarded as preliminary because the study does not directly test the mechanisms underlying these managerial considerations.

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