Revisiting the relationship between leverage and firm value: does managerial ownership matter?

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Abstract

This study aims to revisit the role of managerial ownership (MOWN) on the relationship between leverage and firm value by developing a non-monotonic model to test the managerial entrenchment and trade-off hypotheses. Based on a sample of 108 manufacturing firms listed on the Indonesia Stock Exchange from 2014 to 2018, with a total of 540 firm-years and using weighted two-stage least squares, the research findings confirm the first hypothesis that there is a non-monotonic relationship between leverage and firm value, which is inverted N-shaped in firms without MOWN, and asymmetrical convex-shaped in firms with MOWN. The second hypothesis that managerial ownership affects firm value is rejected, but confirms the third hypothesis that managerial ownership moderates the impact of leverage on firm value. The first negative slope of leverage is greater than the subsequent negative slopes in firms without MOWN, indicating that underinvestment and managerial entrenchment issues are more sensitive than the trade-off between debt tax shield and default risk. Conversely, firms with MOWN are more oriented towards the leverage trade-off theory and fit well with good corporate governance. Meanwhile, firms with MOWN have lower performance than firms without MOWN, implying a critical problem in managerial executive selection based on ownership structure rather than on professional competence skills.

Keywords: *leverage, firm value, managerial ownership, corporate governance. managerial entrenchment*

Introduction

A recent empirical study in Indonesia by Lubis et al. (2025) shows that managerial ownership (MOWN) moderates the effect of leverage on firm value. More specifically, they found that leverage and MOWN have a negative impact on firm value, while the interaction between MOWN and leverage (MOWN*LEV) has a positive effect on firm value. These findings remain robust when considering control variables and endogeneity issues by modifying the econometric model specifications to estimate parameters. They suggest that managerial ownership is a useful tool in the mechanism of good corporate governance (CG), particularly in disciplining managers on the use of debt and mitigating managerial entrenchment behavior.

Several critical issues emerge from the study of Lubis et al. First, they argued that the positive interaction effect of MOWN*LEV on firm value indicates that MOWN, as a tool of good CG mechanisms, effectively disciplines entrenched managers. However, the model also shows negative relationships between leverage and firm value, providing unclear and ambiguous findings and evidence. Meanwhile, Tulcanaza-Prieto et al. (2024) found that leverage has a negative effect on firm value using Korean Market Data. However, this effect

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disappears when CG is included as a moderating variable in the research model. They also found that leverage negatively affects firm value in firms with low CG, but it was insignificant in firms with high CG, indicating that CG effectively disciplines managers in using debt. This finding aligns with other studies that found leverage irrelevant when controlling for endogeneity in their models (Sakawa & Watanabel, 2020).

Second, Lubis et al. treated MOWN as exogenous, referring to a previous study and considering that the issue of family ownership in Indonesia is more dominant than managerial ownership. Meanwhile, Mork et al. (1988) found that there were non-monotonic relationships between MOWN and firms, which has received strong support from a subsequent empirical study by McConnell & Servaes (1990). On the other hand, Demsetz and Vilalonga (2001) reexamined the relationship between MOWN and firm value by controlling for endogeneity in a simultaneous equations model. Their study found no relationship between MOWN and firm value, supporting the diffuse ownership theory.

The issue of MOWN in debt policymaking remains a puzzle. Especially in Indonesia, the percentage of MOWN has continued to decline since the 1998 financial crisis. The MOWN data tends to exhibit a binomial distribution, while institutional ownership (IOWN) has increased. In developed countries, institutional ownership in capital markets is typically dominated by sophisticated investors, with strong oversight, GCG, and superior information to optimize firm value. In contrast, many firms listed on the Indonesian stock exchange are owned by institutions with distinct characteristics from those in developed countries. These institutional owners are mostly founders and their inner circle, who serve on the board of directors, but their names are not listed as insiders; instead, only institutional ownership is formally recorded. The market for corporate control faces challenges in identifying insider behavior masked by institutional ownership. Ferreira and Matos (2008) controlled for the potential endogeneity effect of institutional ownership and excluded irrelevant institutional investors, finding evidence that IOWN positively influences firm value.

Third, Lubis et al. treat leverage as an endogenous variable and found that it has a negative effect on firm value. The form of the relationship between leverage and firm value in relation to managerial entrenchment behaviors varies depending on the motive and context. Empirical evidence on the effect of leverage on firm value in previous studies is mixed. Berger et al. (1997) suggest that when managers have discretion in choosing the leverage level, entrenched managers with vested interests may prefer lower leverage than optimal. Entrenched managers may seek more debt to avoid dilution of control rights and to deter takeover attempts (Harris & Raviv,1988). Entrenched managers prefer higher leverage ratios because they have good relationships with creditors and better access to debt markets (John & Litov, 2010). Meanwhile, Ji et al. (2020) reported that there is a positive relationship between managerial entrenchment and leverage in diversified firms and a negative relationship in focused firms. A Study by Borochin and Knopf (2021) found that diffuse MOWN tends to seek an entrenchment motive, while concentrated MOWN has a control motive to determine leverage, equity issuance, and share liquidity.

Fourth, Lubis et al.'s study covered the period 2014–2022, including the COVID-19 pandemic, which led many companies to address financial distress and a decline in firm value. The Jakarta Composite Index (JCI) experienced a sharp decline in March 2020 due to widespread market concerns. Trading on the Indonesia Stock Exchange (IDX) was even temporarily halted several times to quell panic. COVID-19 also increased stock return

volatility in various countries, including Indonesia (Jebran & Chen, 2022; Ullah et al., 2023). The COVID-19 pandemic has forced entrenched managers to focus on addressing the catastrophic impact on firm value. Therefore, their discretion in using debt may be inconsistent and irrelevant to the managerial entrenchment behavior hypothesis due to the noise bias effect of the crisis.

Fifth, non-monotonic issues have not been widely discussed in investigating the relationship between leverage and firm value in Indonesia. Meanwhile, the trade-off theory explains the non-monotonic relationship between leverage and firm value in the form of an inverted U-shaped curve, which occurs due to the trade-off between the debt tax shield and bankruptcy risk in line with higher debt (Kraus & Litzenberger, 1973). Coricelli et al. (2012) found evidence of a non-monotonic relationship between leverage and firm value. A recent study by Karaca et al. (2025) provides empirical evidence of an inverted U-shaped relationship between leverage and firm value.

Sixth, Lubis et al.'s findings suggest that MOWN is a useful tool in good corporate governance mechanisms. However, their empirical model does not consider other CG proxies to obtain robust results. There are differences in corporate governance practices in developed and developing countries. Corporate governance ecosystems in developed countries are more established and effective in enhancing stakeholder trust and positively impacting firm value. Empirical studies support this argument in the US (Bagh et al. 2025; Danilov, G., 2024), European countries (Fatma and Chuoaibi, 2021), and the UK (Lehman et al., 2019). However, poor corporate governance (CG) implementation is a widely recognized ethical governance issue in developing countries, yet empirical evidence remains mixed, as evidenced by Adinegara and Sukamulja (2021) and Wijaya et al. (2025), who found a positive effect in Indonesia, while Lahjie et al. (2023) found a negative effect.

This study aims to reexamine the relationship between leverage and firm value by developing a model to control for six critical issues not considered in the study by Lubis et al. (2025). First, the distribution of MOWN data is closer to a binomial distribution than a continuous distribution; therefore, using a dummy variable is more appropriate to measure MOWN. Second, since the 1998 financial crisis, the development trend of IOWN has shifted the role of MOWN in Indonesia. Referring to the study by Ferreira and Matos (2008), this study treats IOWN as an endogenous variable, using a simultaneous equation model rather than a single equation model. Third, to mitigate the noise effects of the COVID-19 pandemic, this study uses the 2014-2018 period rather than the 2014-2022 period. Fourth, considering previous empirical studies that provided mixed results (positive and negative effects of leverage on firm value), this study develops a non-monotonic model of leverage's effect on firm value, which refers to the studies of Coricelli et al. (2012) and Karaca et al. (2025).

Literature Reviews and Hypothesis Development.

In their seminal paper, Jensen and Meckling (1976) shifted the perspective of capital structure to ownership structure which is determined by insider equity (*Si*) held by the manager,), outside equity (*So*) held by anyone outside of the firm, and debt (*B*) held by anyone outside of the firm, then the total value of equity (*S*) is $S = Si + So$, and the total firm value (*V*) is $V = S + B$. Shareholders and bondholders have an interest in the capital they invest in company assets. In the case of $Si = S$, there is an interest convergence between

management and owner to maximize firm value. Leverage decisions will pay more attention to the trade-off between the benefits of debt tax shields and the increased risk of bankruptcy as a result of higher leverage. In the case *Si = 0*, they require a corporate control mechanism process to prevent managers from committing moral hazard, being undisciplined, or expropriating assets to other entities. This control mechanism raises agency costs, which must be borne by shareholders and bondholders. The higher the equity capital, the higher the equity agency costs borne by shareholders compared to bondholders, and vice versa. Therefore, there will be a control mechanism process for balancing the agency cost of equity and debt between the two parties as an effort to maximize firm value.

From the agency perspective, leverage and ownership structure play important roles in the corporate control mechanism to prevent managerial entrenchment behavior. Weak corporate control mechanisms increase the likelihood of unethical behavior and moral hazard issues arising from managers acting as agents representing owners in managing the company, especially in situations of asymmetric information, or even intentionally creating asymmetric information. Entrenched managers use their power to expropriate wealth from shareholders. Entrenched managers siphon resources to pay for personal perks. They often engage in excessive perk consumption at the owners' expense.

However, empirical evidence provides mixed results. Grier and Zychowicz (1994) examined the substitute hypothesis of institutional investors and leverage. They found that there is a negative relationship between institutional investors and leverage, which indicates that institutional ownership may be a substitute for the managerial disciplinary and signaling role of debt. In contrast, Firth (1995) examined the hypothesis that managers prefer lower debt in the capital structure, while outside stockholders, who hold diversified portfolios, will tolerate a higher debt ratio. His study supported the hypothesis that institutional investors constrain managerial discretion in setting capital structure. Institutional ownership has a positive effect on leverage.

Empirical studies on the effect of leverage on firm value yield mixed results. Some studies find a positive effect of leverage on firm value (Ferreira & Matos, 2008; McConnell & Servaes, 1990), other studies find a negative effect (Demsetz & Vilalonga, 2001; Kanoujiya et al., 2023; Lubis et al., 2025; Morck et al., 1988), while Sakawa and Watanabel (2020) find no effect. Ibhagui and Olokayo (2018) found a positive relationship between leverage and firm value in large firms and a negative relationship in small firms. Cheng and Tzeng's (2011) study on the effect of leverage on firm value indicates that leverage is positively related to firm value up to a certain point, after which the negative effects of bankruptcy risk become more significant. Pratt et al. (2023) examined the effect of leverage on firm value using stochastic frontier analysis. They found that leverage increases firm value and that the negative effect of leverage on firm value is temporary, associated with firms engaging in tax loss carrybacks. Chang et al. (2025) found the effects of leverage on firm value to be negative in pooled data regression and positive in panel data regression. Various empirical evidence indicates that there is a possibility of a non-monotonic relationship between leverage and firm value, which has received less attention in explaining managerial entrenchment behavior.

The problem of unethical behavior and moral hazard encourages the idea of a solution to agency conflicts by strengthening the principles of corporate governance (both internal and external) in business practices (García-Sánchez et al., 2022; Sari et al., 2025). Good

corporate governance practices should reduce agency conflicts, asymmetric information, and align stakeholder interests. Better corporate governance practices should lead to higher firm value. Recent studies have investigated the moderating effect of CG on the relationship between leverage and firm value. Lubis et al. (2025) used MOWN as a proxy for CG in examining the relationship between leverage and firm value. They used a sample of 323 firms listed on the Indonesian Stock Exchange for the period 2014-2022. They treat the endogenous effect of leverage and found that leverage and MOWN negatively affected firm value, while the interaction between leverage and MOWN positively affected firm value. They suggested that MOWN can address the problem of managerial entrenchment behavior. Tulcanaza-Prieto et al. (2024) used a CG index to examine the relationship between leverage and firm value. They used 215 Korean non-financial companies listed on the KOSPI with an observation period of 2017-2020. The study treated the endogeneity of leverage using a simultaneous equation model. The initial model showed that leverage negatively affected firm value. However, this effect disappeared when the interaction of CG and leverage was included in the econometric model. They suggested that CG effectively mitigates the possibility of managerial entrenchment behavior, as reflected in the reduced negative effect of leverage on firm value. They found a positive, though insignificant, effect of leverage on the value of firms with a high level of CG, but a negative and significant effect in firms with a low level of CG. Furthermore, firms with a high level of CG have lower leverage than firms with a low level of CG. Inconsistent empirical findings indicate an unresolved ethical governance problem.

Several studies have investigated the relationship between IOWN and firm value by using leverage as an instrument variable in their research models. Morck et al. (1988) found that IOWN has a positive impact on firm value, but the impact is lower with higher ownership levels. They also found that leverage --- as an instrument variable --- negatively affects firm value. McConnell and Servaes (1990) retested the Morck et al. model with a similar method, also using a curvilinear model, and found results consistent with the Morck et al. study. They also used debt as an instrument variable but found that debt positively affected firm value. Demsetz and Vilalonga (2001) criticized that Morck et al. ignored the endogeneity issue of MOWN, which leads to biased parameter estimates. They retested Morck et al.'s model by considering the endogeneity issue of MOWN in a simultaneous equation model. They found that MOWN did not affect firm value, consistent with the diffuse ownership theory. Meanwhile, they also reported that debt (as a control variable) negatively affected firm value and ownership structure.

Karaca et al. (2025) investigated the non-monotonic relationship between leverage and firm value in manufacturing companies listed on Borsa Istanbul. They found that leverage has an inverted U-shaped effect on firm value. Karaca's study parallels the findings of Coricelli et al. (2012), who also found a non-monotonic relationship between leverage and firm value. Figure 1 shows the conceptual framework, which shows the hypothesis of the non-monotonic relationship pattern between leverage and firm value by considering managerial ownership as a moderator variable.

H_1: Leverage has a non-monotonic effect on firm value

H_2: Managerial Ownership affects firm value

H_3: Managerial Ownership moderates the impact of leverage on firm value

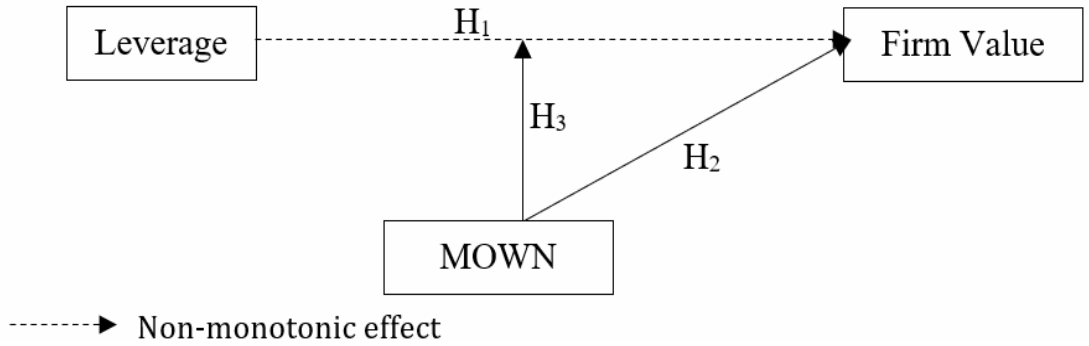

Figure 1. Conceptual Framework

Methods

Data for this study are financial reports and the stock market for manufacturing firms that are listed on the Indonesia Stock Exchange (IDX). The sample selection considers the availability of complete financial data required during the analysis periods. The total sample comprises 118 firms, with the analysis period from 2014 to 2018. This study uses 2014 data as the starting point, referring to the Indonesian Financial Services Authority's (OJK) launch of the Indonesia Corporate Governance Roadmap. Furthermore, the effects of the 2008 global financial crisis have subsided, which will minimize the possibility of the noise bias effect of the crisis, which may lead to misleading results in identifying managerial entrenchment behavior. Entrenched managers may shift their focus to addressing problems that threaten the company's survival. Therefore, this study excludes data from the COVID-19 pandemic, which had a widespread impact on declining firms' performance across many industrial sectors. This study also excludes firms that address financial distress represented by negative equity and/or negative earnings for more than two years. The total net sample size of the study is 108 companies over five years, resulting in 540 firm-year observations. A split sample on the total number of firm-years of 540 firm-year observations; number of firms with and without MOWN of 327 and 213, respectively

Ferreira and Matos (2008) examined the causal relationship between firm value and ownership structure, focusing on IOWN, rather than MOWN. In this study, they also used leverage as an instrument variable. They used the simultaneous equations model with 3SLS to control the endogeneity problem in the model. They found that IOWN positively affected firm value, but firm value negatively affected IOWN. Meanwhile, Fukui et al. (2023) reported that other factors influence leverage as an endogenous variable. Based on considerations of previous studies, this study treats IOWN and leverage as endogenous variables.

Equations (1), (2), and (3) present the initial model, consisting of three equations, that are functions of firm value (Q), leverage (LEV), and institutional ownership (IOWN). The model will be extended to include a non-monotonic model, with and without control variables, for the robustness test. Order identification checks were performed on the initial model, the non-monotonic model, and the robustness test model. The checks indicated that all equations in all models were over-identified. The residual correlation checks for the three equations in each model were also performed. The residuals of each equation are obtained using the Ordinary Least Squares method. All correlation check results indicated no correlation among the residuals for all models. Based on the results of this check, Weighted Two-Stage Least Squares (Weighted 2SLS) was chosen as an efficient and

appropriate technique in hypothesis testing. In addition, Weighted 2SLS is more efficient in dealing with the problem of unbalanced data (Baltagi, 2008), which in this study uses the Managerial Ownership Dummy (MOD) variable with unbalanced data (Tübbicke, 2023).

$$Q_{it} = \alpha_{11.it} + \sum_{t=1}^{T-1} \alpha_{12.t} T_1 + \sum_{k=1}^{K-1} \alpha_{13.i} F_i + \beta_{11} MOD_{it} + \beta_{12} LEV_{it} + \beta_{13}(MOD * LEV)_{it} + \beta_{14} IOWN_{it} + \beta_{15}(MOD * IOWN)_{it} + \beta_{16} STA_{it} + \beta_{17}(MOD * STA)_{it} + \beta_{18} ICOM_{it} + \beta_{19}(MOD * ICOM)_{it} + \beta_{110} ACS_{it} + \beta_{111}(MOD * ACS)_{it} + \varepsilon_{1it} \quad (1)$$

$$LEV_{it} = \alpha_{21.it} + \sum_{t=1}^{T-1} \alpha_{22.t} T_1 + \sum_{k=1}^{K-1} \alpha_{23.i} F_i + \beta_{21} MOD_{it} + \beta_{22} Q_{it} + \beta_{23}(MOD * Q)_{it} + \beta_{24} IOWN_{it} + \beta_{25}(MOD * IOWN)_{it} + \beta_{25} STA_{it} + \beta_{26}(MOD * STA)_{it} + \beta_{27} ROE_{it} + \varepsilon_{2it} \quad (2)$$

$$IOWN_{it} = \alpha_{31.it} + \sum_{t=1}^{T-1} \alpha_{32.t} T_1 + \sum_{k=1}^{K-1} \alpha_{33.i} F_i + \beta_{31} MOD_{it} + \beta_{32} Q_{it} + \beta_{33}(MOD * Q)_{it} + \beta_{33} LEV_{it} + \beta_{34}(MOD * LEV)_{it} + \beta_{35} ASIN_{it} + \varepsilon_{3it} \quad (3)$$

Where $\alpha_{11.it}$, $\alpha_{21.it}$, and $\alpha_{31.it}$ are cross-section and time series intercepts for the data panel; $\alpha_{12.t}$, $\alpha_{22.t}$, and $\alpha_{32.t}$ are time series intercepts for every year (t) with t-1; $\alpha_{13.i}$, $\alpha_{23.i}$, and $\alpha_{33.i}$ are cross-section intercepts for every firm (K) with K-1. Overall, there are 112 intercepts in each equation, consisting of 1 time series cross-section intercept, 107 cross-section intercepts, and 4 time series intercepts. While β_{1x}, β_{2x}, and β_{3x} are the coefficients of the parameter for the exogenous variable, and ε_{it} are cross-section and time series residual errors. Table 1 describes the operational definition and measurement of the main variables. instrument variables, and control variables.

Table 1. Variable Measurement

Variable	Description	Notes
Main Variables		
Q	Market value divided by the book value of assets (MBV)	Varaiya (1987) stated that Tobin's Q and MBV are equivalent measures of value creation, both theoretically and empirically.
LEV	The book value of the long-term debt-to-equity ratio.	Bowman (1980) suggested that the book value of the debt-to-equity ratio performed as well as the market value of the debt-to-equity ratio
IOWN	The number of shares owned by the institution divided by the number of shares outstanding	(Chung & Zhang, 2011)

Variable	Description	Notes
MOD	Managerial Ownership Dummy, 1 for firms with MOWN and 0 for others.	MOWN data is binomially distributed, so measurement with a dummy variable is more appropriate in describing the data.
Instrument Variables		
STA	Sales to the book value of total assets	Ang *et al.* (2000) provide evidence that STA is a good measurement of agency cost
ICOM	The percentage of the number of independent commissioners to the total number of commissioners	Harjoto et al. (2017) consider board structures, especially board independence, as a proxy of corporate governance.
ACS	The number of officers who carry out the function of the company's audit committee	Harjoto et al. (2017)
ASIN	The book value of total assets on sales	Hall (2016) and Nemlioglu and Mallick (2017) employ asset intensity (ASIN) as a proxy of capital intensity.
ROE	Net income on the book value of equity	Chung and Zhang (2011)
Control Variables		
ROA	Net income to the book value of assets	Ji et al. (2020)
SIZE_A	The natural logarithm of total assets	Guo et al. (2016)
SIZE_S	The natural logarithm of total net sales	Ji et al. (2020)

Research Result

Table 2 reports the descriptive statistics and difference test based on a split sample for firms with and without MOWN. The means of *Q, IOWN, ICOM, ROA*, and *ROE* of firms without MOWN are higher than those of firms with MOWN. The results of the t-test show that the difference in the means of the variables of the two samples is statistically significant. The mean of IOWN and ICOM for firms without MOWN is higher than that for firms with MOWN, indicating a corporate governance substitution mechanism between these two variables and MOWN. Furthermore, the means of Q, ROA, and ROE for firms without MOWN are higher than those for firms with MOWN, indicating that they recruit management based on capability and professionalism rather than ownership relations. On the other hand, the ACS of firms without MOWN is significantly lower than that of firms with MOWN. This result indicates that there is no substitution of corporate governance mechanisms related to the size of the audit committee. Meanwhile, other variables, including leverage, company size (size_A and size_S), and ASIN, do not have significant mean differences.

Table 2. Descriptive Statistics and Difference Tests

Variable	Total Sample				Firm with MOWN				Firm without MOWN				t-value
	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	Min.	Max.	Mean	SD	
Q	0.04	23.29	1.92	2.82	0.04	8.64	1.38	1.18	0.34	23.29	2.75	4.11	5.69***
LEV	0.00	9.00	0.77	1.05	0.01	7.87	0.79	0.99	0.00	9.00	0.74	1.13	-0.50
IOWN	0.00	0.99	0.68	0.25	0.00	0.99	0.65	0.25	0.00	0.98	0.74	0.23	4.16***
STA	0.01	74.50	1.24	3.28	0.01	9.69	1.19	1.05	0.01	74.50	1.33	5.07	0.49
ICOM	0.00	0.83	0.39	0.10	0.00	0.67	0.38	0.10	0.20	0.83	0.41	0.10	3.33***
ACS	1.00	5.00	3.01	0.39	2.00	5.00	3.05	0.38	1.00	5.00	2.95	0.40	2.88***
ROE	-0.96	2.24	0.09	0.22	-0.81	0.37	0.06	0.12	-0.96	2.24	0.13	0.31	3.41***
ROA	-0.39	0.92	0.05	0.10	-0.39	0.26	0.04	0.07	-0.19	0.92	0.07	0.12	3.65***
ASIN	0.01	101.38	1.81	6.01	0.10	101.38	1.58	5.75	0.01	84.72	2.17	6.40	1.10
SIZE_A	10.49	14.73	12.40	0.74	10.99	14.73	12.40	0.75	10.49	14.03	12.40	0.72	0.01
SIZE_S	8.87	14.38	12.35	0.77	10.80	14.38	12.38	0.74	8.87	14.03	12.31	0.82	-1.10
N	540				327				213				

****, **, * significant at 1%, 5%, 10% respectively*

Table 3 reports a further analysis of the differences in variables between firms with and without MOWN using binary logistic regression. The analysis results indicate that Q, IOWN, ICOM, ACS, and ROA are determinants in differentiating firms with and without MOWN, consistent with the results of the univariate variable difference analysis. ROE does not affect the difference between firms with and without MOWN. Meanwhile, firm size, measured by assets and sales (Size_A and Size_S), significantly influences the difference between firms with and without MOWN.

Table 3. Logistic Regression: The Determinants of Managerial Ownership

SSVariable	Coef.	Z Value	
Intercept	-0.519	-0.270	
LEV	-0.026	-0.262	
Q	-0.202	-3.491	***
IOWN	-2.409	-5.101	***
ICOM	-2.273	-2.110	**
ACS	0.794	2.648	***
ASIN	0.036	1.645	*
STA	-0.123	-0.595	
ROE	0.531	0.396	
ROA	-4.942	-1.721	*
SIZE_A	-2.401	-3.340	***
SIZE_S	2.557	3.574	***
McFadden R^2	0.14		
LR Stat	101.178	***	
		N: 540, Obs with Dep=0 213, Obs with Dep=1 327	

****, **, * significant at 1%, 5%, 10% respectively*

The results of this multivariate analysis differ from the univariate analysis. These findings also indicate endogeneity and multicollinearity issues among the study variables. The variance analysis also does not provide a satisfactory answer regarding the substitution relationship between leverage and managerial ownership. Table 4 reports the data analysis for the initial model, using equations 1, 2, and 3, with a simultaneous equation model and the W-2SLS technique to estimate the parameter coefficients. The initial model shows that the managerial ownership dummy (MOD) and leverage (LEV) are irrelevant in explaining firm value. Other instrumental variables also did not affect firm value. The model only showed a significant effect of MOD*Q and MOD*LEV on institutional ownership (IOWN). This initial diagnosis strengthens the suspicion that the effect of leverage on firm value is not monotonic. To get a more detailed picture of the pattern of the relationship between leverage and Q, Table 5 provides the decile data of average leverage, followed by the movement of the average Q.

Table 4. Initial Linear Interaction Model

Variables	Q			LEV			IOWN		
	Coef.	t-value	Sig.	Coef.	t-value	Sig.	Coef.	t-value	Sig.
Intercept#	2.608	0.524		0.244	0.400		-0.325	-1.274	
MOD	-4.056	-0.405		0.612	0.527		-0.201	-1.205	
IOWN	9.538	0.428		0.843	0.395				
MOD*IOWN	-10.174	-0.569		-0.550	-0.320				
Q				0.124	1.229		0.056	1.469	
MOD*Q				-0.035	-0.351		-0.112	-2.967	***
LEV	1.485	0.301					-0.145	-0.553	
MOD*LEV	6.858	1.307					0.686	2.876	***
STA	0.086	1.493		-0.010	-0.932				
MOD*STA	0.514	1.211		-0.052	-1.043				
ICOM	-3.506	-0.470							
MOD*ICOM	-1.238	-0.146							
ACS	-4.880	-1.181							
MOD*ACS	1.710	0.693							
ROE				-0.210	-0.995				
ASIN							0.003	1.251	

#The intercept value is the average intercept of 107 firms and 4 years, and 1 firm-year effect in panel data.
****, **, * significant at 1%, 5%, 10% respectively*

Table 5 shows that the value of firms without MOWN has reached a sub-peak Q of 3.26 and a sub-optimal leverage level of 0.16 in the 3rd decile. The value of the firm sharply decreased to a Q trough of 1.81 and a leverage level of 0.85 at the 8th decile. Leverage reaches its optimal level at the ninth decile with an average leverage of 1.37 and a peak Q of 6.85. Finally, at the highest leverage of 3.07, the value of firms reached the lowest Q of 1.24. Meanwhile, optimal leverage for firms with MOWN is also achieved in the third decile, with an average leverage of 0.16, similar to firms without MOWN, but with a Q of 1.89. The firm value gradually decreases until the fifth decile with a Q of 1.29. Firms reach suboptimal leverage in the seventh decile with an average leverage of 0.71 and a Q of 1.66, followed by a gradual decline in Q. Overall, the Q values of firms with MOWN are lower than those of firms without MOWN. Figure 2 shows that the movement of leverage and Q in each group of

firms exhibits a non-monotonic pattern, but with different forms. This pattern map points to the need for further analysis to test the non-monotonic relationship between leverage and Q in firms with and without MOWN.

Table 5. Average Leverage (LEV) and Average Firm Value (Q)

Decile leverage	Firms with managerial ownership		Firms without managerial ownership	
	Leverage (LEV)	Firm Value (Q)	Leverage (LEV)	Firm Value (Q)
1	0.05	1.11	0.07	1.51
2	0.10	1.17	0.11	2.24
3	0.16	1.89	0.16	3.26
4	0.22	1.64	0.22	1.83
5	0.33	1.29	0.28	3.13
6	0.50	1.40	0.39	2.79
7	0.71	1.66	0.58	3.08
8	0.99	1.18	0.85	1.81
9	1.48	1.09	1.37	6.85
10	2.88	1.38	3.07	1.24

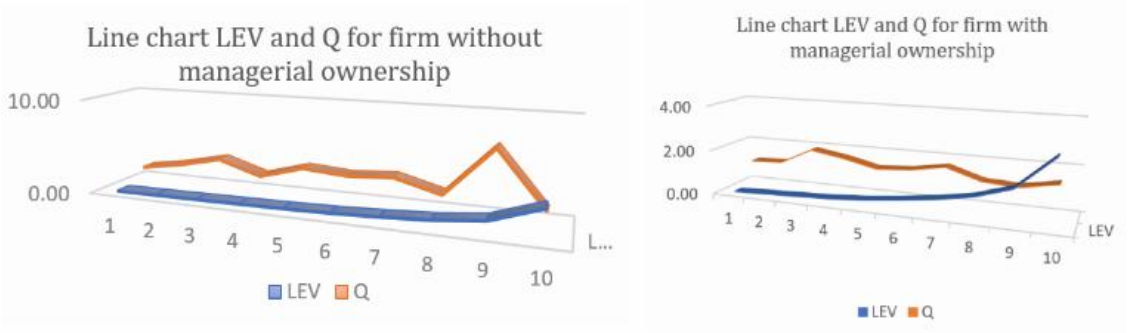

Figure 2. Line Chart Decile Average LEV and Q

Table 6 presents the weighted 2SLS of the cubic leverage-Q model to test the hypothesis of the non-monotonic relationship between leverage and Q. The table shows that the effect of leverage on firm value is non-monotonic and statistically significant. The result confirms the first hypothesis that leverage has a non-monotonic effect on firm value. MOD does not directly affect Q, but has a significant moderating effect of leverage on Q. The effects of leverage on the firm value have an inverted N-shaped (–, +, –) pattern for firm without MOWN and asymmetrical convex-shaped (+, –, –) for firm with MOWN. These results do not confirm the second hypothesis, but do confirm the third hypothesis. The effect of leverage on firm value is much greater for firms without MOWN than for firms with MOWN. The causal relationship between LEV and Q only exists in firms with MOWN. Furthermore, the table also shows a positive causal relationship between Q and IOWN. However, ACS has a negative effect on Q, raising the issue of whether this proxy is relevant for measuring good corporate governance.

Table 6. Initial Non-Linear Interaction Model

Variables	Q			LEV			IOWN		
	Coef.	t-value	Sig.	Coef.	t-value	Sig.	Coef.	t-value	Sig.
INTERCEPT	11.387	2.350	*	-15.444	-1.361		0.529	0.706	
MOD	6.496	1.008		-0.557	-0.475		0.197	4.088	***
IOWN	50.077	3.270	***	0.586	0.278				
MOD*IOWN	-40.837	-3.208	***	0.174	0.102				
Q				-0.205	-2.230	**	0.074	5.751	***
MOD*Q				0.272	2.931	***	-0.071	-4.784	***
LEV	-14.700	-2.778	***				0.016	0.718	
LEV^2	5.216	2.635	***						
LEV^3	-0.385	-2.597	***						
MOD*LEV	14.982	2.929	***				-0.008	-0.352	
MOD*LEV^2	-5.234	-2.711	***						
MOD*LEV^3	0.382	2.626	***						
STA	0.082	1.947	*	0.016	1.456				
MOD*STA	0.068	0.245		-0.074	-1.430				
ICOM	-5.251	-1.100							
MOD*ICOM	1.001	0.163							
ACS	-6.854	-2.227	**						
MOD*ACS	4.252	2.395	**						
ROE				-0.554	-2.625	***			
ASIN							0.002	1.365	
R^2	2.88%			75.18%			79.31%		
Adj. R^2	-26.75%			68.15%			73.57%		

#The intercept is the average intercept of 107 firms and 4 years, and 1 firm-year effect in panel data.

*$Combined the coefficient of paramaters calculation as follow: –14.700+14.982 = 0,281; 5.216 – 5.234 = –0.018; –0.385 + 0.382 = –0.003. Hence, the net coefficient of the parameters MOD*LEV, MOD*LEV² and MOD*LEV³ are 0,281, –0,018, and –0,003 respectively; This reflects an asymmetrical convex -shaped (+, –, –) pattern;*

****, **, * significant at 1%, 5%, 10% respectively*

Several previous studies have shown that profitability and firm size also influence the relationship between leverage and firm value (Chung & Zhang, 2011; Ibhagui & Olokoyo, 2018; Ji et al., 2020). Abel (2018) reported that under trade-off conditions, profitability reduces the optimal capital structure. To ensure reliable results, a robustness test was conducted by including the control variables ROA and firm size, measured by assets (SIZE_A) and sales (SIZE_S), in the empirical model. Table 7 presents a robustness test to provide additional reliable evidence for the hypothesis of a non-monotonic relationship between leverage and firm value. The robustness test results show that the leverage parameter coefficients are smaller than those in the previous model. However, there is no substantial change in the hypothesis-testing results relative to the previous model. The findings confirm the first hypothesis, which states that there is a non-monotonic relationship between LEV and Q, with an inverted N-shaped (-, +, -) relationship in firms

without MOWN and an asymmetrical convex-shaped(+, -, -) relationship in firms with MOWN. MOD does not directly affect Q; however, the moderating effect of MOD significantly influences the relationship between LEV and Q. This finding is consistent with the previous model, which did not confirm the second hypothesis but did confirm the third hypothesis. Thus, the robustness test findings verify that the empirical model is reliable.

Table 7. Non-Linear Model with Control Variables (ROA, SIZE_S, and SIZE_A)

Variables	Q			LEV			IOWN		
	Coef.	t-value	Sig.	Coef.	t-value	Sig.	Coef.	t-value	Sig.
Intercept#	7.799	3.036	*	-0.586	-0.855		-0.315	-3.116	
MOD	-0.026	-0.007		-0.959	-1.185		0.219	4.281	***
IOWN	26.949	4.268	***	-0.388	-0.259				
MOD*IOWN	-21.747	-4.095	***	0.844	0.700				
Q				-0.110	-1.313		0.083	6.000	***
MOD*Q				0.224	2.741	***	-0.081	-5.049	***
LEV	-10.475	-3.308	***				0.023	0.989	
LEV^2	3.695	3.086	***						
LEV^3	-0.273	-3.040	***						
MOD*LEV	10.831	3.521	***				-0.016	-0.631	
MOD*LEV^2	-3.703	-3.159	***						
MOD*LEV^3	0.269	3.034	***						
STA	0.137	3.746	***	0.009	0.919				
MOD*STA	0.191	0.972		-0.033	-0.682				
ICOM	-7.307	-2.424	**						
MOD*ICOM	3.859	0.974							
ACS	-3.926	-2.213	**						
MOD*ACS	2.525	2.542	**						
ROE				-0.555	-2.880	***			
ASIN							0.002	1.352	
SIZE_S	-2.226	-2.403	**						
ROA	0.246	0.131					0.233	1.935	*
SIZE_A				1.335	5.790	***	-0.010	-0.165	
R^2	58.21%			79.14%			77.00%		
Adj. R^2	45.20%			73.16%			70.49%		

#The intercept is the average intercept of 107 firms and 4 years, and 1 firm-year effect in panel data.
*$Combined the coefficient of paramaters calculation as follow: –10.475+10.831 = 0,356; 3.695 – 3.703 = –0.008; –0.273 + 0.269 = –0.004. Hence, the net coefficients of the parameters MOD*LEV, MOD*LEV², and MOD*LEV³ are 0,356, –0,008, and 0,004 respectively. This reflects an asymmetrical convex-shaped (+, –, –) pattern.*
****, **, * significant at 1%, 5%, 10% respectively*

The robustness test found empirical evidence of the effects of endogenous variables and instruments on firm value. IOWN has a significantly positive effect on Q in firms without MOWN, with a parameter coefficient of 26.949, which is more sensitive than firms with MOWN at 5.202 (26.949-21.747). The finding indicates that IOWN is necessary in corporate governance mechanisms as a substitute for MOWN. STA, as a proxy for agency costs, has a significant positive effect on firm value; there is no difference in the effect on both firms with and without MOWN. ICOM, as a proxy for corporate governance, has a significant negative effect on firm value; there is no difference in the effect on both firms with and without

MOWN. ACS, which is also a proxy for corporate governance, has a significant negative effect on Q in firms without MOWN, with a parameter coefficient of -3.926, compared to -1.401 in firms with MOWN.

Discussions

This study found that the relationship between leverage and firm value has an inverted N-shaped in firms without MOWN, and is asymmetrical convex-shaped in firms with MOWN. These findings imply that at low levels of leverage, debt has a negative impact on Q in firms without MOWN, but a positive impact in firms with MOWN. The negative slope of *LEV* means that the higher the debt, the lower the firm value. It indicates there was an underinvestment problem. The negative effect also indicates that there is a managerial entrenchment problem in firms without MOWN. It is consistent with Berger et al.'s (1997) study, which found entrenched managers prefer less debt. Furthermore, the findings of this study parallel Tulcanaza-Prieto et al.'s (2024) study, which found that leverage negatively impacts the value of firms with low CG. On the other side, at a low leverage level, firms with MOWN achieve optimal leverage by reaching the peak Q. These findings support the argument that managerial ownership aligns the interests of management and principal and is an effective corporate governance mechanism for disciplining management (Lubis et al., 2025).

At a moderate level of leverage, when the Q of a firm without MOWN continues to decrease into a trough, an entrenched manager will be aware of the potential danger of debt default, additional debt encourages management of firms without MOWN to be more disciplined in seeking high-risk investment projects that provide high expected returns to cover the higher cost of debt. At this level, debt effectively leads the slope of LEV^2 to positive, the higher the debt, the higher the firm value up to the peak Q. Some studies found that leverage positively affects firm value from different perspectives. Ibhagui and Olokoyo (2018) found a positive relationship between leverage and firm value for Nigeria's listed firms, but a negative relationship for small-sized firms. Cheng and Tzeng (2011) found that leverage positively affects firm value; the effect is stronger for firms with better financial quality. Iturriaga and Crisóstomo (2010) found that leverage has a positive effect on the value of a firm without growth opportunities, but a negative effect for a firm with growth opportunities. Pratt et al. (2023) reported that leverage has a positive effect on firm value, but they also found that leverage has a negative effect on firm value due to tax loss carryback. Meanwhile, when the value of the firm with MOWN reaches its peak, leverage (LEV^2) has a negative effect on Q, indicating that investors' concerns about default exceed the benefits of the debt tax shield.

At the highest level of leverage of firms without MOWN, debt holders ask for higher interest rates of return for higher debt as compensation for the risk of debt default. At this stage, the potential risk of bankruptcy outweighs the tax savings benefits of additional debt; therefore, it leads the slope of LEV^3 to negative, which means the higher the debt, the lower the firm value. The parameter coefficient of -0.004 at the highest leverage (LEV^3) is relatively lower than the parameter coefficient of -0.008 at a moderate leverage (LEV^2). This finding supports previous studies related to the trade-off theory (Abel, 2018; Coricelli et al., 2012; Karaca et al., 2025).

In general, the novelty of the research findings in this study is the inverted N-shaped pattern in firms without MOWN, which indicates managerial entrenchment behavior at low

leverage levels but indicates trade-off theory at high leverage levels. However, the severe problems are more likely to be managerial entrenchment than trade-off theory. Meanwhile, in firms with MOWN, the main issues are more likely to be trade-off theory.

The research findings have several implications for business practice. *First*, an inverted N-shaped relationship between leverage and the value of firms without MOWN, with the negative slope in the first line of -10.48, is greater than the negative slope in the third line of -0.27, suggesting that the managerial entrenchment hypothesis issue is more sensitive than the trade-off theory issue. Meanwhile, a positive slope only occurs at a moderate leverage level. These findings imply that adding debt at moderate upper levels is more effective in disciplining managers in increasing the value of firms without MOWN.

Second, an asymmetrical convex-shaped pattern relationship between leverage and the value of firms with MOWN suggests that there is an alignment of interests between management and principals. This result implies that managerial ownership functions as a substitute for leverage in increasing the value of firms with MOWN. Third, there is a substitution mechanism between managerial and institutional ownership in corporate governance. Firms without MOWN require more additional institutional ownership than firms with MOWN in an effort to strengthen corporate control.

Fourth, the average Q of firms with MOWN, 1.38, is smaller than the Q of firms without MOWN, 2.75. This result indicates that the management of firms without MOWN has better capabilities than the management of firms with MOWN. This result also implies that the management recruitment system in firms without MOWN is more selective and stringent in obtaining qualified professionals and skilled managers. Meanwhile, management selection in firms with MOWN may be based on managerial ownership rather than professionalism and skills.

Fifth, ICOM and ACS, as proxies for corporate governance, have a negative impact on firm value. This finding aligns with Lahjie et al. (2023), who found that corporate governance negatively impacts firm value in the Indonesian capital market. Ferriswara et al. (2022) found that corporate governance had no effect on firm value, but negatively impacted the financial performance of companies listed in the Jakarta Islamic Index. Meanwhile, Adinegara and Sukamulja (2021) used the CG index to find a positive effect on firm value. These results imply that corporate governance practices remain weak in Indonesia. Investors and entrepreneurs need to pay careful attention to corporate governance practices based on independent commissioners and the audit committee due to inconsistent results across the empirical literature in Indonesia.

Conclusion

This study revisits a recent study by Lubis et al. (2025), which provides ambiguous empirical evidence and lacks theoretical clarity in examining the role and moderating effect of managerial ownership on the relationship between leverage and firm value. The research findings of this study confirm several issues that cannot be explained by a single theory. First, it confirms the first hypothesis that leverage has a non-monotonic effect on the value of firms. The effect of leverage on the firm value is inverted N-shaped in firms without MOWN and asymmetrical convex-shaped in firms with MOWN. The negative effect on the first line is greater than the negative effect on the third line, indicating that the problems of underinvestment and managerial entrenchment are more prominent than the trade-off

problem of debt tax shield benefits and bankruptcy risk in firms without MOWN. Conversely, the asymmetrical convex-shaped relationship between leverage and the value of the firm with MOWN indicates there is no conflict of interest between management and the principal; this is more relevant to trade-off theory than managerial entrenchment. Second, Managerial ownership has no direct effect on firm value but moderates the effects of leverage and firm value. This finding does not confirm the second hypothesis but does confirm the third.

Third, the value of a firm without MOWN is higher than that of a firm with MOWN, implying that managerial selection based on professionalism and competency skills is superior to selection based on ownership structure. Fourth, firms with MOWN have a lower average IOWN than firms without MOWN. Moreover, the positive effect of IOWN on firm value is greater for firms without than for those with MOWN, which indicates that there is a substitution relationship between institutional ownership and managerial ownership. The research results generally confirm that leverage and institutional ownership are effective substitutes for managerial ownership in corporate governance to discipline the management of firms without MOWN.

There are three suggestions that can be considered for further research. First, this study employed a relatively small sample size with a short data period, from 2014 to 2018, to control for data homogeneity and minimize noise from the confounding effects of extraordinary events. According to Berger et al. (1997), the motivations of entrenched managers for using leverage are susceptible to both internal and external circumstances. Future studies can add a larger sample size with a longer time period while still controlling and separating extraordinary events that distract management from managing debt. Second, Lubis et al. (2025) suggest that managerial ownership functions as a corporate governance mechanism to discipline management in using debt. Future studies could directly use the corporate governance index as another approach to analyzing the relationship between leverage and firm value (Bagh et al., 2025; Biçer & Şit, 2023; Tulcanaza-Prieto et al., 2024). Furthermore, further study should also be aware of endogenous issues of CGI. Ararat et al. (2017) examine the effect of CGI on firm value; they also test the determinants of CGI, indicating that the issue of CGI endogeneity also needs to be considered in empirical models. Third, studies to identify managerial entrenchment can also be conducted using the entrenchment index (E-index) measurement presented by Bebchuk et al. (2009), which is strengthened by evidence that the E-index is negatively related to firm value and is supported by other empirical studies (Dah, 2025).

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