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The relationship between capital structure and firm performance: The moderating role of agency cost

Robby Pranata[1], Vina Nugroho[2]

[1,2]Master of Management Study Programme, Universitas Pelita Harapan, Jakarta, Indonesia

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ABSTRACT

This research investigates the relationship between capital structure and financial performance, with a particular focus on the moderating influence of agency costs. It analyzes the impact of capital structure on financial outcomes through the perspective of agency costs. Data was obtained from non-financial firms listed on the Indonesia Stock Exchange (IDX) between 2020 and 2022. Capital structure is represented using metrics such as the debt-to-asset ratio and debt-to-market capitalization, while financial performance is measured through indicators like return on assets (ROA), Tobin's Q, and earnings per share (EPS). The results reveal that, although capital structure can negatively influence financial performance, agency costs can serve as a positive moderating factor. By considering various performance metrics, the study highlights the significance of adopting a holistic approach to analyzing capital structure. The research aims to provide a deeper understanding of the dynamic interplay between capital structure and financial performance.

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Corresponding Author:

Robby Pranata,
Master of Management Study Programme,
Universitas Pelita Harapan,
Jalan Palem VII no 17, Kec. Klp Dua, Kabupaten Tangerang, Banten, Jakarta, 15811
Email: robbypranata7@gmail.com

INTRODUCTION

Globalization has rapidly given rise to a wide range of industries, emerging to meet the increasing demands of society. This has heightened competition among businesses. As stated by (Jensen et al., 1976), company performance is assessed based on how effectively an organization achieves its goals and objectives. It serves as a measure of efficiency in managing resources and operations to attain desired outcomes (Irawan & Kusuma, 2019). Periodic evaluations of company performance allow management to pinpoint strengths and weaknesses, facilitating strategic decision-making. Capital structure is defined as the method by which a company funds its assets using a mix of equity and debt, which significantly impacts the associated risks and overall value of the organization (Myers, 1984). Striking an optimal balance in the capital structure is crucial for realizing long-term financial objectives, including growth, profitability, and stability. The key components of capital structure are equity, which represents the ownership stake or capital from

investors (Ross et al., 2022) and debt, which is external funding that must be repaid over a specified timeframe (Brealey et al., 2017).

As outlined in Myers & Majluf (1984), pecking order theory, firms generally prioritize internal funding, such as retained earnings, over external alternatives. Balancing equity with debt effectively helps minimize the cost of capital while maximizing firm value. The COVID-19 pandemic and changes in the global economy have an impact on the company's capital structure. Many companies face liquidity pressures due to declining demand, supply chain disruptions, and disrupted economic activity. To overcome this, companies utilize short-term debt by taking advantage of low interest rates imposed by the central. Optimal capital structure is achieved by balancing equity and debt to minimize the cost of capital and maximize firm value (Margaretha & Retta Ginting, 2016). In determining their capital structure, companies must consider various factors, including income stability, interest rates, market dynamics, and long-term strategic goals.

Extensive studies have examined the link between capital structure and firm performance, yielding varied results. Many researchers argue that a well-optimized capital structure enhances firm performance by balancing the costs and benefits of equity and debt. For instance, Modigliani et al. (1958) highlighted the tax advantages associated with debt, which can boost a firm's value. Similarly, Abor (2005) discovered that short-term debt positively impacts return on equity (ROE) in Ghanaian firms due to the low costs and tax-related advantages associated with debt usage. Hypothesis 1: Capital structure significantly affects financial performance.

Agency costs, initially introduced by Adolf A. Berle (1932) and later expanded by Jensen & Meckling (1976), describe conflicts that arise when ownership and management are separated. In such cases, managers may prioritize their own interests over those of shareholders, focusing more on personal benefits than shareholder wealth. For example, when companies have surplus cash flow, managers may allocate resources to projects that serve their own interests rather than pursuing profitable opportunities. For example, with excess cash flow, managers might invest in unprofitable projects for personal gain. Ang et al. (2000) analyzed agency costs through the ratios of both the operating expense and the asset utilization. Their findings show that higher operating expense ratios are linked to elevated agency costs, while higher asset utilization ratios indicate more efficient use of resources, which inversely correlates with agency costs. Hypothesis 2: Increasing agency cost can significantly affect firm performance.

The role of agency costs as a moderating variable in the relationship between capital structure and firm performance has been explored by researchers like Sdiq & Abdullah (2022). Their findings show that agency costs can either positively or negatively affect this relationship. Some studies show that firms with lower leverage can effectively raise capital (Abdullah & Tursoy, 2021; Hoang et al., 2019; Jensen, 1986; McCall, 1982). This means that managers have lower ability to focus on their personal interest, which reduces conflict of interest. Jensen (1986), argues that high debt use can pressure managers to focus more on productive projects and reduce the potential for misuse of free cash flow. Thus, debt can help minimize agency costs and improve company performance. Excessive debt, however, can impose financial strain, forcing firms to focus on productivity and limit inefficient use of free cash flow. Operational efficiency plays a key role in moderating this relationship, suggesting that companies should address both aspects simultaneously to achieve optimal performance. Mangkona et al. (2023). Hypthesis 3: Agency cost moderates the influence of capital structure on firm performance.

This study has two primary objectives. The first is to explore the connection between capital structure and financial performance in firms operating within developing economies. The second objective focuses on examining the role of agency costs in corporate performance, specifically investigating how agency costs influence the relationship between capital structure and financial outcomes in non-financial firms in Indonesia. Indonesia's industrial sector significantly contributes to economic growth. However, as a developing economy, its capital markets often

exhibit inefficiencies and heightened information asymmetry compared to developed nations (Eldomiaty, 2008). These conditions underscore the relevance of examining the Indonesian context for fresh insights. Previous studies have highlighted the pivotal role of capital structure in improving firm value. Nonetheless, empirical studies focusing on corporate financial practices in Indonesia, especially those involving internal factors, remain scarce (Ahmed et al., 2023). In terms of geographical coverage, they focused on emerging markets in the Middle East. Their findings focus on the moderating role of agency costs in the relationship between capital structure and firm performance in manufacturing firms in Iran during the period 2011–2019, before the COVID-19 pandemic. Temporal differences are also evident, examining data before the pandemic. Their findings suggest that debt tends to have a negative relationship with firm performance but can reduce agency conflicts, ultimately increasing efficiency. In contrast, this study analyzes non-financial companies in Indonesia during the period 2020–2022, reflecting post-pandemic market dynamics.

The selection of the non-financial sector as the focus of the study, as in the study, is based on the differences in financial and operational characteristics compared to the financial sector. Non-financial companies use debt for investment and operations, so it's impact on performance is easier to analyze. In addition, this sector is less bound by strict regulations regarding capital, providing greater variability in capital structure decisions. Operational efficiency and agency costs are also more relevant in determining the performance of this sector. In Indonesia, the non-financial sector contributes significantly to the economy, so it's relevant to analyze. These findings highlight the role of asset utilization efficiency in mitigating the negative impact of debt on firm performance, suggesting that good asset management can improve profitability and market valuation despite high debt levels. These defferences emphasize the importance of considering geographic, temporal, and unique variable contexts in analyzing the relationship between capital structure, agency costs, and firm performance.

RESEARCH METHOD

The research examines financial performance data from 2020 to 2022, focusing on non-financial sector companies listed on the Indonesia Stock Exchange (IDX). This study's dataset originated from Capital IQ, a business and financial intelligence platform managed by S&P Global.

The time span of 2020-2022 was selected in the study to analyze the profound impact of the COVID-19 pandemic on corporate financial performance and capital structure decisions. This period is pivotal, as it encompasses a phase of significant economic disruption, including supply chain breakdowns, shifts in market demand, and fluctuations in financial conditions, such as changes in interest rates and limited access to capital. By focusing on this timeframe, the study seeks to offer valuable insights into how firms strategically adapted their capital structures and operational approaches in response to the heightened global economic uncertainty brought on by the pandemic.

Market Intelligence. Initially, 797 firm-year observations were included, but after refinements, the sample was narrowed to 587 companies. Financial performance, serving as the dependent variable, is evaluated using indicators like ROA (Return on Assets), Tobin's Q, and EPS (Earnings Per Share). The independent variables include the Debt-to-Asset Ratio (DTA) and Debt-to-Market Capitalization (DTMC). Agency cost is analyzed both as a direct factor and as a moderating variable. Additional control variables, such as sales growth (SG) and the firm's age, are utilized to ensure a more comprehensive analysis.

The research employs econometric techniques, utilizing both fixed effects and random effects models to analyze panel data. Random effects models assume firm-specific characteristics are random and unrelated to other variables. In contrast, fixed effects models treat these unique

characteristics as constant and potentially correlated with other variables. This study also employs various econometric techniques to address potential bias caused by heteroscedasticity and autocorrelation in panel data. Heteroscedasticity was tested to ensure constant error variance across observations, with results indicating its presence in some models. Although heteroscedasticity does not bias parameter estimates, it can reduce their efficiency, necessitating adjustments to the estimation method. Autocorrelation was examined using the Wooldridge test, which found no significant autocorrelation in the ROA models but detected it in the Tobin's Q and EPS models. To address these issues, the study applied robust standard errors, ensuring that parameter estimates remain consistent and statistical inferences valid. These steps ensure the reliability and accuracy of the study's findings, making them credible and applicable. A detailed explanation of the measurements utilized in this analysis is provided in subsequent sections.

Table 1. Description of variables

Variable	Proxies	Definition
ROA	Return on Assets	Net Income/Total Assets
Tobin's Q	Tobin's Q	(Market Value of Equity + Book Value of Debt)/Book Value of Assets
EPS	Earning Per Share	Net Income/Number of Shares Outstanding
DTA	Debt to Asset	Total Debt/Total Assets
DTMC	Debt to Market Capitalization	Total Debt/(Total Debt + Market Capitalization)
AUR	Asset Utilization Ratio	Annual Sales/Total Assets
SG	Sales Growth	Proportion of sales growth compared with the previous year
AGE	Firm Age	Natural logarithm of number of years in service since established

This method enables the evaluation of how a single dependent variable is influenced by multiple independent variables, as outlined by Ngatno et al. (2021). It has also been applied by research done by Dawar (2014) and Mehmood (2021). The equation formulated to test the hypotheses is:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 M_{it} + \beta_3 (X_{it} M_{it}) + \beta_4 C_{it} + E_{it}$$

In this equation, Y_{it} denotes the dependent variable, the constant term is 0, 1 to 5 correspond to the explanatory variables in the model, X_{it} signifies the independent variable, M_{it} acts as both a moderating and independent variable. X_{it} x M_{it} represents the moderating and independent variable relationship. Additionally, C_{it} serves as the control variable, and E_{it} accounts for the statistical random error.

RESULTS AND DISCUSSIONS

Table 2. Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
ROA	1.761	.0316	.0857	-.2468	.4539
Tobin's Q	1.761	2.1668	3.724671	.3725099	29.82148
EPS	1.761	50.9218	129.1907	-98.86	475.3
DTA	1.761	.5361	.51365	.0252	3.956782
DTMC	1.761	.4044	.2628449	.0066554	.9452197
AUR	1.761	.7811	9699679	.003704	6.528585
SG	1.761	.2236	9352815	-.93	6.92
AGE	1.761	1.4279	.2557551	.69897	1.959041

Table 3. Correlation matrix of variables

Variables	ROA	Tobin's Q	EPS	DTA	DTMC	AUR	SG	AGE
ROA	1.000							
Tobin's Q	-.040	1.000						
	.096							
EPS	.473*	-.042	1.000					
	.000	.072						
DTA	-.161*	.436*	-.144*	1.000				
	.000	.000	.000					
DTMC	-.206*	-.211*	.-.182*	.478*	1.000			
	.000	.000	.000	.000				
AUR	.114*	.288*	.117*	.306*	-.020	1.000		
	.000	.000	.000	.000	.414			
SG	.107*	-.009	.081*	-.014	-.039	.006	1.000	
	.000	.688	.000	.559	.108	.809		
AGE	.084*	-.118	.192*	.030	.174*	-.010	-	1.000
	.000	.000	.000	.206	.000	.670	.105*	
							.000	

*Significance of pairwise correlation between variables at P < 0.01

This study employs a panel dataset comprising 587 manufacturing firms, covering the period between 2020 and 2022. Consequently, it is crucial to address the potential issue of multicollinearity among variables. To assess whether variables are collinear, correlation coefficients among the independent variables were examined. Wooldridge (2015) and, Porter & Gujarati (2009) suggested that multicollinearity could arise if the correlation coefficient exceeds 70%. However, the findings in Table 3 reveal that all correlation coefficients are below 47%, indicating no significant relationships among the independent variables. Hence, multicollinearity is not a concern in this analysis.

To evaluate multicollinearity, the study utilized the Variance Inflation Factor (VIF) and Tolerance values. According to Nachane (2006) and Newbold et al. (2013), the acceptable limit for VIF is less than 10, while tolerance should be greater than 0.1. As shown in Table 4, the maximum VIF value is 1.50, and the minimum tolerance value is 0.669. These results indicate that multicollinearity is not a concern in this analysis.

Table 4. Variance Inflation Factors (VIF)

Variable	VIF	Tolerance
DTA	1.50	0.669
DTMC	1.40	0.716
AUR	1.15	0.870
SG	1.05	0.956
AGE	1.01	0.989

Table 5. Hausman Test Result

Summary	Chi-square statistic	P-value
Model 1 (ROA)	31.95	0.000
Model 2 ROA (without Moderation)	10.75	0.057
Model 3 (Tobins Q)	18.77	0.009
Model 4 Tobins Q (without Moderation)	16.72	0.005
Model 5 (EPS)	82.23	0.000
Model 6 EPS (without Moderation)	11.42	0.043

Models 1, 3, 4, 5, and 6 show Prob > Chi2 values under 0.05, indicating significant differences between fixed-effects and random-effects estimations. This supports rejecting the null hypothesis, implying that the fixed-effects model is more suitable since it better handles unobserved individual variations and provides more precise results. Conversely, Model 2 presents a Prob > Chi2 value above 0.05, meaning the null hypothesis cannot be rejected. In this case, the random-effects model is deemed more appropriate as it effectively accommodates individual variations without introducing significant bias. Consequently, the random-effects model is chosen as the optimal method for this context.

Table 6. Heteroscedasticity Test

Summary	Prob. > Chi^2
Model 1 (ROA)	0.000
Model 2 (ROA without Moderation)	0.000
Model 3 (Tobin's Q)	0.000
Model 4 (Tobin's Q without Moderation)	0.000
Model 5 (EPS)	0.000
Model 6 (EPS without Moderation)	0.000

A heteroskedasticity test was conducted. Homoskedasticity requires constant error variance. If heteroskedasticity is present, parameter estimates remain consistent but may lack efficiency. Heteroskedasticity for random is can be skipped (Wooldridge, 2010).

Table 7. Autocorrelation Test

Summary	Prob. > F
Model 1 (ROA)	0.259
Model 2 (ROA without Moderation)	0.169
Model 3 (Tobin's Q)	0.000
Model 4 (Tobin's Q without Moderation)	0.000
Model 5 (EPS)	0.000
Model 6 (EPS without Moderation)	0.000

The Wooldridge test results show no autocorrelation in the ROA models (F-statistics 1.276 and 1.822, p-values > 0.05). However, significant autocorrelation is observed in the Tobin's Q and EPS models, as evidenced by F-statistics of 20.875, 21.144, 29.761, and 33.084, with p-values of 0.0000. This finding highlights the need for additional adjustments to address these issues.

Table 8. Panel regression results

Variable	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	Coef	P-	Coef	P-	Coef	P-	Coef	P-	Coef	P-	Coef	P-
		value	.	value	.	value	.	value	.	value		value
DTA	-	0.073**	-	0.000**	4.36	0.000**	4.34	0.000**	4.53	0.254*	-	0.814*
DTMC	0.00	0.079**	0.02	*	88	*	93	*	32	0.000**	1.04	0.000*
AUR	57	0.000**	51	0.000**	-	0.000**	-	0.000**	-	*	75	**
	-	*	-	*	4.91	*	7.38	*	104.	0.000**	-	0.000*
	0.28		0.04	0.000**	21	0.000**	85	0.024**	14	*	100.	**
	9		45	*	2.70	*	0.94	*	33.7		16	
	.064		0.01		80		90		9		25.0	
	0		38								8	

AUR*D	-	0.000**			-	0.000**			-	0.000**		
TA	0.01	*			0.27	*			5.70	*		
AUR*D	54	0.000**	0.01	0.000**	16	0.000**	-	0.000**	98	0.612*	8.47	0.000*
TMC	-	*	20	*	-	*	0.24	*	4.36	0.000**	0	**
SG	0.02	0.000**	0.04	0.000**	3.55	0.000**	55	0.707*	4	*	278.	0.000*
AGE	94	*	15	*	81	*	0.13	0.002	8.26	0.000**	92	**
Cons	0.00	0.000**	-	0.0004	-	0.422*	80	0.2707	35	*	-	0.000
R-	89	*	0.00	0.1024	0.23	0.006	1.93	1500.2	274.	0.000	327.	0.083
Squared	0.09	-13.01	98	260.04	32	0.3055	98	6	74	0.0848	78	3
F-	17	0.1071		0.000	-	12.26		0.000	-	221.53		177.2
statistics	-	65.04			0.24	0.000			328.	0.000		3
Prob	0.11	0.000			99				20			0.000
	94				1.34							
					1							

*Note: ***, **, and * indicate the level of significancy at 1%, 5%, and 10% respectively.*

The analysis indicates that the Debt-to-Asset Ratio (DTA) negatively affects ROA and EPS, with coefficients of -0.0242 (highly significant at p = 0.000) and -1.0475 (not significant at p = 0.814), respectively. This suggests that higher DTA reduces ROA as companies with excessive debt face higher interest expenses, decreasing efficiency in asset utilization. Although DTA also shows a tendency for lower EPS, the relationship is not statistically significant. Conversely, DTA positively impacts Tobin's Q with a coefficient of 4.3493 (significance 0.000), indicating a higher market valuation. For Debt to Market Capitalization (DTMC), the results show a negative effect on ROA (-0.0445, significance 0.000), Tobin's Q (-7.3885, significance 0.000), and EPS (-100.1579, significance 0.000). Higher DTMC lowers profitability, market valuation, and earnings per share, as increased debt raises interest expenses, reduces net income, and heightens default risk, discouraging investor confidence (Ibhagui & Olokoyo, 2018; Kraus & Litzenberger, 1973).

The findings further reveal that Agency Cost (AUR) positively influences ROA, Tobin's Q, and EPS. AUR shows a coefficient of 0.0139 (significance 0.000), indicating that better asset utilization improves efficiency by minimizing resource wastage and boosting profitability. Furthermore, Tobin's Q, with a coefficient of 0.0949 (p = 0.000), suggests that effective resource management can lead to higher market valuations. EPS, with a coefficient of 25.0882 (p = 0.000), further underscores that efficient asset utilization translates to higher earnings and improved performance**.** (Hoang et al., 2019; Pham & Tran, 2020; Seth et al., 2020)

The study underlines how asset utilization efficiency moderates the link between capital structure and firm performance. Regression results reveal that the interaction term AUR*DTA significantly impacts ROA (-0.0154, p = 0.000), Tobin's Q (-0.2716, p = 0.000), and EPS (-5.7098, p = 0.000). This suggests that efficient asset management can mitigate profitability losses and valuation challenges resulting from high levels of debt. Similarly, AUR*DTMC negatively affects ROA (-0.0294, significance 0.000) and Tobin's Q (-3.5582, significance 0.000), reflecting the negative consequences of ineffective debt utilization on profitability and market valuation. While its effect on EPS (4.3641, significance 0.612) is positive, it remains statistically insignificant, suggesting that debt-funded investments occasionally boost earnings but do not consistently improve performance. Sdiq & Abdullah (2022) and (Hoang et al., 2019) also affirm that Agency costs, as a moderating variable, impact the connection between capital structure and firm performance in both positive and negative ways. These findings emphasize opportunities for firms to optimize their performance by managing these interacting factors.

CONCLUSION

This research explores the relationship between capital structure and firm performance, focusing specifically on the role of agency costs as a moderating factor. The findings indicate that high leverage, represented by the Debt-to-Asset Ratio (DTA) and Debt-to-Market Capitalization (DTMC), tends to negatively affect performance metrics like ROA, Tobin's Q, and EPS. However, when firms improve their asset utilization efficiency—used here as a representation of agency costs—they can reduce the harmful effects of high debt levels. Companies with better asset utilization are more capable of effectively managing their resources, minimizing waste, and ultimately enhancing profitability and market valuation.

The study also considers the influence of control variables. For instance, sales growth is shown to positively affect ROA and EPS, indicating that firms with increasing revenues are better able to turn operational success into profits. However, its connection to Tobin's Q is insignificant, implying that growth alone doesn't always result in higher market valuation. On the other hand, the analysis finds that older firms, represented by firm age, tend to experience lower Tobin's Q values. This suggests that aging firms might face challenges like reduced innovation or market saturation, which can limit their market performance.

This study has several limitations that should be addressed in future research. Firstly, the sample is restricted to non-financial companies in Indonesia, limiting the applicability of the findings to other sectors or regions. Secondly, the analysis period of 2022-2022 coincieds with the COVID-19 pandemic, which may not represent typical economic conditions. Additionally, the study defines agency costs solely through asset utilization efficiency, which may not fully reflect the broader complexities of agency costs within companies.

The findings of this study can inform policy development to enhance transparency in agency costs. Governments and regulators could implement policies that reward companies with high asset utilization efficiency, such as through tax incentives. Requiring detailed reporting on agency costs and their management could also improve transparency and encourage companies to optimize their operations. Furthermore, promoting best practices in debt management would enable companies to balance debt and equity effectively, minimizing the adverse affects of high leverage while leveraging the tax benefits of debt.

Future researce should address these limitations by including a more diverse sample spanning multiple industries and regions, integrating additional moderating variables, and extending the study period to capture long-term trends. Exploring other moderating factors, such as corporate governance mechanisms (e.g., board composition and ownership structure) or technological advancements (e.g., investments in R&D or digital transformation), could provide deeper insights. Expanding the scope to include financial companies and firms from both developing and developed economies would also enhance the relevance of the findings. Lastly, longitudinal studies are crucial for understanding the long-term dynamics between capital structure and agency costs.

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