THE INFLUENCE OF FIRM SIZE AND CAPITAL STRUCTURE ON FINANCIAL PERFORMANCE IN THE ASEAN MANUFACTURING SECTOR

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ABSTRACT

This study examines the impact of firm size and capital structure on the financial performance of ASEAN manufacturing companies during the 2014-2023 period, considering the influence of the COVID-19 pandemic. The pandemic triggered a global economic crisis, disrupting corporate financial stability. Total assets and revenue measure firm size, while capital structure is represented by the debt-to-asset ratio (DAR) and debt-to-equity ratio (DER). Financial performance is assessed using return on assets (ROA), and Tobin's Q. Data from 767 companies was collected through purposive sampling and analyzed using a fixed-effects panel data model. The results reveal that total assets have a significant positive impact on ROA but a negative impact on Tobin's Q. Total revenue significantly positively affects both ROA and Tobin's Q. DAR has a significant negative impact on ROA, while DER shows a significant negative effect on Tobin's Q. These findings provide insights for company management in formulating financial strategies and for investors in evaluating investment potential based on firm size and capital structure.

Keywords: firm size, capital structure, financial performance

1. Introduction

The manufacturing sector in ASEAN has been a cornerstone of the region's economic growth. Nations like Indonesia, Singapore, Malaysia, Thailand, and the Philippines rely heavily on this sector to drive gross domestic product (GDP), create jobs, and boost exports. ASEAN manufacturers produce high-value finished goods and process raw materials into intermediate goods that are integral to global trade. However, amid intensifying competition, manufacturing firms must continuously innovate, enhance operational efficiency, and maintain financial stability to remain competitive in the dynamic global market (Cahyani & Puspitasari, 2023).

The COVID-19 pandemic posed unprecedented challenges to ASEAN's manufacturing sector. Social restrictions, lockdowns, and disrupted supply chains led to a significant decline in economic activity and created widespread market uncertainty. In Indonesia, for instance, the pandemic forced many companies to curtail or halt operations, resulting in market fluctuations. However, as widespread vaccination and health protocols were implemented in late 2021, the sector began to show signs of recovery (Naibaho & Simatupang, 2024).

Financial performance is a crucial indicator of a company's ability to navigate challenges in this context. Firms that effectively utilize their resources tend to be more resilient during crises and can generate stable profits. Firm size and capital management are key factors influencing this success. Larger firms, for example, often have advantages regarding access to resources, technology, and markets. However, excessive size can also lead to operational inefficiencies.

Conversely, sound capital management can enhance a company's operations, but mismanagement can increase financial risks (Inayah, 2022).

This study examines how firm size and capital management influence the performance of manufacturing companies in ASEAN during the 2014-2023 period, particularly in the face of pandemic-related pressures. By understanding this relationship, this study provides insights for companies to formulate more effective strategies to address economic challenges. The findings are also expected to assist corporate decision-makers and investors in developing policies and strategies promoting long-term business sustainability.

2. Literature Review

2.1 Agency Theory

Agency theory highlights potential conflicts of interest between owners and management within a company. Jensen & Meckling (1976) suggest that the size of a company can increase agency costs due to increased managerial complexity and information asymmetry. This research is relevant in the context of modern corporations, particularly in the face of increasing globalization and technological change. Therefore, understanding the relationship between firm size, capital structure, and agency costs is crucial for designing effective control mechanisms to maximize firm financial performance (Jensen & Meckling, 1976).

2.2 Trade-Off Theory

Trade-off theory provides a financial framework that analyzes the trade-offs between various benefits and costs of financing decisions. This theory underscores that every corporate financing decision involves a multi-faceted trade-off. Firms will choose an optimal combination of debt and equity, considering factors such as the cost of capital, the risk of bankruptcy, and agency costs arising from the relationship between owners and managers. According to this theory, firms will continue to increase their debt until the additional costs associated with increased debt outweigh the benefits, thereby reaching an optimal capital structure that maximizes firm value (Sari & Paramita, 2021).

2.3 Pecking Order Theory

Pecking order theory posits that managers have a preference hierarchy for financing operations. This theory suggests managers prioritize internal funds due to their lower risk profile. External financing options such as debt will be considered if internal funds are insufficient. Equity financing is typically the last resort. This theory highlights information asymmetry between managers and investors as a key determinant in capital structure decisions. Managers possessing more information tend to select financing sources that minimize information asymmetry. Consequently, firms adhere to a pecking order, prioritizing retained earnings due to their lower information risk. Firms may resort to debt despite its liquidity implications when internal funds are inadequate. Equity financing is seen as a last resort as it involves the highest information asymmetry costs (Muamilah & Jannah, 2022).

2.4 Conceptual Framework and The Research Hypotheses

2.4.1 The Effect of Firm Size (Ln Total Asset) on Financial Performance

As measured by the natural logarithm of total assets, firm size has been identified as a significant factor influencing financial performance (Diana & Osesoga, 2020). Previous studies, such as by Januarty (2019), have consistently shown a positive correlation between firm size and financial performance, particularly among manufacturing firms. However, a study by

Dermawan & Lestari (2022)suggests that while firm size can enhance operational efficiency, its impact on financial performance (measured by Tobin's Q) is not always positive, indicating the need to consider other contextual factors. Based on these findings, this study hypothesizes a positive relationship between firm size and return on assets (ROA). A negative relationship between firm size and Tobin's Q. Specifically, the hypotheses are:

 H_{1a} : Firm size (Ln Total Asset) positively impacts financial performance (Return on Asset). H_{1b} : Firm size (Ln Total Asset) has a negative impact on financial performance (Tobin's Q).

2.4.2 The Effect of Firm Size (Total Revenue) on Financial Performance

As measured by total revenue, firm size is a crucial indicator of financial performance (ROA) as it reflects the income generated from core operations. An increase in firm size suggests improved efficiency and profitability. Studies consistently demonstrate a positive correlation between firm size and financial performance. Larger firms possess greater capacity to manage resources, effectively enhancing financial performance. However, research also indicates that firm size (measured by total revenue) can have a negative impact on financial performance as measured by Tobin's Q. If a firm cannot effectively manage its growth, investor perception of its financial health may decline, negatively affecting its overall financial performance. Based on these findings, this study hypothesizes a positive relationship between firm size and ROA and a negative relationship between firm size and Tobin's Q. Specifically, the hypotheses are: H_{1c} : Firm size (Total Revenue) positively impacts financial performance (Return on Asset). H_{1d} : Firm size (Total Revenue) has a negative impact on financial performance (Tobin's Q).

2.4.3 The Effect of Capital Structure (Debt to Asset Ratio) on Financial Performance

The debt-to-asset ratio (DAR) is a crucial indicator reflecting the proportion of debt financing relative to total assets. Empirical evidence, as highlighted by Ritonga et al. (2021), suggests that DAR positively and significantly impacts return on assets (ROA). However, research also indicates a negative relationship between debt structure and Tobin's Q. While a higher debt ratio correlates with increased ROA in some studies, it can also negatively affect overall financial performance. Based on these findings, this study hypothesizes a positive relationship between DAR and ROA and a negative relationship between DAR and Tobin's Q. Specifically, the hypotheses are:

 H_{2a} : Capital Structure (Debt to Asset Ratio) positively impacts financial performance (Return on Asset).

 H_{2b} : Capital Structure (Debt to Asset Ratio) has a negative impact on financial performance (Tobin's Q).

2.4.4 The Effect of Capital Structure (Debt to Equity Ratio) on Financial Performance

The debt-to-equity ratio (DER) indicates the proportion of debt to equity in a company. Increasing DER can enhance financial performance theoretically, as higher debt levels can support business expansion and operations. Research by Yuliani (2021)supports this, showing a positive relationship between DER and return on assets (ROA). However, research by Sa'adah & Indana (2022)highlights the negative side of increased DER: a decrease in Tobin's Q. A high debt ratio can increase creditor risk and decrease the company's market value. Based on these findings, this study hypothesizes that DER has a positive impact on ROA and a negative impact on Tobin's Q. Specifically, the hypotheses are:

 H_{2a} : Capital Structure (Debt to Equity Ratio) positively impacts financial performance (Return on Asset).

 H_{2b} : Capital Structure (Debt to Equity Ratio) has a negative impact on financial performance (Tobin's Q).

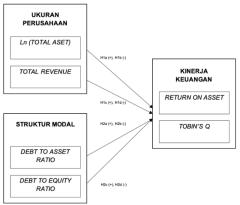


Figure 1. Conceptual Frameworks Source: Research Results

3. Research Method

3.1 Population, Sample, and Data Source

The population of this study comprised all manufacturing companies listed on S&P Capital IQ in Indonesia, Singapore, Malaysia, Thailand, and the Philippines during the period 2014-2023. A sample of these companies was selected based on specific criteria, including public company status, operational activity during the specified period, and availability of complete financial data. The financial data was sourced from S&P Capital IQ and, in some cases, supplemented with data from the World Bank to ensure comprehensive analysis.

3.2 Data Collection Techniques

This study uses secondary data from financial reports of manufacturing companies listed on S&P Capital IQ from 2014-2023. The sampling technique used is purposive sampling, where the researcher selects samples based on specific criteria relevant to the research objectives. Data analysis employs a parametric panel approach to examine the relationships between variables, assuming particular relationships such as linearity.

3.3 Variable Measurement

3.3.1 Dependent Variable

A dependent variable conceptually refers to a value that changes in response to changes in the value of an independent variable. This variable is the primary focus of quantitative data analysis (Sekaran & Bougie, 2019). This research measures the dependent variable using two metrics: Return on Assets (ROA) and Tobin's Q.

3.3.1.1 Return on Asset

ROA is a financial metric that assesses how effectively assets are utilized to generate profits. This research uses ROA as an indicator of the company's financial performance. The formula used is as follows (Asaubi & Sakir, 2021):

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

3.3.1.2 Tobin's Q

Tobin's Q is a ratio used to evaluate whether a company's market value is higher or lower than its book value. In this study, Tobin's Q is a key indicator of the company's financial performance. The formula used is as follows (Butt et al., 2023):

$$TQ = \frac{Market \, Value \, of \, Equity \, + \, Debt}{Total \, Assets}$$

3.3.2 Independent Variable

An independent variable is a factor that is assumed to cause changes in a dependent variable. The relationship between the two can be positive, negative, or non-linear. (Sekaran & Bougie, 2019). In this research, firm size and capital structure are used as independent variables.

3.3.2.1 Firm size

Firm size is expected to explain variations in the dependent variable, proxied by total assets and revenue. (Oktaviyana et al., 2023). These two proxies provide insights into the scale and capacity of the firm in carrying out its operational activities.

3.3.2.1.1 Total Asset

Total assets are used to measure the total economic resources owned by a company. Total assets are used as a reference for calculating the size of a company. The following is the formula (Oktaviyana et al., 2023). :

$$Total Aset = Ln (Total Asset)$$

3.3.2.1.2 Total Revenue

Total revenue is a variable used to measure the total income a company receives from selling products or services. Total revenue is used as an indicator to measure the scale of a company.

3.3.2.2 Capital Structure

Capital structure is seen as a cause that can explain variations in the dependent variable. DAR and DER are considered determinants of financial risk and performance.

3.3.2.2.1 Debt to Asset Ratio

DAR is a tool used to measure the proportion of total liabilities to the total assets of a company. In this research, DAR is used as a proxy to analyze the company's capital structure. The following is the calculation formula for the DAR (Asaubi & Sakir, 2021):

$$DAR = \frac{Total\ Debt}{Total\ Asset}$$

3.3.2.2.2 Debt to Equity Ratio

DER is a tool used to measure the proportion of total liabilities to a company's total equity. This research adopts DER as a proxy to analyze the company's capital structure. The following is the calculation formula for DER (Cahyani & Puspitasari, 2023):

$$DER = \frac{Total\ Debt}{Total\ Equity}$$

3.3.3 Control Variable

Control variables act as determinants of the dependent variable, similar to independent variables, but are not the primary focus of analysis. They function as additions to the equation to avoid anomalous results. Variables such as GDP, inflation, firm age, and the COVID-19 pandemic exert significant influence in this analysis. GDP and inflation reflect macroeconomic conditions affecting market demand, while firm age indicates experience and adaptability to market changes. The COVID-19 pandemic, which posed significant challenges to the manufacturing sector, is used as a control variable to understand its impact on the financial stability of firms during the crisis period (Naibaho & Simatupang, 2024).

3.4 Analysis Technique

$$Y1 = ROA_{it} = \alpha + \beta 1TA_{it} + \beta 2TR_{it} + \beta 3DAR_{it} + \beta 4DER_{it} + \beta 5INFL_{it} + \beta 6GDP_{it} + \beta 7AGE_{it} + \beta 8C19_{it} + \varepsilon_{it}$$

$$Y2 = TQ_{it} = \alpha + \beta 1TA_{it} + \beta 2TR_{it} + \beta 3DAR_{it} + \beta 4DER_{it} + \beta 5INFL_{it} + \beta 6GDP_{it} + \beta 7AGE_{it} + \beta 8C19_{it} + \varepsilon_{it}$$

Description:

Constanta :

®1,2,3,...,7
 Coefficient Variable
 ROA
 Return on Aset
 TQ
 Tobin's Q
 AST
 Ln Total Asset
 REV
 Total Revenue
 DAR
 Debt to Asset Ratio
 DER
 Debt to Equity Ratio

INFL : Inflasi

GDP : GDP Growth

AGE : Age
C19 : Covid-19
i : Perusahaan ke-i
t : Tahun ke-t
Σ : Error

4. Results and Discussion

4.1 Descriptive Statistics

Table 1. Descriptive Statistical Results

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	7670	0.023	0.097	-0.437	0.271
TQ	7670	0.727	0.985	-0.379	5.54
TA	7670	4.578	1.468	1.901	9.325
TR	7670	309.343	991.067	0.758	7683.249
DAR	7670	0.38	0.21	0.04	1.015
DER	7670	0.84	1.066	-1.769	6.803
GDP	7670	3.255	3.299	-6.05	9.691
INFL	7670	1.875	1.878	-1.139	6.395
AGE	7670	36.134	16.848	8	102
C19	7670	0.2	0.4	0	1

The descriptive statistics analysis of 7,670 observations from 767 companies in Indonesia, Thailand, the Philippines, Malaysia, and Singapore revealed several key insights. Firstly, the average Return on Assets (ROA) was 0.023, indicating a positive but modest return on assets for the sample companies. However, the range of ROA values, from -0.437 to 0.271, suggests significant variation in financial performance, with some companies performing poorly while others performing well. Secondly, the average Tobin's Q was 0.727, indicating that most companies had reasonably good market valuations relative to their asset values. Yet, the wide range of values, from -0.379 to 5.54, highlights considerable variation in market valuation. Thirdly, the average total assets were 4,578, suggesting a substantial asset base for most companies in the sample. However, the total assets range from 1,901 to 9,325, indicating significant variation in firm size. The average total revenue was 309,343, ranging from 0.758 to 7,683.249, suggesting significant variation in revenue generation. Regarding capital structure, the average debt-to-assets ratio (DAR) of 0.38 indicates a relatively low level of debt. In contrast, the average debt-to-equity ratio (DER) of 0.84 suggests a lower level of debt relative to equity. However, both ratios exhibit significant variations, indicating different capital structures among companies. Macroeconomic factors, such as GDP growth and inflation, also showed significant fluctuations, impacting the operating environment of these companies. Finally, the age of the companies varied significantly, with some being relatively young and others quite old, including a COVID-19 dummy variable that highlighted the impact of the pandemic on companies' performance.

4.2 Correlation Test

Table 2. Correlation Test-Pairwise Correlation

Variables	ROA	TQ	TA	TR	DAR	DER	GDP	INFL	AGE	C19
ROA	1.000									
TQ	0.165***	1.000								
IQ	(0.000)	1.000								
TA	0.176***	0.026**	1.000							
	(0.000)	(0.021)								
TR	0.074***	0.046***	0.630***	1.000						
	(0.000)	(0.000)	(0.000)							
DAR	-0.224***	0.009	0.275***	0.203***	1.000					
	(0.000)	(0.433)	(0.000)	(0.000)						
DER	-0.144***	-0.035***	0.222***	0.159***	0.698***	1.000				
	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)					
GDP	0.040***	-0.058***	-0.027***	-0.025***	-0.016	-0.011	1.000			
	(0.000)	(0.000)	(0.018)	(0.027)	(0.150)	(0.316)				
INFL	0.004	-0.037***	0.040***	-0.001	0.060***	0.050***	0.498***	1.000		
	(0.700)	(0.001)	(0.000)	(0.913)	(0.000)	(0.000)	(0.000)			
AGE	-0.008	-0.122***	0.237***	0.108***	0.031***	-0.003	-0.019*	0.066***	1.000	
	(0.462)	(0.000)	(0.000)	(0.000)	(0.007)	(0.807)	(0.089)	(0.000)		
C19	-0.033***	0.058***	0.031***	0.002	-0.005	-0.003	-0.597***	-0.302***	0.058***	1.000
	(0.004)	(0.000)	(0.006)	(0.871)	(0.681)	(0.769)	(0.000)	(0.000)	(0.000)	
***p<0.01	**p<0.05, *p	0<0.1								

Source: Research data

A company's financial performance exhibits a varied relationship with internal and external factors, reflecting the dynamics of profit efficiency and market valuation. As measured by total assets, firm size has a significant positive correlation with ROA of 0.176 (p < 0.01), indicating that larger companies tend to be more efficient in generating profits. However, the correlation with Tobin's Q of 0.026 (p < 0.05) suggests that larger companies only experience a slight increase in market valuation. Based on total revenue, the correlation with ROA of 0.074 (p < 0.074) (p < 0.074)

0.01) indicates efficient asset utilization. In contrast, the correlation with Tobin's Q of 0.046 (p < 0.01) suggests that higher revenues increase market valuation. Capital structure, as measured by the debt-to-asset ratio (DAR), has a significant negative correlation with an ROA of -0.224 (p < 0.01), indicating that high debt reduces profit efficiency. The correlation with Tobin's Q is positive but insignificant at 0.009 (p > 0.1), suggesting a limited impact on market valuation. The debt-to-equity ratio (DER) has a significant negative correlation with both ROA (-0.144, p < 0.01) and Tobin's Q (-0.035, p < 0.05), indicating that increasing the debt-to-equity ratio tends to suppress profits and decrease market valuation. External factors such as GDP growth positively correlate with an ROA of 0.040 (p < 0.01), suggesting that favorable macroeconomic conditions support profit efficiency. Still, a negative correlation with Tobin's Q of -0.058 (p < 0.01) indicates that market valuation tends to decrease. Inflation has an insignificant correlation with ROA of 0.004 (p > 0.1) but a negative correlation with Tobin's Q of -0.037 (p < 0.01), suggesting that high inflation negatively impacts market valuation. Company age has an insignificant correlation with ROA of -0.008 (p > 0.1) but a significant negative correlation with Tobin's Q of -0.122 (p < 0.01), suggesting that older companies tend to have lower market valuations. The impact of COVID-19 shows a negative correlation with an ROA of -0.033 (p < 0.01), indicating a decrease in profit efficiency during the pandemic. In contrast, a positive correlation with Tobin's Q of 0.058 (p < 0.01) suggests that despite declining profits, market valuations increased, possibly due to long-term prospects or strategic responses during the crisis.

4.3 Hausman Test

Table 3. Hausman Test – Model 1.2

2	Prob> Chi ²	Conclusion
58	0.0000	Fixed Effect Model
10	0.0000	Fixed Effect Model
	.58 .10	

Source: Research data

Table 3 shows the results of the Hausman test conducted to select between model 1 and model 2. The (Prob > chi2) value is 0.0000, which means the significance level is less than 0.05. Based on these results, it can be concluded that the most suitable panel model for both model 1 and model 2 is the fixed effect model.

4.4 Chow Test

Table 4. Chow Test – Model 1,2

Model	Chi ²	Prob> Chi ²	Conclusion
Model 1	7.48	0.0000	Fixed Effect Model
Model 2	14.76	0.0000	Fixed Effect Model

Source: Research data

The results of the Chow test for model 1 and model 2 are presented in Table 4. The (Prob > F) value is 0.0000, which means the significance level is less than 0.05. Based on these results, it is concluded that the panel chosen for both model 1 and model 2 is the fixed effect model.

4.5 Multicollinearity Test

Table 5. Multicollinearity Test – Model 1,2

Variable	VIF	1/VIF
TA	10.81	0.092539
DAR	7.90	0.126662
AGE	5.57	0.179561

GDP	3.40	0.293940
DER	3.10	0.322581
INFL	2.69	0.371357
C19	1.83	0.547788
TR	1.48	0.677588
Mean VIF	4.60	

Source: Research data

The results of testing model 1 and model 2 show a VIF value of 4.60, which is less than 10. The results of the research on model 1 and model 2 indicate no multicollinearity violation. The VIF value for each variable in this study is also below 10, so no violation of multicollinearity was found for each variable.

4.6 Heteroskedasticity Test

Table 6. Heteroskedasticity Test – Model 1.2

1.13 0.01 1,2	
Prob>Chi ²	
0.0000	
0.0000	
	Prob>Chi ² 0.0000

Source: Research data

The research results show that model 1 and model 2 are 0.000, less than 0.1. Observations show that model 1 and model 2 have heteroscedasticity violations (Prob > chi2 = 0.0000 < 0.1).

4.7 Autocorrelation Test

Table 7. Autocorrelation Test – Model 1,2

Model	Chi ²	Prob> Chi ²
Model 1	70.977	0.0000
Model 2	122.872	0.0000
	Source: Research data	

The results of the autocorrelation test show that (Prob > F = 0.0000) is less than 0.05, indicating a violation of autocorrelation in both model 1 and model 2 of the research.

4.8 Cross-Sectional Independence

Table 8. Cross-Sectional Independence Test – Model 1,2

Model	Pesaran test	Pr
Model 1	17.307	0.0000
Model 2	100.444	0.0000

Source: Research data

The cross-sectional dependency test results for model 1 and model 2 show statistic values of 17.307 and 100.444, respectively, with a probability (Pr) of 0.0000 for both. This probability, which is less than 0.05, provides strong evidence to reject the null hypothesis, concluding that cross-sectional dependence exists among the variables in both models.

4.9 F test

Table 9. f Test – Model 1,2

Model	Prob>Chi ²
Model 1	0.0000
Model 2	0.0000

The table shows that the F probability value for both models is minimal, indicating a statistically significant result of 0.0000. Adjusting the significance levels to 10%, 5%, and 1%, the results show that the F value is less than the determined significance level (less than 5%). Data analysis reveals that all independent variables significantly contribute to the change in the dependent variable in both models being compared.

4.10 Coefficient of Determination Test

Coefficient of Determination Test

Table 10. Coefficient of Determination Test– Model 1.2

Model	Overall
Model 1	0.0308
Model 2	0.0068

Source: Research data

The results for Model 1 show a coefficient of determination (Adjusted R-squared) of 0.0308, while for Model 2, it is 0.0068. This indicates that the independent variables in Model 1 can explain 3.08% of the variation in the dependent variable, whereas in Model 2, they can only explain 0.68%. The remaining percentages, 96.92% and 99.32%, respectively, are presented by other factors outside the variables included in this research model.

4.11 Hypothesis Test Result

Table 11. Hypothesis Test- Model 1 - ROA

Variable	Coefficient	Prob/2	Result	Overall
Independer	nt Variable			
TA	0.0203294	0.021	Positive Significant	H_{1a} Supported
TR	0.0000296	0.000	Positive Significant	H_{1c} Supported
DAR	-0.1551427	0.000	Negative Significant	H_{2a} Rejected
DER	0.0028208	0.156	Positive Not Significant	H_{2c} Supported
Control Va	riable			
GDP	0.001934	0.000		
INFL	0.0017267	0.01555		
AGE	-0.0045368	0.000		
C19	0.0121754	0.000		
CONS	0.128965	0.000		

Source: Research data

The test results indicate that firm size, as measured by total assets, is significant at the 5% level (p < 0.05) with a probability value of 0.042 (divided by 2 due to a one-tailed hypothesis), and a coefficient of 0.0203294. This suggests a positive influence on financial performance (ROA), thus supporting hypothesis H_{1a} . Similarly, firm size, measured by total revenue, is highly significant at the 1% level (p < 0.01) with a probability value of 0.000 and a coefficient of 0.0000296, indicating a positive impact on ROA, thereby supporting hypothesis H_{1c} . As measured by the debt-to-asset ratio, capital structure is highly significant at the 1% level (p < 0.01) with a probability value of 0.000 and a negative coefficient of -0.1551427, suggesting a negative influence on ROA, thus rejecting hypothesis H_{2a} . However, capital structure, as

measured by the debt-to-equity ratio, is not significant at the 5% level (p > 0.05) with a probability value of 0.312 (divided by 2), although it has a positive coefficient of 0.0028208, indicating a positive but insignificant impact on ROA. Therefore, hypothesis H_{2c} is partially supported.

Table 12. Hypothesis Test- Model 2 - Tobin's Q

Variable	Coefficient	Prob/	Result	Overall
		2		
Independent Varia	able			
TA	-0.1297431	0.028	Negative Significant	H_{1b} Supported
TR	0.0000082	0.001	Positive Significant	H_{1d} Rejected
DAR	0.1417588	0.308	Positive Not Significant	H _{2b} Rejected
DER	-0.0528908	0.0005	Negative Significant	H_{2d} Supported
Control Variable				
GDP	0.0035598	0.2455		
INFL	1.89e-06	0.5		
AGE	-0.0066554	0.103		
C19	0.1915676	0.000		
CONS	1.476748	0.000		

Source: Research data

The test results reveal that firm size, as measured by total assets, is significant at the 5% level (p < 0.05) with a probability value of 0.056 (adjusted for a one-tailed test), and a negative coefficient of -0.1297431. This suggests a negative influence on financial performance, as measured by Tobin's Q, thus supporting hypothesis H_{1b} . Conversely, firm size, measured by total revenue, is highly significant at the 1% level (p < 0.01) with a probability value of 0.002 (adjusted for a one-tailed test), and a positive coefficient of 0.000082, indicating a positive impact on Tobin's Q, thereby rejecting hypothesis H_{1d} . Regarding capital structure, the debt-to-asset ratio is not significant at any conventional significance level (p > 0.10) with a probability value of 0.616 (adjusted for a one-tailed test), despite having a positive coefficient of 0.1417588. Therefore, the debt-to-asset ratio is deemed to have no significant impact on Tobin's Q, and hypothesis H_{2a} is rejected. On the other hand, the debt-to-equity ratio is highly significant at the 1% level (p < 0.01) with a probability value of 0.001 (adjusted for a one-tailed test) and a negative coefficient of -0.0528908, indicating a negative influence on Tobin's Q, thus supporting hypothesis H_{2d} .

Discussion Firm Size (Ln Total Asset) Has an Influence on Financial Performance

Table 13. Country Hypothesis Test– Model 1 – ROA

Country	Variable	Coefficient	Prob/2	Result	
Indonesia	TA	0.0049335	0.0035	Positive Significant	
Singapura	TA	0.0766757	0.000	Positive Significant	
Malaysia	TA	0.024114	0.037	Positive Significant	
Thailand	TA	0.109216	0.0495	Positive Significant	
Filipina	TA	0.0201568	0.0685	Positive Not Significant	
=	Source: Decearch data				

Based on Table 11, the test results indicate that firm size, proxied by the natural logarithm of total assets (Ln Total Asset), significantly influences financial performance (ROA). This finding suggests that companies with larger total assets and effective management tend to achieve better financial performance. Therefore, hypothesis H_{1a}, which states that total assets positively impact ROA, is supported. This finding aligns with research by Januarty (2019)which found that firm size positively impacts the financial performance of manufacturing companies.

Based on the hypothesis test results in Table 13, the influence of Ln Total Asset on ROA varies across countries. In Indonesia, Ln Total Asset significantly impacts ROA (coefficient 0.0049335, probability 0.0035). In Singapore, the influence is also positive and significant (coefficient 0.0766757, probability 0.000). Malaysia also shows a significant positive influence (coefficient 0.024114, probability 0.037), while Thailand has the highest coefficient (0.109216, probability 0.0495) and is significant. Conversely, in the Philippines, the influence is positive but insignificant (coefficient 0.0201568, probability 0.0685).

Table 14. Country Hypothesis Test– Model 2 – Tobin's O

Country	Variable	Coefficient	Prob/2	Result
Indonesia	TA	-0.2549482	0.000	Negative Significant
Singapura	TA	-0.2680342	0.006	Negative Significant
Malaysia	TA	-0.092145	0.170	Negative Significant
Thailand	TA	0.0509147	0.2925	Positive Not Significant
Filipina	TA	-0.6222583	0.0035	Negative Significant

Source: Research data

Based on Table 12, Ln Total Asset is found to have a significant negative impact on Tobin's Q. This indicates that an increase in firm size does not always positively impact market valuation. Large asset sizes are likely not always accompanied by sufficient productivity to enhance investor perception of the company. Therefore, hypothesis H_{1b}, which states that total assets have a negative impact on Tobin's Q, is supported. This research aligns with the findings of (Dermawan & Lestari, 2022), who discovered that firm size can negatively influence financial performance.

According to the hypothesis test results in Table 14, the impact of Ln Total Asset (TA) on Tobin's Q varies across countries. In Indonesia, Ln Total Asset significantly negatively impacts Tobin's Q (coefficient -0.2549482, probability 0.000). In Singapore, the influence is also negative and significant (coefficient -0.2680342, probability 0.006). The Philippines shows the most significant negative impact with the largest coefficient (-0.6222583, probability 0.0035). In Malaysia, the influence is negative but insignificant (coefficient -0.092145, probability 0.170). Meanwhile, in Thailand, Ln Total Asset has a positive but insignificant impact on Tobin's Q (coefficient 0.0509147, probability 0.2925). This indicates that Ln Total Asset generally negatively impacts Tobin's Q, except in Thailand.

Firm Size (Total Revenue) Has an Influence on Financial Performance

Table 15. Country Hypothesis Test- Model 1 – ROA

Country	Variable	Coefficient	Prob/2	Result
Indonesia	TR	0.0000124	0.0095	Positive Significant
Singapura	TR	0.00001	0.0235	Positive Significant
Malaysia	TR	0.0000807	0.000	Positive Significant

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"The Role of Industries and Innovation in Achieving Global Sustainability Goals" 25 April 2025, Tangerang.

Thailand	TR	5.88e-06	0.063	Positive Not Significant			
Filipina	TR	6.78e-06	0.1885	Positive Not Significant			
Source: Research data							

Based on Table 11, total revenue has a significant positive impact on ROA. This indicates that higher revenue allows companies to improve operational efficiency and generate higher profits. This finding emphasizes the importance of revenue optimization in strengthening financial performance. Therefore, hypothesis H_{1c} , which states that firm size positively influences financial performance, is supported.

Based on the hypothesis test results in Table 15, the impact of Total Revenue on ROA varies across countries. In Indonesia, Total Revenue significantly impacts ROA (coefficient 0.0000124, probability 0.0095). In Singapore, the influence is also positive and significant (coefficient 0.00001, probability 0.0235). Malaysia shows a significant positive influence with a coefficient of 0.0000807 and a probability of 0.000. Conversely, the influence is positive but insignificant in Thailand (coefficient 5.88e-06, probability 0.063) and in the Philippines (coefficient 6.78e-06, probability 0.1885). This indicates that Total Revenue significantly impacts ROA in Indonesia, Singapore, and Malaysia but not Thailand and the Philippines.

Table 16. Country Hypothesis Test– Model 2 – Tobin's Q

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Country	Variable	Coefficient	Prob/2	Result
Indonesia	TR	-0.0001324	0.2805	Negative Not Significant
Singapura	TR	-4.35e-06	0.4055	Negative Not Significant
Malaysia	TR	0.0000263	0.424	Positive Not Significant
Thailand	TR	0.0000724	0.000	Positive Significant
Filipina	TR	0.0000255	0.3315	Positive Not Significant

Source: Research data

Table 12 shows that total revenue significantly impacts Tobin's Q. This indicates that higher revenue can positively influence a company's market valuation. Therefore, hypothesis H_{1d}, which suggests that firm size has a negative impact on financial performance, is rejected. Based on the hypothesis test results in Table 16, the impact of Total Revenue on Tobin's Q varies across countries. In Indonesia, Total Revenue has a negative but insignificant effect on Tobin's Q (coefficient -0.0001324, probability 0.2805). In Singapore, the influence is also negative and insignificant (coefficient -4.35e-06, probability 0.4055). Malaysia shows a positive but insignificant impact (coefficient 0.0000263, probability 0.424). Conversely, in Thailand, Total Revenue significantly positively impacts Tobin's Q (coefficient 0.0000724, probability 0.000). In the Philippines, the influence is positive but insignificantly impacts Tobin's Q in Thailand, while the impact is not significant in other countries.

Capital Structure (Debt to Asset Ratio) has an Influence on Financial Performance

Table 17. Country Hypothesis Test– Model 1 – ROA

Country	Variable	Coefficient	Prob/2	Result
Indonesia	DAR	-0.1319472	0.000	Negative Significant
Singapura	DAR	-0.3268718	0.000	Negative Significant
Malaysia	DAR	-0.0979537	0.003	Negative Significant
Thailand	DAR	-0.1040042	0.000	Negative Significant
Filipina	DAR	-0.0153439	0.2875	Negative Not Significant

The test results in Table 11 indicate that the Debt-to-Asset Ratio (DAR) significantly negatively impacts ROA. This suggests that a higher debt-to-asset ratio increases financial risk, negatively impacting a company's operational performance. Therefore, hypothesis H_{2a} , which states that capital structure positively influences financial performance, is rejected. This research aligns with the findings of (Alifiana & Indah, 2020), who concluded that capital structure does not positively and significantly impact financial performance.

Based on the hypothesis test results in Table 17, the impact of the Debt-to-Asset Ratio (DAR) on ROA consistently shows negative results across all countries. In Indonesia, DAR significantly negatively affects ROA (coefficient -0.1319472, probability 0.000). In Singapore, the influence is also negative and significant, with a larger coefficient (-0.3268718, probability 0.000). Malaysia and Thailand also show significant negative impacts (coefficients -0.0979537 and -0.1040042, respectively, with probabilities 0.003 and 0.000). Conversely, in the Philippines, the effects of DAR are negative but not significant (coefficient 0.0153439, probability 0.2875). This suggests that DAR tends to negatively impact ROA significantly in most countries, except for the Philippines.

Table 18. Country Hypothesis Test– Model 2 – Tobin's Q

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Country	Variable	Coefficient	Prob/2	Result
Indonesia	DAR	-0.2549482	0.000	Negative Significant
Singapura	DAR	0.7395909	0.000	Positive Significant
Malaysia	DAR	0.9387227	0.0035	Positive Not Significant
Thailand	DAR	-0.9405857	0.0565	Negative Not Significant
Filipina	DAR	-0.8428764	0.0055	Positive Not Significant

Source: Research data

Based on Table 12, DAR has a positive but insignificant impact on Tobin's Q. This suggests that asset-based leverage has not yet significantly influenced the company's market value. Therefore, hypothesis H_{2b} , which states that capital structure has a negative impact on financial performance, is supported.

Based on the hypothesis test results in Table 18, the impact of DAR on Tobin's Q varies across countries. In Indonesia, DAR significantly negatively impacts Tobin's Q (coefficient -0.2549482, probability 0.000). In Singapore, the influence is positive and significant (coefficient 0.7395909, probability 0.000). In Malaysia, the influence is positive but insignificant (coefficient 0.9387227, probability 0.0035). Meanwhile, in Thailand, DAR has a negative but insignificant impact on Tobin's Q (coefficient -0.9405857, probability 0.0565). In the Philippines, the influence is also positive but not significant (coefficient -0.8428764, probability 0.0055). This indicates that DAR has varying impacts on Tobin's Q across countries in terms of direction and significance.

Capital Structure (Debt to Equity Ratio) has an Influence on Financial Performance

Table 19. Country Hypothesis Test– Model 1 – ROA

Country	Variable	Coefficient	Prob/2	Result
Indonesia	DER	0.0007612	0.3505	Positive Not Significant
Singapura	DER	-0.0048512	0.249	Negative Not Significant
Malaysia	DER	0.0034604	0.3145	Positive Not Significant
Thailand	DER	-0.0052369	0.0125	Negative Significant
Filipina	DER	0.0009063	0.147	Positive Not Significant
		Carrage Dagger	-l- d-4-	

The test results in Table 11 indicate that the Debt-to-Equity Ratio (DER) has a positive but insignificant impact on ROA. This suggests that using equity to finance the company does not significantly impact financial performance. Therefore, hypothesis H_{2c}, which states that capital structure positively influences financial performance, is supported. This research aligns with the findings of (Tamba & Sudjiman, 2021), who found that capital structure has a positive impact on financial performance.

Based on the hypothesis test results in Table 19, the impact of DER on ROA varies across countries. In Indonesia, DER has a positive but insignificant effect on ROA (coefficient 0.0007612, probability 0.3505). In Singapore, the influence is negative but insignificant (coefficient -0.0048512, probability 0.249). Malaysia also shows a positive but insignificant impact (coefficient 0.0034604, probability 0.3145). Conversely, in Thailand, DER significantly negatively affects ROA (coefficient -0.0052369, probability 0.0125). The influence in the Philippines is positive but insignificant (coefficient 0.0009063, probability 0.147). This indicates that DER is mostly unimportant in influencing ROA in most countries, except for Thailand, where it has a significant negative impact.

Table 20. Country Hypothesis Test– Model 2 – Tobin's Q

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Country	Variable	Coefficient	Prob/2	Result
Indonesia	DER	-0.0163932	0.002	Negative Significant
Singapura	DER	-0.0518457	0.014	Negative Significant
Malaysia	DER	-0.173436	0.000	Negative Significant
Thailand	DER	0.0009226	0.4895	Positive Not Significant
Filipina	DER	-0.0028886	0.555	Negative Not Significant
_		Source: Researc	h data	-

Table 12 shows that DER significantly negatively impacts Tobin's Q. This indicates that a higher proportion of debt compared to equity can reduce the company's market value. Therefore, hypothesis H_{2d} , which suggests that capital structure has a negative impact on financial performance, is supported. This research aligns with the findings of (Sa'adah & Indana, 2022),who proposed that capital structure has a negative impact on financial performance.

Based on the hypothesis test results in Table 20, the impact of DER on Tobin's Q varies across countries. In Indonesia, DER significantly negatively affects Tobin's Q (coefficient -0.0163932, probability 0.002). In Singapore, the influence is also negative and significant (coefficient -0.0518457, probability 0.014). Malaysia shows the most significant negative impact (coefficient -0.173436, probability 0.000). Conversely, in Thailand, DER has a positive but insignificant effect on Tobin's Q (coefficient 0.0009226, probability 0.4895). In the Philippines, the influence is negative but insignificant (coefficient -0.0028886, probability 0.555). This indicates that DER significantly negatively impacts Tobin's Q in Indonesia, Singapore, and Malaysia but not in Thailand and the Philippines.

5. Conclusion

This study examines the impact of firm size and capital structure on financial performance, as measured by ROA and Tobin's Q, among manufacturing companies in the ASEAN region from 2014 to 2023. Empirical analysis reveals that firm size, proxied by the natural logarithm of total assets, exhibits a significant positive correlation with ROA but a significant negative correlation with Tobin's Q. Total revenue also demonstrates a significant positive correlation with BOA and Tobin's Q. However, its impact on Tobin's Q contradicts the proposed

hypothesis. Capital structure, measured by DAR, has a significant negative correlation with ROA but is insignificant concerning Tobin's Q. At the same time, DER shows a significant negative correlation with Tobin's Q but is insignificant with ROA.

A country-specific analysis reveals that the natural logarithm of total assets exerts a significant positive influence on ROA in all countries (Indonesia, Singapore, Malaysia, and Thailand) but significantly negatively impacts Tobin's Q in most countries. Total revenue exhibits a significant positive impact on ROA in Indonesia, Singapore, and Malaysia, as well as on Tobin's Q in Thailand. Capital structure (DAR) significantly negatively impacts ROA across all countries. Still, its effect on Tobin's Q varies, with a significant positive impact in Singapore and a significant negative impact in Indonesia. DER significantly negatively affects ROA in Thailand and Tobin's Q in most countries, including Indonesia, Singapore, and Malaysia.

This study provides valuable insights for company management, investors, and researchers to understand how these variables influence financial performance. The limitations of this study include data coverage and classical assumption issues. Therefore, extending the time period and using more variable proxies is recommended for more comprehensive results.

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