



The Determinants of Capital Structure of Transportation and Logistic Companies in Indonesia during COVID-19 Pandemic

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Abstract. This study investigates the determinants of capital structure among transportation and logistics companies in Indonesia during the COVID-19 pandemic. Employing data from 12 firms listed on the Indonesia Stock Exchange between 2020 and 2023, the study analyzes the impact of profitability, tangibility, and firm size on capital structure decisions. EVIEWS 13 program is utilized for data processing in this study. The results indicate that profitability significantly and negatively influences capital structure, supporting the pecking order theory, which suggests that firms prioritize internal funding over external debt to minimize financing costs. Tangibility, defined as the proportion of tangible assets, has a significant positive impact, as fixed assets enhance collateral availability and increase access to debt financing. Conversely, firm size, measured as the natural logarithm of total assets, does not significantly affect capital structure, possibly due to the inclusion of less reliable assets like receivables in the measurement. The study contributes to understanding capital structure dynamics under crisis conditions, highlighting that companies adapt their financial strategies based on asset composition and profitability. Limitations include a focus on listed companies and a narrow firm size metric. Future research could explore other sectors positively impacted by the pandemic, such as healthcare and telecommunications, or adopt alternative measures for firm size to validate these findings.

Keywords: Capital structure, COVID-19, Profitability, Tangibility, Firm size

1 Introduction

In the dynamic and ever-changing business landscape, decisions regarding capital structure are critical to the sustainability and growth of any organization. These decisions directly impact how companies secure financing and balance their long-term financial health. According to Wirianata and Wijoyo, businesses have two primary sources of funding: internal and external [1]. Internal funding is derived from shareholders through retained earnings or equity issuance, while external funding is sourced from creditors in the form of debt. The balance between these funding sources is crucial for maintaining financial stability. Furthermore, Laviola and Santi-

oso emphasize that a company's performance significantly influences its capital structure [2]. Companies with strong performance typically enjoy higher share prices on the stock exchange, enabling them to leverage internal financing more effectively.

The COVID-19 pandemic introduced unprecedented challenges and disruptions to global supply chains, making logistics and transportation companies vital to the movement of goods and services. While some companies faced sharp declines in demand due to restrictions on non-essential activities, others experienced a surge in demand for essential goods. This dual impact necessitated swift operational adjustments, such as optimizing routing efficiency, implementing contactless delivery methods, and refining inventory control processes. According to Smith and Johnson, these companies also accelerated their digital transformation efforts, adopting technologies like automated warehousing and real-time tracking systems to enhance operational resilience and adaptability during the crisis [3].

Profitability, as highlighted by Myers, is a key determinant of a company's ability to generate internal cash, reducing its reliance on external debt [4]. Higher profitability allows firms to finance operations and growth through retained earnings, resulting in a lower debt-to-equity ratio. Conversely, less profitable companies may depend more on external financing, increasing their leverage. Similarly, tangibility, defined by Rajan and Zingales as the proportion of tangible assets within a company's capital structure, plays a vital role. Companies with higher levels of tangible assets are better positioned to secure debt financing, as these assets can serve as collateral, enhancing creditworthiness and reducing perceived risk for lenders [5].

Firm size according to Frank & Goyal is another significant variable, as larger organisations frequently have more access to capital markets and more diversified financing choices. Due to their recognised creditworthiness and capacity for steady cash flow generation, larger companies typically display lower leverage ratios, which can result in more advantageous financing arrangements [6].

According to Myers' trade-off theory, the optimum debt ratio of a company in general is often overlooked as a trade-off between loan costs and benefit, managing the company's assets, and constant investment plans [4]. The company needs to substitute between debt and equity financing to achieve its maximum firm value. Furthermore, Myers also raises a theory regarding capital structure decisions, called pecking order theory. In this theory, the company determined the capital structure decisions based on the following ranking: 1) The company prefers internal funding; 2) the company adjusts the dividend payment target ratio to the investment owned by the company.; 3) the attached dividend policy, added with fluctuation of profitability and unpredictable investment opportunity, indicates that internally generated cashflows might be higher or lower than actual investment expenditures.; and 4) if the company needs external funding, the company will prioritize issuing the safest form of securities.

Building upon this theoretical framework, the researchers aim to explore the determinants of capital structure in Indonesia's transportation and logistics sector during the COVID-19 pandemic. Specifically, they seek to assess the impact of firm size, profitability, and tangibility on capital structure decisions and examine how management navigated these factors to optimize financial strategies in a period of heightened

uncertainty. This research provides valuable empirical insights into how businesses adapt their capital structures to mitigate risk and sustain operations during crises.

2 Research Method

2.1 Samples

As described in the initial section, the COVID-19 pandemic fundamentally reshaped how businesses operate, forcing organizations across industries to adapt rapidly to unprecedented challenges. These disruptions extended beyond operational adjustments and impacted financial decision-making, particularly in the context of capital structure. In light of this, researchers sought to gather empirical evidence on how specific independent variables namely profitability, tangibility, and firm size affected companies' capital structure decisions during this period of economic uncertainty. The focus of this study is to analyze the transportation and logistics industry, a sector that played a critical role in maintaining the flow of goods and services during the pandemic. The sector's importance to supply chain continuity, coupled with its unique financial and operational challenges, makes it an ideal candidate for understanding the dynamics of capital structure under crisis conditions.

The study utilized data from companies in the transportation and logistics sector listed on the Indonesia Stock Exchange (IDX) between 2020 and 2023. A purposive sampling method was employed to ensure the selection of a relevant and representative sample that met specific research criteria. This sampling approach allowed the authors to focus on companies with characteristics deemed essential for analyzing the relationship between the independent variables and capital structure.

To identify the research sample, the authors applied several inclusion and exclusion criteria. These criteria ensured that the selected companies not only reflected the characteristics of the transportation and logistics sector but also provided reliable data for the study. For instance, companies that experienced initial public offerings (IPOs), delisting, or relisting during the 2020–2023 period were excluded, as these events could distort the analysis of their capital structure. Similarly, firms that reported consistent financial losses during the same period were also excluded to avoid skewed results. Ultimately, the carefully curated sample offered a robust foundation for exploring the determinants of capital structure and yielded meaningful insights into how transportation and logistics companies adapted their financial strategies amidst the challenges posed by the COVID-19 pandemic.

Table 1. Sample selection criteria

No.	Sample Selection Criteria	Total
1.	Transportation & logistics sector companies listed on IDX during 2020-2023	36
2.	Transportation & logistics sector companies experienced IPO, delisting and relisting in 2020-2023	(9)
3.	Transportation & logistics sector companies experienced loss in 2020-2023	(15)
<i>Number of companies</i>		12
<i>Year of research</i>		4
<i>Number of research samples from 2020-2023</i>		48

The research object of this study consists of three independent variables and one dependent variable. Profitability, tangibility and firm size are chosen as the independent variables. The dependent variable used in this research is capital structure. The data for this study was processed using EViews 13.

2.2 Measurement

To gather robust empirical evidence regarding the determinants of capital structure, this study focuses on analyzing the relationships between profitability, tangibility, and firm size as independent variables and capital structure as the dependent variable. These measurement factors were carefully selected based on their theoretical and practical relevance to capital structure decisions, as highlighted in previous research and established financial theories.

The research adopts panel data regression as the primary testing method. Panel data regression is particularly well-suited for this study as it allows for the examination of cross-sectional and time-series data simultaneously, thereby capturing both inter-company and intra-company variations over the study period (2020–2023). This method provides a more comprehensive and nuanced analysis of how the selected variables influence capital structure decisions within the transportation and logistics sector, which faced significant challenges and opportunities during the COVID-19 pandemic.

The formulas and measurement approaches for each variable are summarized in the following table, providing a clear framework for the empirical analysis. This structured methodology ensures the reliability of the results and facilitates a deeper understanding of the factors that shape capital structure decisions in a critical and dynamic industry during a period of global economic uncertainty.

Table 2. Summary of variables

Variables	Description
Dependent variable	
<i>Capital structure</i>	$\text{Leverage (Lev)} = \frac{\text{Total Debt}}{\text{Total Assets}}$
Independent variables	
<i>Profitability</i>	$\text{Profitability (Prof)} = \frac{\text{Earning Before Interest and Taxes}}{\text{Total Assets}}$
<i>Tangibility</i>	$\text{Tangibility (Tang)} = \frac{\text{Total Fixed Assets}}{\text{Total Assets}}$
<i>Firm size</i>	$\text{Firm Size (Size)} = \text{Natural Logarithm of Total Assets}$

This research used EViews 13 to process the data. According to Widarjono, there are 3 panel data assumption approaches in EViews, namely, common effect, fixed effect, and random effect [7]. One of these methods will be chosen based on the result of 3 step model testing: 1) F Statistics Test, 2) Lagrange-Multiplier Test, and 3) Hausman Test.

F Statistics Test. This test performed to determine whether the regression is better to be tested using common effect model or fixed effect model. According to the following table, F count value taken from the test output of Cross-section F is 86.145694 with probability value of 0.0000. F table value with the following condition ($\alpha = 5\%$, df (11,33)) is 2.09325441. Since the F count is higher than F table, it is confirmed that fixed effect model is preferable for the testing.

Table 3. F Statistics Test Result

Redundant Fixed Effects Tests			
Equation: CAPITALSTRUCTURE			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob
<i>Cross-section F</i>	86.145694	(11,33)	0.0000
<i>Cross-section Chi-square</i>	62.799668	11	0.0000

Lagrange Multiplier (LM) Test. This test performed to determine whether the regression is better to be tested using common effect model or random effect model. The result of this test is shown in the following table.

Table 4. Lagrange Multiplier Test Result

Lagrange Multiplier Tests for Random Effects			
Null hypotheses: No effects			
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives			
	Test Hypothesis		
	Cross-section	Time	Both
<i>Breusch-Pagan</i>	65.10047 (0.0000)	2.005539 (0.1567)	67.10601 (0.0000)
<i>*Mixed chi-square asymptotic critical values:</i>			
1%	7.289		
5%	4.321		
10%	2.952		

According to the test result, LM statistics represented as cross-section value in the table of 65.10047 is greater than 5% mixed chi-square asymptotic critical values of 4.321. This test confirmed that random effect model is preferable for the regression testing.

Hausman Test. This final test performed to determine whether the regression is better to be tested using fixed effect model or random effect model. The result of this test is shown in the following table.

Table 5. Hausman Test Result

Correlated Random Effects - Hausman Test			
Equation: CAPITALSTRUCTURE			
Test cross-section fixed effects			
Test Summary	Chi-Square Statistic	Chi-Square d.f.	Prob
<i>Cross-section random</i>	0.264674	3	0.9665

Based on the abovementioned result, Chi-Square Statistics taken from the test output is 0.264674 with probability value of 0.9665. While Chi-Square table value with the

following condition ($\alpha = 5\%$, $df(3)$) is 7.81472790. Since the Chi-Square Statistics is lower than Chi-Square table value, it is confirmed that random effect model is chosen as the model for regression testing.

Following the model test result, Widarjono states that no classic assumption testing to the research model since random effect model is used [7]. Because, random effect model has used Generalised Least-Square (GLS) estimation method which the variables has been transformed to fulfil standard least square assumptions. This method has process the data to produce Best Linear Unbiased Estimator (BLUE).

Random effect model in panel data regression testing represents a model which used error terms ε_{it} and disturbance variables v_i in panel data estimation. This model estimates that disturbance variables may be interconnected across time and between individuals. The equation of this model are as follows:

$$LEV_{it} = \beta_{1i} + \beta_2 PROF_{it} + \beta_3 TANG_{it} + \beta_4 SIZE_{it} + \varepsilon_{it} + v_i$$

Data analysis. To ensure that the abovementioned model fulfil the “Goodness of Fit” assumption, according to Ajija, et al. the author performed simultaneous regression coefficients testing (F/ANOVA test) and coefficient of determination test (Adjusted R^2 test) [8].

Table 6. F/ANOVA Test & Adjusted R^2 test Result

Dependent Variable: LEV	
Method: Pooled EGLS (Cross-section random effects)	
Total pool (balanced) observations: 48	
Swamy and Arora estimator of component variances	
Weighted Statistics	
<i>R-squared</i>	0.272075
<i>Adjusted R-squared</i>	0.222444
<i>F-statistic</i>	5.481943
<i>Prob (F-statistic)</i>	0.002739

According to the test result, adjusted R-squared value of 0.222444 indicates that 22,24% of capital structure decisions is explained by profitability, tangibility, and firm size and the remaining 77.76% is explained by other variables or factors. While the F count value taken from the test output of F-statistics is 5.481943 with a probability value of 0.002739. F table value with the following condition ($\alpha = 5\%$, $df(3,45)$) is 2.81154352. Since the F count is higher than the F table, according to the ANOVA test, it shows that the independent variables in this model are simultaneously affecting the capital structure. Since both of these tests show a positive result, this model has been concluded to be a good model and can be used to calculate data panel regression testing.

3 Results and Discussions

Table 7. Regression Test Result

Dependent Variable: LEV		
Method: Pooled EGLS (Cross-section random effects)		
Total pool (balanced) observations: 48		
Swamy and Arora estimator of component variances		
Variable	t-Statistic	Prob
<i>C</i>	-1.228740	0.2257
<i>PROF</i>	-2.140396	0.0379
<i>TANG</i>	2.216112	0.0319
<i>SIZE</i>	1.602130	0.1163

T testing is performed to each independent variable. T testing compares between t count value (represented by t-Statistic value in the abovementioned table) and t table value with criteria ($\alpha = 0,05/2$, $df (44)$) is 2.01536757. The t count value of profitability and tangibility is higher than t table value with probability below 0.05. This conclude that profitability and tangibility have a significant influence on capital structure. While the t count value of firm size is lower than t table value with probability above 0.05. This conclude that firm size does not have a significant influence on capital structure.

Profitability has a significant negative influence with capital structure. This result is consistent with several other research [9] [10]. This result also consistent with the ranking explained in pecking order theory, which profitable companies will employ less of debt financing because its operational result is sufficient to support the funding needs of the companies. According to pecking order theory, in general, the companies with good profitability will use its retained earnings as their first source of financing. Especially during COVID-19 pandemic situation, the companies are more selective in obtaining external funding with all the operational uncertainties due to the pandemic.

Tangibility has a significant positive influence with capital structure. Several other research also shown the same conditions [9] [11]. This result support the theory that company's fixed assets may increase the company's confidence level in obtaining external funding. Since the data used in this research is transportation and logistics companies, its common that the companies owned a large number of fixed assets. As the demand for logistics services is increasing during the COVID-19 pandemic, this result support that the companies with high fixed assets are deemed as more stable and proper to obtain external funding, providing more collateral for the funding.

Not in line with the result of previous 2 independent variables, firm size does not have a significant influence to the capital structure. There are several ways to measure firm size, such as from annual sales, total employees, fair value of the companies and equity value of the shareholders. This result has concluded that firm size measured by natural logarithm of total assets is not a main factor in determining the capital structure. Total assets contain not only real tangible assets, but also contain other figures

such as receivables which are prone to impairment in value. Market information users may prefer to use fair value of a company as a firm size measurement due to the reliability of the data.

4 Conclusions and Suggestions

Based on those results, concluded that profitability is significantly influencing the capital structure. This support the pecking order theory which the companies tend to prioritize internal funding since the internal financing cost is much lower than obtaining external funding. The result on tangibility also given a point of confidence for companies with large number of fixed assets, since it shows that companies with high numbers of fixed assets are significantly influencing the capital structure decisions. While for the firm size, since this research limits the measurement of firm size using natural logarithm of total assets, there are possibilities for next research to measure firm size with other measurement to test whether the research produce a different outcome. Moreover, these insights highlight the critical need for adaptive financial strategies under crisis conditions, particularly for sectors critical to maintaining supply chains during global disruptions.

Future research should explore alternative methods of measuring firm size, such as annual sales or equity valuation, to provide a more comprehensive understanding of its influence on capital structure. Expanding the study to include unlisted transportation and logistics companies could offer broader insights into the sector's capital structure dynamics. Additionally, investigating other sectors that experienced growth during the pandemic, such as healthcare and telecommunications, would provide comparative insights and extend the applicability of the findings.

Furthermore, longitudinal studies across different economic cycles could help identify whether the observed relationships are specific to crisis periods or hold across varying conditions. Policymakers and financial institutions could also benefit from these insights by tailoring financial instruments and support systems to enhance the resilience of transportation and logistics companies during future crises. Finally, companies should consider leveraging their tangible assets and maintaining strong profitability to optimize their capital structure and ensure long-term sustainability in volatile environments.

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