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Optimal Capital Structure to Increase Indonesia Firm Value

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ABSTRACT

This study aimed to determine the construction firms' optimal capital structure compared to the sub-sector industry in the Indonesia Stock Exchange (IDX). The population comprised ten issuers of the construction sub-sector in IDX with quarterly data from June 2013 to December 2020. The data were analyzed using static panel data with three independent variables moderated by ownership of state- and non-state-owned companies. Furthermore, three macro and two dummy variables for infrastructure policy and the Covid-19 pandemic were used. The results showed that company value is significantly influenced by optimal capital structure, profitability, tangibility, infrastructure budget, interest and exchange rates, infrastructure policy, and the pandemic. The construction companies' optimal capital structure was 4.8 times the industry's DER. Each construction company's capital structure was lower than the industry's optimal firm value. Therefore, construction companies should optimize their capital structure to achieve optimal firm value.

INTRODUCTION

Infrastructure development is Indonesia's national priority, essential in increasing public access to basic services and improving productivity and competitiveness. Indonesia needs good infrastructure to become a developed country. Since infrastructure is also an investment tool for Indonesians, the government builds toll roads, airports, Mass Rapid Transportation System (MRT), ports, and dams. Figure 1 shows that the infrastructure budget increased by 169.43% from Rp. 157.4 trillion in 2014 to Rp. 423.3 trillion in 2020. The government estimates the funding needs for infrastructure development at IDR 5,519 trillion (MNDPRI, 2014). Governments worldwide struggle with the demand for large expenditures with limited budgets in infrastructure development (UN Habitat, 2015). In line with this, Indonesia is building

new infrastructure projects to facilitate local economic growth and prosperity. The development of road infrastructure and supporting facilities also impacts regional economic growth (Kunstler, 1993).

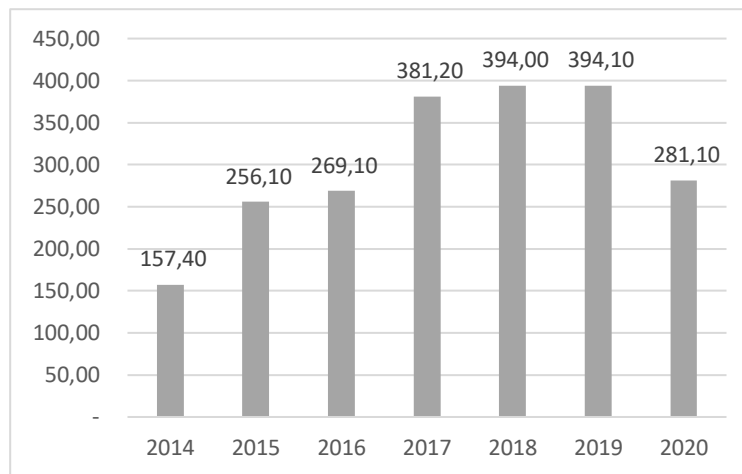


Figure 1. Indonesia's Infrastructure Budget 2014-2020 (Rp trillion)

Source: own

Infrastructure is essential in production activities and impacts other sectors' economic efficiency. The government must implement policies encouraging economic productivity, such as providing high-quality infrastructure and long-term investment and innovation (UN Habitat, 2015). The Public-Private Partnership (PPP) approach is an alternative in infrastructure development programs to financing transportation projects in Indonesia. However, infrastructure is the responsibility of the government and the private sector. This makes construction companies require significant funding to run their business activities and achieve an optimal capital structure that increases their value.

1. LITERATURE REVIEW

The capital structure comprises the company's capital sources, consisting of capital and short-and long-term debt (Modigliani & Miller, 1958). A capital structure maximizes the company's stock price using an optimal debt ratio. Maximum firm value is the financial management's goal because it increases stockholders' wealth (Koller et al., 2020). Optimal capital structure maximizes the company's stock price and requires an optimal debt ratio, because the optimal capital structure can decrease the capital costs and the firm's market value (Alipour et al., 2015). As commonly employed in previous studies, the price-to-book value (PBV) used as the firm value indicator. PBV compares the market price with the book value per share. A PBV value implies increased market confidence in the company (Khanna & Sonti, 2004). The primary objective of capital structure decisions is to maximize the firms' market value. Financial and macroeconomic variables significantly influence management decisions in compiling the capital structure, and Bui et al. (2023) found a significant positive relationship between capital structure and firm value.

1.1 Optimal Capital Structure and Company's Value

Figure 2 explains about model of optimal capital structure. The optimal capital structure maximizes a company's stock price and necessitates a low debt-to-equity ratio (Brealey et al., 2018). They should manage and respond quickly and accurately regarding the sources of funds used to strengthen the capital structure. In this case, the company could minimize its business risks, strengthening positive market sentiment. The company's capital structure could be optimized by maximizing the firm's value. Furt-

hermore, optimal capital structure varies because each company has different characteristics (Titman & Tsyplakov, 2007). The hypothesis proposed is as follows:

H1: Optimal capital structure positively affects a company's value.

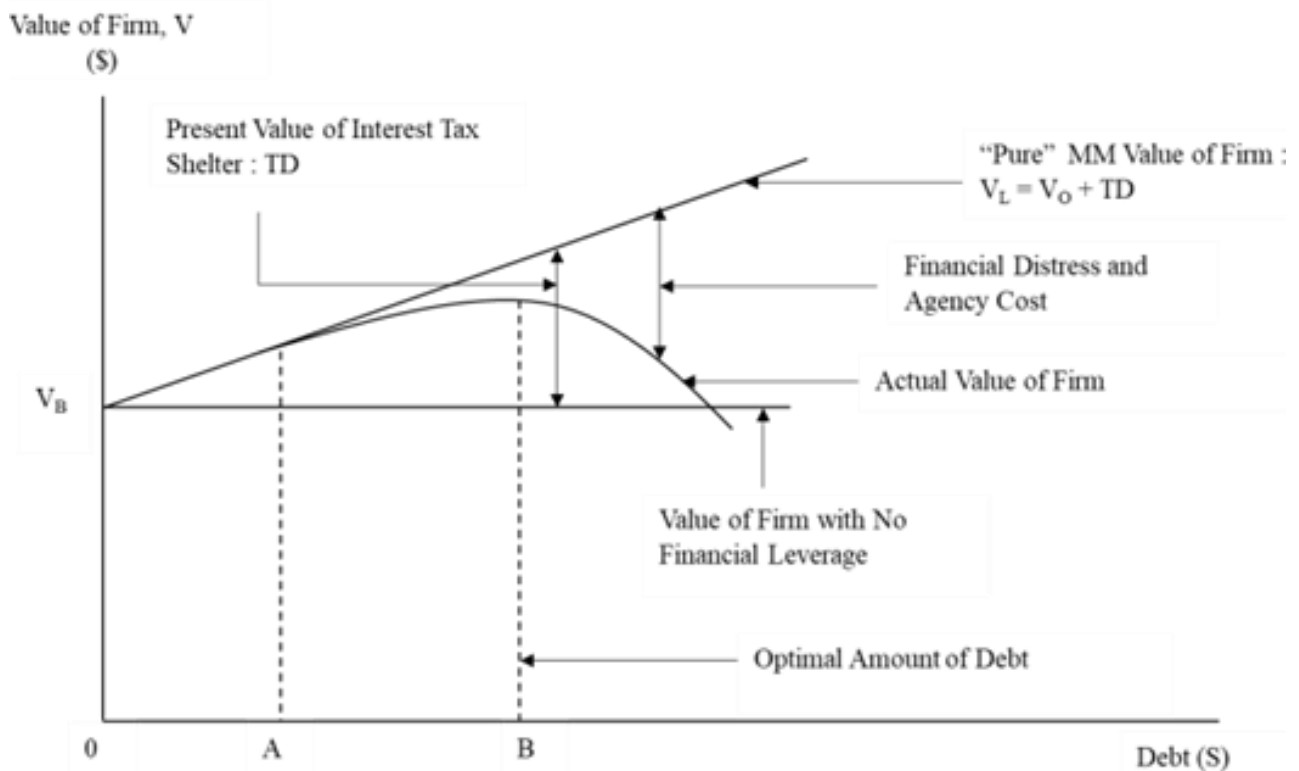


Figure 2. Optimal Capital Structure

Source: own

1.2 Profitability and Company's Value

Profit is a measure of a company's capacity to fulfill its responsibilities to its funders, and it is essential in determining firm value. Chen and Chen (2011) stated that a higher company's profit attracts more investors. High profits indicate prospects for the company. Furthermore, high investor interest due to high profits increases the stock price, positively affecting firm value. High profits attract investors because the greater dividends to be later distributed. Additionally, more investors increase stock prices and the company's value (Akhmadi & Januarsi, 2021). The hypothesis proposed is as follows:

H2: Profitability positively affects a company's value.

1.3 Tangibility and Company's Value

Tangibility is positively related to debt because high tangible assets could be used as real guarantees to the firm's creditors. Therefore, an increase in the value of tangible assets used as a guarantee increases the company's debt (Myers & Majluf, 1984). Tangibility is an important variable in determining the company's capital structure because tangible assets are used as collateral that attracts investors. This is in line with (Christofi et al., 2023), which stated that higher company assets increase its value. Investors are entitled to the company's guaranteed tangible assets when it experiences financial distress or bankruptcy. The hypothesis proposed is as follows:

H3: Tangibility positively affects a company's value.

1.4 Activity and Company's Value

Sales growth reflects the company's business success and increases investment opportunities, demand indicators, and competitiveness. They affect the ability to maintain profits and predict future growth. According to Cheng Yu-Shu et al. (2010), companies with a greater operating sales growth rate have a higher firm value. The total asset turnover ratio measures the turnover of all company assets and how much revenue they generate (Berk & Demarzo, 2019). A higher asset turnover rate indicates an increase in the company's sales value. This promotes more asset utilization to anticipate market demand. The increase in asset turnover also shows that the public is satisfied with the company's products. This increases the value of product sales and profits. It attracts investors because the company can generate income, increasing the stock price. The hypothesis proposed is as follows:

H4: Activity positively affects a company's value.

1.5 Infrastructure Budget and Company's Value

Infrastructure spending is part of the government's capital expenditures because the utilization value of the infrastructure built is more than one year. The Indonesian government accelerates infrastructure development projects to promote regional economic growth. The Ministry of Public Works and Public Housing PUPR is among the ministries that provide infrastructure. It is allocated the most significant portion of infrastructure spending in the Budget Allocation on National Economy (MNDPRI, 2014). According to (Dunk, 2011), the government's infrastructure budget positively impacts economic growth. The hypothesis proposed is as follows:

H5: Infrastructure Budget positively affects a company's value.

1.6 Exchange Rate and Company's Value

An appreciation or depreciation of the national currency exchange rate influences exports and imports and companies' value (Dominguez & Tesar, 2006). Companies using imported production materials increase their debt when the domestic currency against foreign currencies depreciates. In this case, a currency's depreciation negatively impacts a company's market value (Simakova, 2017). The production costs of companies relying on imported raw materials increase when the exchange rate depreciates in production costs will occur, reducing profits. The hypothesis proposed is as follows:

H6: Exchange rate negatively affects a company's value.

1.7 Interest Rate and Company's Value

An increase in interest rate prompts management to change its capital structure and reduce the financial burden that must be paid. Furthermore, interest rates have a significant adverse effect on firm value (Tarkom & Ujah, 2023). According to (Mankiw, 2022), interest rates negatively and positively affect investment in the long and short term, respectively. The increase in interest rates will increase the company's burden. They cause a decline in company performance, stock prices, and company value. Also, interest rates have a substantial negative relationship with share prices in emerging countries. The hypothesis proposed is as follows:

H7: Interest rate negatively affects a company's value.

1.8 Infrastructure Policy and Company's Value

Infrastructure policy is the government's effort to control the economy through government revenues and expenditures. The infrastructure policy is implemented through integration by increasing the role of Public-Private Cooperation. This policy involves the company and shareholders with different

interests (Davies & Crawford, 2014). The variable was created due to the differences in government policies on construction companies' value from 2015 to 2019. The hypothesis proposed is as follows:

H8: Infrastructure Policy positively affects a company's value.

1.9 The Covid-19 Pandemic and Company's Value

The Covid-19 pandemic negatively impacted companies, causing a decline in stock prices and financial performance that affected firm value (Almustafa et al., 2023). Moreover, it has wreaked havoc on various industries, including the financial market, making individuals wary of investing. Since March 2020, the Composite Stock Price Index (IHSG) of the Indonesia Stock Exchange (IDX) has decreased because many investors have sold their shares (Indonesia Stock Exchange, 2021). The pandemic severely affected the economy worldwide. China's GDP dropped by 6.8%, and many countries suffered from corporate bankruptcies and unemployment (Zhang et al., 2021). The hypothesis proposed is as follows:

H9: The Covid-19 pandemic negatively affects a company's value.

Based on this equation, the primary independent variable is the optimal capital structure. The other determinant variables include profitability, tangibility, activity, infrastructure budget, exchange rate, and interest rate. This model specification allows for identification of the optimal PBV level for each existing debt value.

2. RESEARCH METHOD

2.1 Data

This study used secondary data sourced from IDX, Bank Indonesia, and the Ministry of Public Works. It utilized static panel data on ten listed construction companies in the 2013-2020 quarterly period.

Table 1 explains the company's value is the dependent variable measured as the price to book value (PBV). The independent variables are the company's profitability, tangibility, and activity. The effects of independent variables on the dependent variable were moderated by state and non-state ownership, macroeconomic conditions such as infrastructure budget, exchange and interest rates, government policy on infrastructure, and the Covid-19 pandemic.

Table 1. Variable definition and measurement

No.	Variables	Notation	Description on Relationship	Source
1.	Company's value	PBV	(Price/ Book Value)	IDX
2.	Capital Structure	DER	(Debt /Equity)	IDX
3.	Optimal Capital Structure	DER ²	(Debt /Equity) ²	IDX
4.	Profitability	PROF	(EBIT/Total Assets)	IDX
5.	Tangibility	TANG	(Fixed Assets/Total Assets)	IDX
6.	Activity	AKTF	(Sales/Total Assets)	IDX
7.	Infrastructure budget	LNINFRA	Infrastructure Budget	Ministry of Public Works and Public Housing
8.	Exchange Rate	LNUSD	(Rp/USD)	BI
9.	Interest Rate	RATE	Bank Indonesia Interest Rate	BI
10.	Ownership	DOWN	1 for State-Owned Company; 0 for Non-State-Owned Company	Degenerate
11.	Infrastructure Policy	DPLCY	1 for 2015 ≤ x ≤ 2019 ; 0 for < tahun 2015 and > tahun 2019	Degenerate
12.	The Covid-19 Pandemic	DPAN	1 when ≥ tahun 2020 ; 0 when < 2020	Degenerate

Source: own

The sample data consisting of ten construction companies listed in Indonesia stock exchange, such as Acset Indonusa Tbk Corp (ACST), Adhi Karya Corp (ADHI), Nusa Konstruksi Enjiniring (DGIK), Jaya Konstruksi Manggala Pratama Corp (JKON), Nusa Raya Cipta Corp (NRCA), PP Corp (PTPP), Surya Semesta Internusa Corp (SSIA), Total Bangun Persada Corp (TOTL), Wijaya Karya Corp (WIKA), and Waskita Karya Corp (WSKT).

2.2 Panel Data Analysis

Static panel data analysis technique was used to determine the effect of independent variables on firm value. There are two stages in choosing an estimation method for panel data analysis. The first step compares the pooling least square method using OLS or Common Effect Method (CEM) with the fixed effect method (FEM) using the Chow-test or Likelihood ratio test. When the test results show the best OLS model, the OLS or CEM model is compared with the Random Effect model using the Lagrange Multiplier (LM) test. However, when FEM is better than CEM, the random effects method (REM) uses the Hausman test to determine the best regression model to be used (Gujarati & Porter, 2020).

2.3 Design of Regression Model

A static panel regression model with the following specification was used in the analysis.

$$PBV_{it} = \beta_0 + \beta_1 DER_{it} + \beta_2 DER2_{it} + \beta_3 PROF_{it} + \beta_4 DOWNPROF_{it} + \beta_5 TANG_{it} + \beta_6 DOWNTANG_{it} + \beta_7 AKTF_{it} + \beta_8 DOWNAKTF_{it} + \beta_9 LNINFRA_{it} + \beta_{10} LNUSD_{it} + \beta_{11} RATE_{it} + \beta_{12} DPLCY_{it} + \beta_{13} DPAN_{it} + \mu_{it} \dots (1)$$

where:

PBV_{it} : Price to Book Value of Company-i in time-t.

DER_{it} : Debt to Equity of Company-i in time-t.

$DER2_{it}$: Debt to Equity Squared of Company-i in time-t.

$PROF_{it}$: Profitability of Company-i in time-t.

$DOWNPROF_{it}$: Moderation of Company Ownership with Profitability of Company-i in time-t

$TANG_{it}$: Tangibility of Company-i in time-t.

$DOWNTANG_{it}$: Moderation of Company Ownership with Tangibility of Company-i in time-t

$AKTF_{it}$: Activity of Company-i in time-t.

$DOWNAKTF_{it}$: Moderation of Company Ownership with Activity of Company-i in time-t

$LNINFRA_{it}$: Infrastructure Budget in time tL

$NUSD_{it}$: exchange Rate in time t.

$RATE_{it}$: Bank Indonesia Interest Rate in time t.

$DPLCY_{it}$: Infrastructure Policy, 1 if $2015 \leq x \leq 2019$; 0 if < 2015 and > 2019 .

$DPAN_{it}$: The Covid-19 Pandemic, 1 if > 2020 ; 0 if < 2020

β_0 : common y-intercept.

$\beta_1 - \beta_{13}$: coefficients of the concerned explanatory variables.

μ_{it} : error term of the firm i at time t.

3. EMPIRICAL RESULTS

3.1 Descriptive analysis

Table 2 shows the descriptive analysis results of the construction company's financial characteristics variables. They include company value (PBV), leverage (DER), profitability (PROF), tangibility (TANG), and activity (AKTF). PBV ranges between 0.241 and 8.808. DGIK has the highest PBV value of 8.808, while PTPP has the lowest with 0.241. The mean value of the average PBV of ten construction companies is 2.021, with a standard deviation of 1.681. DER ranges between 0.630 and 6.321. ADHI has the highest DER value of 6.321, while ACST has the lowest with 0.630. The mean value of the average DER of ten construction companies is 2.039, with a standard deviation of 1.311.

Table 2. Statistical data description of variables

VARIABLE		ACST	ADHI	DGIK	JKON	NRCA	PTPP	SSIA	TOTL	WKA	WSKT
MEAN											
PBV	2.021	2.084	1.597	4.545	0.559	1.457	2.527	0.944	2.556	2.026	1.913
DER	2.039	1.672	4.348	0.971	1.040	0.922	3.024	0.951	1.956	2.432	3.073
PROF	0.016	0.004	0.015	0.021	0.001	0.022	0.018	0.024	0.024	0.017	0.015
TANG	0.096	0.133	0.052	0.153	0.082	0.051	0.111	0.154	0.054	0.115	0.057
AKTF	0.198	0.163	0.161	0.287	0.168	0.336	0.172	0.144	0.220	0.160	0.165
STANDARD DEVIATION											
PBV	1.681	1.546	0.937	2.225	0.229	0.970	2.022	0.496	1.115	1.203	1.330
DER	1.311	1.011	1.329	0.209	0.257	0.104	1.183	0.194	0.214	0.375	0.718
PROF	0.272	0.067	0.009	0.018	0.014	0.012	0.010	0.036	0.007	0.010	0.015
TANG	0.049	0.041	0.014	0.024	0.020	0.016	0.055	0.029	0.013	0.036	0.011
AKTF	0.108	0.070	0.083	0.121	0.056	0.114	0.079	0.046	0.033	0.064	0.159
MINIMUM											
PBV	0.241	0.524	0.319	0.919	0.264	0.560	0.241	0.425	0.798	0.446	0.241
DER	0.630	0.630	2.189	0.672	0.713	0.669	1.718	0.685	1.536	1.468	1.619
PROF	-0.347	-0.347	0.005	-0.005	-0.027	0.002	0.003	-0.013	-0.004	0.001	-0.040
TANG	0.011	0.071	0.025	0.116	0.054	0.032	0.011	0.013	0.029	0.075	0.037
AKTF	0.032	0.056	0.062	0.127	0.073	0.185	0.061	0.075	0.159	0.049	0.032
MAXIMUM											
PBV	8.808	8.725	4.210	8.808	1.128	4.609	8.290	2.670	5.611	4.209	5.895
DER	6.321	4.580	6.321	1.594	1.683	1.181	5.366	1.420	2.297	3.089	5.369
PROF	0.197	0.054	0.043	0.056	0.026	0.055	0.047	0.197	0.037	0.360	0.044
TANG	0.215	0.215	0.074	0.191	0.130	0.077	0.172	0.185	0.076	0.172	0.076
AKTF	0.805	0.335	0.426	0.528	0.270	0.533	0.354	0.224	0.291	0.315	0.805

Source: own

PROF ranges between -3.047 to 0.197, where ACST has the highest and lowest values. The mean value of the average PROF is 0.016, with a standard deviation of 0.072. TANG ranges between 0.011 to 0.215. ACST and PTPP have the highest and lowest TANG values, respectively. The mean value of the average TANG is 0.096, with a standard deviation of 0.049. AKTF ranges between 0.032 to 0.805, with WSKT having the highest and lowest values. The mean value of the average AKTF is 0.198, with a standard deviation of 0.108.

3.2 Results of Estimation of the Panel Regression Model

Table 3 explains the CEM analysis results the parameters or coefficients of all independent variables affect PBV, with a significance level of 1%. The coefficient of determination R² for the CEM model was 0.4868. The FEM analysis results show that the independent variables significantly affect PBV, unlike the previous CEM. The effect of all independent variables is significant at $\alpha=1\%$ and $\alpha = 10\%$, with a coefficient of determination, R² of 0.45492. The REM analysis shows that the variables all independent variables affect PBV, with a significance level of 5% and 10%. The coefficient of determination R² is 0.5489.

Table 3. Results of Estimation of the Panel Regression Model

Variable	CEM		FEM		REM	
	Coefficient	Prob	Coefficient	Prob	Coefficient	Prob
DER	1.7173933***	0.000	0.81190309***	0.007	0.82589476***	0.005
DER2	-.19306152***	0.000	-.08361715*	0.051	-.08583181**	0.041
PROF	-10.814947***	0.000	-11.641637***	0.000	-11.733339***	0.000
DOWNP	37.879616***	0.005	28.656647***	0.005	29.126188***	0.004
TANG	15.157947***	0.000	12.821473***	0.000	12.598071***	0.000
DOWNTANG	-7.5870051***	0.002	-11.699076***	0.004	-11.445026***	0.001
AKTF	7.3860032***	0.000	0.24830475	0.816	0.68793384	0.504
DOWNAKTF	-4.7330439***	0.003	0.85837235	0.560	0.454902	0.750
LNINFRA	-1.8435864**	0.011	-1.6861918***	0.002	-1.6976875***	0.002
LNUSD	-8.1612915***	0.000	-7.9740623***	0.000	-7.9763336***	0.000
RATE	41.553498***	0.000	47.874387***	0.000	47.570404***	0.000
DPLCY	1.9006168***	0.000	1.5250081***	0.000	1.5445431***	0.000
DPAN	2.8876252***	0.000	2.1259935***	0.000	2.1638919***	0.000
_CONS	127.40762***	0.000	123.42647***	0.000	123.73828***	0.000
R-squared	0.4868		0.5492		0.5489	

legend: * p<.1; ** p<.05; *** p<.01

Source: own

Table 4 explains the Likelihood test results in Table 5 show that the probability value is less than 0.05, meaning H_0 is rejected. Therefore, FEM is the best data panel estimate model. Chow test was conducted to test a better panel model between FEM and CEM. The results show that FEM is better than CEM, with a probability < 0.05.

Table 4. Likelihood Test Result/Chow Test

F test that all $u_i=0$: F(9, 287) = 26.76	Prob > F = 0.0000
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Source: own

Table 5 explains the Lagrange Multiplier test was conducted to compare CEM and REM using the Breusch-Pagan method. Based on the LM test results, the panel model shows that REM is better than CEM (Breusch Pagan 0.05).

Table 5. Lagrange Multiplier Test Result

Estimates results:

	<i>Var</i>	<i>sd = sqrt(Var)</i>
pbv	2.824235	1.680546
e	0.848544	0.9211645
u	0.943254	0.9712031
Test: Var (u) = 0		
	chibar2(01)	432.96
	Prob > chibar2	0.0000

Source: own

Table 6 explains the possibility test shows that the best model is FEM. The Hausman test compared FEM with REM and found that Cross Section Random >0.05, meaning REM models are better than FEM. The best model among the three models is the REM.

Table 6. Hausman Test Results

Test: H0: difference in coefficients not systematic	
Prob>Chi2	0.6730

Source: own

4. DISCUSSION

4.1 Optimal Capital Structure

The estimation results show that the debt-to-equity ratio (DER) significantly and positively affects firm value. The capital structure or debt increases the construction company's value. The company reduced its cost of capital by taking on more debt, increasing its value. This is in line with the MM hypothesis that rising debt lowers the cost of capital and increases the company's value. The maximization approach to a quadratic function found that the optimal capital structure of Indonesia's construction industry is 4.8 times DER (Figure 3).

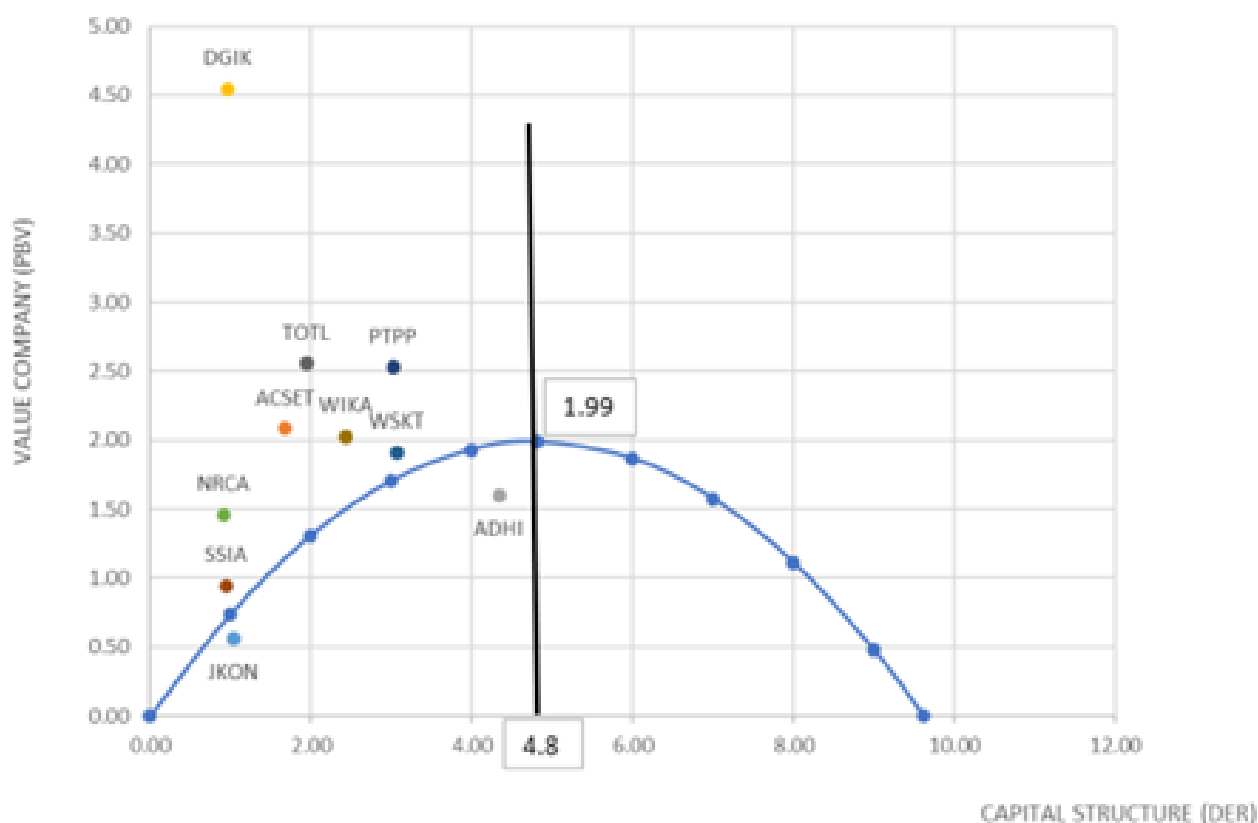


Figure 3 Construction Company's Optimal Capital Structure

Source: own

This number suggests that construction companies on average owe up to 4.8 of their debt-to-equity ratios. The capital structure of each construction company is lower than the industry's optimal capital structure.

4.2 Profitability

Profitability significantly and negatively affects the construction companies' value. In this case, an increase in profits reduces the company's debt, increasing the cost of capital (WACC) and decreasing its value. Companies with a high return on investment use relatively small debt. An increase in the company's profitability reduces its debt levels. This supports Paulo Esperança et al. (2003), which stated that less profitable companies are more likely to require external funding or debt. A decrease in profitability increases the value of non-state-owned companies more than state-owned companies and vice versa.

4.3 Tangibility

Tangibility or significant investment increases profits and the value of construction companies. In this case, higher company assets increase its value because large companies have more stable conditions and prospects that attract investors to buy shares. An increase in the demand for company shares increases the share price, indicating excellent company value. Tangible assets could be used as collateral to attract investors and increase the company's value. This supports (Christofi et al., 2023) that tangible assets positively affect firm value. Non-state-owned companies have more robust assets to increase their value because they manage their tangible assets more effectively and efficiently.

4.4 Activity

The estimation results show that the activity does not significantly affect the firm's value. Furthermore, the increase in sales does not affect firm value because of low income. It means that the construction company cannot profit even while earning revenue. The increase in income does not affect the company's value because it does not provide the expected profit or the minimum required return. Dang et al. (2019) stated that sales growth does not significantly increase the firm's value. Therefore, the company's value cannot be reflected through the increase in sales. The results show no difference in the effect of income on the value of state-owned and non-state-owned companies.

4.5 Infrastructure Budget

Accelerating connectivity or infrastructure development requires a considerable budget involving construction companies and optimal funding to increase its value. The estimation results show that the infrastructure budget significantly and negatively affects the construction company's value. The profitability for infrastructure budget projects reduces the value of construction companies because the projects incur more costs than the revenue. This is in line with (Firth et al., 2013) that local governments spending more incur greater costs from companies, lowering the firm value, specifically for state-owned enterprises.

4.6 Exchange Rate

The exchange rate is the price of a currency expressed in another currency. It creates negative sentiment and discourages investors, reducing the company's market. The estimation findings demonstrate that the exchange rate's variable coefficient significantly and negatively impacts firm value. The price of material for project construction or investment has increased. Therefore, more considerable funding is needed to finance the purchase of materials and investment. An increase in raw materials and investment price reduces the construction company's profit, lowering firm value. This is in line with Simakova (2017) that exchange rate and the firm's value have a negative relationship.

4.7 Interest Rate

The interest rate of Bank Indonesia used as a measure of the cost of capital incurred to obtain the capital from their capital. The estimation results show that interest rates significantly and positively affect firm value. Although interest rates have increased, the increase in company income is more significant, dominating and increasing the value. The result of this study contravenes the hypothesis that states that the interest rate significantly and negatively affects firm value (Olalere et al., 2020).

4.8 Infrastructure Policy

Infrastructure policy represents government policy created due to differences in policies on firm value from 2015 to 2019. The infrastructure policy dummy was made because of the differences in government policies on company value before and after 2015 to 2019. The estimation results show that the infrastructure policy significantly and positively affects firm value. This means the infrastructure projects provide added value for construction companies. The results of this study are in line with the hypothesis that states that infrastructure policy significantly and positively affects firm value (Suárez-Cuesta & Latorre, 2023).

4.9 The Covid-19 Pandemic

The estimation results show that the pandemic significantly and positively affected firm value. Construction activities and projects decreased due to the Covid-19 pandemic. However, the pandemic

increased the company's value because construction companies avoided projects with no added value. The companies also conducted operational efficiency and corporate restructuring. Investors still benefit from buying stocks during the epidemic by backing up their decisions with thorough calculations. This supports. Concerning resilience to the Covid-19 pandemic, with stock prices rising significantly during its outbreak. For instance, China became a safer investment destination during the pandemic period. The result of this study contravenes the hypothesis that states that the Covid 19 pandemic significantly and negatively affects firm value (Boumlik et al., 2023).

CONCLUSIONS

While investing in construction companies, investors should evaluate indicators such as optimal capital structure, profitability, tangibility, infrastructure budget and policies, exchange and interest rates, and the Covid-19 pandemic. The effects of these indicators on companies' value are moderated by state and non-state company ownership, profitability, and tangibility.

The optimal capital structure of construction companies significantly affects firm value by 4.8 times DER. The capital structure of each construction company is lower than the industry's optimal capital structure. ACST has a capital structure of 1.672 times its DER, ADHI 4.348, DGIK 0.971, JKON 1.040, NRCA 0.922, PTPP 3.024, SSIA 0.951, TOTL 1.956, WIKA 2.432, and WSKT 3.073. Construction companies must manage their operations efficiently to generate profits from the project's income. They must also select projects that provide profitability to the company's value. Therefore, construction companies should adjust their financing decisions during the Covid-19 pandemic to achieve optimal capital structure.

Suggestion for future research

Studies should examine the effects of liquidity ratio, business risk, and good corporate governance on the firm value. They should also evaluate determinants of firm value separately between state-owned and non-state-owned construction companies due to their differing characteristics. Furthermore, future studies should include the state-owned companies not listed as engaged in infrastructure development. They should use financial ratios to benchmark the construction companies' capital structure.

REFERENCES

- Akhmadi, A., Januarsy, Y. (2021), "Profitability and Firm Value: Does Dividend Policy Matter for Indonesian Sustainable and Responsible Investment (SRI)-KEHATI Listed Firms?", *Economies*, Vol. 9(4), 1–23. <https://doi.org/10.3390/economies9040163>
- Alipour, M., Mohammadi, M.F.S., Derakhshan, H. (2015), "Determinants of Capital Structure: An Empirical Study of Firms in Iran", *International Journal of Law and Management*, Vol. 57, No. 1, pp. 53–83. <https://doi.org/10.1108/IJLMA-01-2013-0004>
- Almustafa, H., Nguyen, Q.K., Liu, J., Dang, V.C. (2023), "The Impact of COVID-19 on Firm Risk and Performance in MENA Countries: Does National Governance Quality Matter?", *PLoS ONE*, Vol. 18, No. 2, pp. 1–25. <https://doi.org/10.1371/journal.pone.0281148>
- Berk, J., Demarzo, P. (2019), *Corporate Finance*, Fifth Edit, Pearson Education Limited.
- Boumlik, Z., Oulhadj, B., Colot, O. (2023), "Risk and Financial Management The Effect of the COVID-19 Pandemic on Corporate Dividend Policy of Moroccan Listed Firms", *Journal of Risk and Financial Management*, Vol. 16, No. 8, pp. 1–17. <https://doi.org/https://doi.org/10.3390/jrfm16080350>
- Brealey, R.A., Myers, S.C., Marcus, A. . (2018), *Fundamentals of Corporate Finance*, Ninth Edit, McGraw-Hill.
- Bui, T.N., Nguyen, X.H., Pham, K.T. (2023), "The Effect of Capital Structure on Firm Value: A Study of Companies Listed on the Vietnamese Stock Market", *International Journal of Financial Studies*, Vol. 11, No. 3, pp. 1–20. <https://doi.org/10.3390/ijfs11030100>
- Chen, L.J., Chen, S.Y. (2011), "The Influence of Profitability on Firm Value with Capital Structure as the Mediator and Firm Size and Industry as Moderators", *Investment Management and Financial Innovations*, Vol. 8, No. 3, pp. 121–129. <https://www.businessperspectives.org/index.php/journals/>

- investment-management-and-financial-innovations/issue-84/the-influence-of-profitability-on-firm-value-with-capital-structure-as-the-mediator-and-firm-size-and-industry-as-moderators
- Cheng Yu-Shu, Liu Yi-Pei, Chien Chu-Yang (2010), "Capital Structure and Firm Value in China: A Panel Threshold Regression Analysis", *African Journal of Business Management*, Vol. 4, No. 12, pp. 2500–2507. <http://www.academicjournals.org/AJBM>
- Christofi, K., Chourides, P., Papageorgiou, G. (2023), "Revealing a Non-Linear Relationship Between Knowledge Assets and Firm's Value", *Electronic Journal of Knowledge Management*, Vol. 21, No. 1, pp. 1–12.
- Dang, H.N., Vu, V.T.T., Ngo, X.T., Thi, H., Hoang, V. (2019), "Study the Impact of Growth , Firm Size , Capital Structure , and Profitability on Enterprise Value : Evidence of Enterprises in Vietnam", *The Journal of Corporate Accounting & Finance*, Vol. 30, No. 1, pp. 144–160. <https://doi.org/10.1002/jcaf.22371>
- Davies, T., Crawford, I. (2014), *Corporate Finance and Financial Strategy: Optimising Corporate and Shareholder Value*, Pearson Education Limited.
- Dominguez, K.M.E., Tesar, L.L. (2006), "Exchange Rate Exposure", *Journal of International Economics*, Vol. 68, No. 1, pp. 188–218. <https://doi.org/10.1016/j.jinteco.2005.01.002>
- Dunk, A.S. (2011), "Product Innovation, Budgetary Control, and the Financial Performance of Firms", *British Accounting Review*, Vol. 43, No. 2, pp. 102–111. <https://doi.org/10.1016/j.bar.2011.02.004>
- Firth, M., Gong, S.X., Shan, L. (2013), "Cost of Government and Firm Value", *Journal of Corporate Finance*, Vol. 21, No. 1, pp. 136–152. <https://doi.org/https://doi.org/10.1016/j.jcorpfin.2013.01.008>
- Gujarati, D.N., Porter, D.C. (2020), *Econometría* (Quinta Edi), Mc Graw Hill.
- Indonesia Stock Exchange (2021), *Annual Report 2021 - Outperforming Expectations Amidst Uncertainties*, <https://www.idx.co.id/id/tentang-bei/laporan-tahunan/>
- Khanna, N., Sonti, R. (2004), "Value Creating Stock Manipulation: Feedback Effect of Stock Prices on Firm Value", *Journal of Financial Markets*, Vol. 7, no. 3, pp. 237–270. <https://doi.org/https://doi.org/10.1016/j.finmar.2003.11.004>
- Koller, T., Goedhart, M., Wessels, D. (2020), "Valuation: Measuring and Managing the Value of Companies" in *John Wiley & Sons*, Seventh Ed., McKinsey & Company. http://store.marketline.com/Product/mckinsey_company_inc?productid=C8F574E9-CB6E-424F-BB96-5A5FBB38CC21
- Kunstler, J.H. (1993), *The Geography of Nowhere: The Rise and Decline of America's Man-Made Landscape*, Touchstone Rockefeller Center.
- Mankiw, N.G. (2022), "Macroeconomics" in *Worth Pub*, Eleventh E, Issue Economy, MacMillan Learning.
- MNDPRI. (2014), *Minister of National Development Planning/Head of the National Development Planning Agency, National Medium-Term Development Plan 2015-2019 Jakarta (ID)*. <https://datarenbang.bappenas.go.id/publikasi/dokumen>
- Modigliani, F., Miller, M.H. (1958), "The Cost of Capital, Corporation Finance and the Theory of Investment", *American Economic Review*, Vol. 48, No. 3, pp. 261–297. <https://doi.org/10.2307/1286430>
- Myers, S.C., Majluf, N.S. (1984), "Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have", *Journal of Financial Economics*, Vol. 13, No. 2, pp. 187–221. [https://doi.org/https://doi.org/10.1016/0304-405X\(84\)90023-0](https://doi.org/https://doi.org/10.1016/0304-405X(84)90023-0)
- Olalere, O., Islam, M.A., Junoh, M.Z.M., Yusoff, W.S., Iqbal, M.M. (2020), "Revisiting the Impact of Intrinsic Financial Risks on the Firm Value of Banks in ASEAN-5 countries: A Panel Data Approach", *Banks and Bank Systems*, Vol. 15, No. 2, pp. 200–213. [https://doi.org/10.21511/bbs.15\(2\).2020.18](https://doi.org/10.21511/bbs.15(2).2020.18)
- Paulo Esperança, J., Matias Gama, A.P., Azzim Gulamhussen, M. (2003), "Corporate Debt Policy of Small Firms: An Empirical (Re)examination", *Journal of Small Business and Enterprise Development*, Vol. 10, No. 1, pp. 62–80. <https://doi.org/10.1108/14626000310461213>
- Simakova, J. (2017), "The Impact of Exchange Rate Movements on Firm Value in Visegrad Countries", *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, Vol. 65, No. 6, pp. 2105–2111. <https://doi.org/10.11118/actaun201765062105>
- Suárez-Cuesta, D., Latorre, M.C. (2023), "Modeling the Impact of Public Infrastructure investments in the U.S.: A CGE Analysis", *International Advances in Economic Research*, Vol. 29, No. 1, pp. 165–176. <https://doi.org/10.1007/s11294-023-09875-w>
- Tarkom, A., Ujah, N.U. (2023), "Inflation, Interest Rate, and Firm Efficiency: The Impact of Policy Uncertainty", *Journal of International Money and Finance*, Vol. 131, No. 1, pp. 145–167. <https://doi.org/https://doi.org/10.1016/j.jimonfin.2022.102799>

- Titman, S., Tsyplakov, S. (2007), "A Dynamic Model of Optimal Capital Structure", *Review of Finance*, Vol. 11, No. 3, pp. 401–451. <https://doi.org/10.1093/rof/rfm017>
- UN Habitat (2015), "The Challenge of Local Government Financing in Developing Countries: United Nations Human Settlements Programme (UN-Habitat), the City of Barcelona and the Province of Barcelona" in *United Nations Settlement Programme*, Vol. 1, Issue 1, https://sustainabledevelopment.un.org/content/documents/1732The_Challenge_of_Local_Government_Financing_in_Developing_Countries_3.pdf
- Youssef, A., El-ghonamie, A. (2015), "Factors That Determine Capital Structure in Building Material and Construction Listed Firms: Egypt Case", *International Journal of Financial Research*, Vol. 6, No. 4, pp. 46–59. <https://doi.org/10.5430/ijfr.v6n4p46>
- Zhang, P., Gao, J., Li, X. (2021), "Stock Liquidity and Firm Value in the Time of Covid-19 Pandemic", *Emerging Markets Finance and Trade*, Vol. 57, No. 6, pp. 1578–1591. <https://doi.org/10.1080/1540496X.2021.1898368>