Book of Proceeding
The 5th Asia-Pacific Management Research Conference (APMRC) 2024
"Adapting Sustainability Strategies in Business and Management"

Analysis The Effect of Capital Structure and Capital Expenditure on Firm Value Through Profitability as an Intervening Variable in The Infrastructure Sector Listed on The Indonesia Stock Exchange

Maulana Edi Saputra[1*]; Hadi Santoso[2,]
[1,2]Department of Management
[1,2]Universitas Widya Dharma Pontianak
Jl. Hos Cokroaminoto No.445, Darat Sekip, Kec. Pontianak Kota, Pontianak, West Kalimantan, Indonesia, 78243
[1*]edilah1234@gmail.com; [2]hadisantoso@widyadharma.ac.id

Corresponding Author

Abstract—**This research investigates the impact of capital structure and capital expenditure on firm value, with profitability acting as a mediating variable, within the infrastructure sector of the Indonesia Stock Exchange from 2018 to 2022. This research was undertaken due to inconsistencies in prior studies, some of which suggested that capital structure and capital expenditure do not impact firm value, but are instead influenced by profitability. The population for this study comprises all 70 companies in the infrastructure sector listed on the Indonesia Stock Exchange. The sampling technique employed is purposive sampling, targeting companies listed before 2019 and not on the "special monitoring" listing board. This approach yielded a sample of 33 companies, resulting in a total of 165 data points. Path analysis in regression tests was utilized to analyze the data. The results of this study indicate that profitability can mediate the impact of capital structure and capital expenditure on firm value. The mediating effect of profitability on capital structure is partial, while its effect on capital expenditure is full.**

Keywords—Capital Structure; Capital Expenditure; Profitability; Firm Value; Pecking Order Theory; Trade-off Theory

I. INTRODUCTION

The capital structure is pivotal in ensuring the stability of the company's funding. Decision-making regarding the capital structure is particularly concerning because it influences perceptions among shareholders. Companies often adhere to the principles of the pecking order theory by prioritizing internal financing sources such as retained earnings over external debt. Additionally, when resorting to external debt, they typically prefer short-term obligations over long-term liabilities to manage liquidity and mitigate financial risk. Moreover, debt financing is generally favored over equity issuance due to its potential tax advantages and the desire to maintain ownership control. These strategic financial decisions reflect a balanced approach aimed at optimizing funding stability while aligning with shareholder interests and operational requirements [1]. The trade-off theory posits that there are both benefits and costs associated with issuing debt, resulting in an optimal financial debt ratio that maximizes firm value [1]. The optimal capital structure occurs when it minimizes the overall cost of capital or the average cost of capital [2].

Regarding shareholder perception, one factor that influences their viewpoint is capital expenditure. Capital expenditure is frequently linked with depreciation expenses and results in fixed monthly costs due to investments in fixed assets. Consequently, high capital expenditure increases the company's fixed expenses, contradicting the company's principle of minimizing costs to maximize profits [3].

This research is based on the assumption that the period from 2018 to 2022 spans the time before, during, and after the COVID-19 pandemic, which had significant impacts on various sectors. This study examines the internal economic sector of companies, focusing on several key issues, with firm value

emerging as a primary concern. Many companies face funding difficulties due to excessively large or small capital structure ratios, making it challenging for them to survive.

The study focuses on the infrastructure sector as the object of research, given its crucial role in the development of Indonesia. Therefore, it is essential for the infrastructure sector to navigate various present and future challenges. The infrastructure sector is closely linked to the issues described above because it involves businesses that require an appropriate capital structure and capital expenditure to generate benefits for both internal and external stakeholders.

According to previous research, there are differences in findings on these issues. Some studies have found that capital structure and profitability have a significant effect on firm value [4] [5] [6] [7], while others have found that capital structure has no effect on firm value [8] [9]. Similarly, some researchers find that capital expenditure affects firm value [8] [9] [10], but other studies have found that capital expenditure has no effect on firm value [7].

This article is divided into four sections. The first section is an introduction that discusses the background of this research and the theories used to support it. The second section covers the research methods, detailing how the research data was obtained, including the population and criteria used in sampling, as well as the data processing methods and the measurement instruments for each variable. The third section presents the results and discussion, including data processing results (regression and t-test, correlation tests, coefficient of determination, and ANOVA tests). The fourth section provides the conclusions and suggestions from the researchers regarding the study's findings.

II. RESEARCH METHODS

This study utilizes secondary data from annual financial reports of infrastructure sector companies listed on the Indonesia Stock Exchange for the years 2018-2022. At the time of this research, there were 70 infrastructure companies listed. The study employs purposive sampling to determine the sample based on the following criteria: 1) Companies listed before 2019, and 2) Companies not categorized under "Special Monitoring." These criteria align with the 2018-2022 research period to examine factors influencing firm value before, during, and after the COVID-19 pandemic. Companies in the special monitoring category are excluded as their stock data lacks movement, which does not support the assessment of company value in this study. Data from the Indonesia Stock Exchange revealed that 33 companies met the sampling criteria over a 5-year period, resulting in 165 company data points.

This study employs IBM SPSS software for data processing, using the path analysis method and the Sobel calculator to determine the mediation relationship of variables in the study. The benchmarks for each variable used in the study are as follows: The independent variable of capital structure, according to [4], is measured by the formula total liabilities/total equity. The independent variable of capital expenditure is measured by the formula ln(cash flow from investing activities). The mediating variable of profitability is measured by the formula net profit after tax/net income. The dependent variable of firm value is measured by the formula price per share/book value per share. The following multiple regression equation is used:

Structural 1:

$$\gamma = \alpha + \beta 1X1 + \beta 2X2 + \beta 3Z + e$$

$$\gamma = \alpha + \beta 1CapitalStructure + \beta 2CapitalExpenditure + \beta 3Profitability + e$$

Structural 2:

$$z = \alpha + \beta 1X1 + \beta 2X2 + e$$

$$z = \alpha + \beta 1CapitalStructure + \beta 2CapitalExpenditure + e$$

Sobel test using the Sobel calculator on the website https://quantpsy.org/sobel/sobel.htm

X1-Z-Y:

$$a = \beta 1CapitalStructure\ (structural\ 2)$$
$$b = \beta 3Profitability\ (structural\ 1)$$
$$Sa = e\ CapitalStructure\ (structural\ 2)$$
$$Sb = e\ Profitability\ (structural\ 1)$$

X2-Z-Y:

$$a = \beta 2 CapitalExpenditure\ (structural\ 2)$$
$$b = \beta 3 Profitability\ (structural\ 1)$$
$$Sa = e\ CapitalExpenditure\ (structural\ 2)$$
$$Sb = e\ Profitability\ (structural\ 1)$$

The capital structure is a critical component that influences a company's value. Determining the company's value requires considering its equity composition. If the capital structure predominantly consists of debt, the firm's value is likely to be higher, and vice versa. Therefore, decisions regarding the capital structure are crucial for facilitating the company's funding system and are considered beneficial for shareholders, potentially enhancing the firm's value.

H_1: Capital structure has a positive effect on firm value

The variable of capital expenditure is believed to have a negative correlation with firm value because high capital expenditure reflects increased production costs. Moreover, capital expenditure leads to monthly depreciation expenses on fixed assets [3]. Differences in investment methods and risk profiles between managers and shareholders contribute to agency conflicts. Managers often prefer low-risk investments, whereas shareholders favor higher-risk investments. These differences create divergent perspectives on investing in the company, potentially reducing shareholders' interest [5]. Consequently, if not aligned with shareholder preferences, this tendency can jeopardize the company's equity value and overall worth.

H_2: Capital expenditure has a negative effect on firm value

High profitability indicates that the company efficiently performs its operational activities. This efficiency significantly impacts changes in capital value, thereby increasing equity value and ultimately boosting firm value.

H_3: Profitability has a positive effect on firm value

The correct capital structure decision can lead to substantial profitability; optimal debt usage can positively influence profitability [11]. One advantage of using debt is the tax savings resulting from interest payments, which reduces income tax and enhances profitability.

H_4: Capital structure has a positive effect on profitability

Capital expenditure is the cost incurred by the company to purchase, maintain, and finance its fixed assets to enhance its operational activities. This capital expenditure is expected to consistently generate returns for the company's profitability. Therefore, an increase in capital expenditure is anticipated to lead to an increase in profitability as well [8].

H_5: Capital expenditure has a positive effect on profitability

Capital structure describes how debt is utilized as an alternative funding source within a company's financial structure, aiming to enhance its profitability and is considered a critical factor in assessing the success of capital structure decisions [6].

H_6: Capital structure affects firm value through mediation of profitability

Capital expenditure is utilized by the company to acquire new investments and facilitate smooth production processes, ultimately enhancing profitability and increasing the firm's value [9].

H_7: Capital expenditure affects firm value through mediation of profitability

III. RESULT AND DISCUSSION

STRUCTURAL 1

1) REGRESSION TEST AND T-TEST

Table 1. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2.189	1.090		2.008	.046
	Capital Structure	.608	.079	.569	7.717	.000
	Capital Expenditure	-.060	.043	-.104	-1.398	.164
	Profitability	1.507	.557	.193	2.704	.008

a. Dependent Variable: FIRM VALUE

Source: Data Processed by SPSS (2024)

$$\gamma = 2{,}189 + 0{,}608X1 - 0{,}060X2 + 1{,}507Z$$

Variable X1 has a significance value of 0.000, which is less than 0.05, and the t-value is 7.717, which is greater than the t-table value of 1.97481. Therefore, H0 is rejected and H1 is accepted, indicating a positive effect of capital structure on firm value.

Variable X2 has a significance value of 0.164, which is greater than 0.05, and the t-value is -1.398, which is less than the t-table value of 1.97481. Therefore, H0 is accepted and H2 is rejected, indicating no effect of capital expenditure on firm value.

Variable Z has a significance value of 0.008, which is less than 0.05, and the t-value is 2.704, which is greater than the t-table value of 1.97481. Therefore, H0 is rejected and H3 is accepted, indicating a positive effect of profitability on firm value.

2) CORRELATION TEST

Table 2. Correlations

		Capital Structure	Capital Expenditure	Profitability	Firm Value
Capital Structure	Pearson Correlation	1	.329**	-.186*	.498**
	Sig. (2-tailed)		.000	.017	.000
	N	165	165	165	165
Capital Expenditure	Pearson Correlation	.329**	1	.224**	.126
	Sig. (2-tailed)	.000		.004	.106
	N	165	165	165	165
Profitability	Pearson Correlation	-.186*	.224**	1	.064
	Sig. (2-tailed)	.017	.004		.414
	N	165	165	165	165

Firm Value	Pearson Correlation	.498**	.126	.064	1
	Sig. (2-tailed)	.000	.106	.414	
	N	165	165	165	165

**. Correlation is significant at the 0.01 level (2-tailed)
*. Correlation is significant at the 0.05 level (2-tailed)

Variable X1 has a significance value of 0.000, which is less than 0.05, an r value of 0.498, which is greater than the R table value of 0.1528, and an asterisk indicating a positive correlation between capital structure and firm value.

Variable X2 has a significance value of 0.106, which is greater than 0.05, indicating no correlation between capital expenditure and firm value.

Variable Z has a significance value of 0.414, which is greater than 0.05, indicating no correlation between profitability and firm value.

3) COEFFICIENT DETERMINATION

Table 3. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.532[a]	.283	.269	1.33944360

a. Predictors: (Constant), Profitabilitiy, Capital Structure, Capital Expenditure

The R Square value is 0.283, which represents 28.3%. This indicates that the variables of capital structure, capital expenditure, and profitability collectively account for 28.3% of the variation in firm value, with the remaining 71.7% influenced by other variables not examined in this study.

4) ANOVA TEST

Table 4. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	113.814	3	37.938	21.146	.000[b]
	Residual	288.852	161	1.794		
	Total	402.665	164			

a. Dependent Variable: Firm Value

b. Predictors: (Constant), Profitabilitiy, Capital Structure, Capital Expenditure

The significance value is 0.000, which is less than 0.05. The F table value is 2.66. The F value is 21.146, which is greater than 2.66, indicating that the variables of capital structure, capital expenditure, and profitability have a significant simultaneous effect on firm value.

STRUCTURAL 2

1) REGRESSION TEST AND T-TEST

Table 4. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.490	.149		-3.294	.001
	Struktur Modal	-.040	.011	-.291	-3.741	.000
	Ukuran Perusahaan	.024	.006	.319	4.104	.000

a. Dependent Variable: PROFITABILITY

$$\boldsymbol{Z = -0,490 - 0,040X1 + 0,024X2}$$

The significance value of X1 on Z is 0.000, which is less than 0.05, and the t-value is -3.741, which is greater than the t-table value of 1.97472. Therefore, H0 is accepted and H4 is rejected, indicating a negative effect of capital structure on profitability.

The significance value of X2 on Z is 0.000, which is less than 0.05, and the t-value is 4.104, which is greater than the t-table value of 1.97472. Therefore, H0 is rejected and H5 is accepted, indicating a positive effect of capital expenditure on profitability.

2) CORRELATION TEST

Table 5. Correlations

		Capital Structure	Capital Expenditure	Profitability
Capital Structure	Pearson Correlation	1	.329**	-.186*
	Sig. (2-tailed)		.000	.017
	N	165	165	165
Capital Expenditure	Pearson Correlation	.329**	1	.224**
	Sig. (2-tailed)	.000		.004
	N	165	165	165
Profitability	Pearson Correlation	-.186*	.224**	1
	Sig. (2-tailed)	.017	.004	
	N	165	165	165

Variable X1 has a significance value of 0.017, which is less than 0.05, an r value of -0,186, which is greater than the R table value of 0.1528, and an asterisk indicating a negative correlation between capital structure and profitability.

Variable X2 has a significance value of 0.004 which is less than 0.05, an r value of 0,224, which is greater than the R table value 0,1528, and an asterisk indicating a positive correlation between capital expenditure and profitability.

3) COEFFICIENT DETERMINATION

Table 6. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.354[a]	.126	.115	.18887638

a. Predictors: (Constant), Capital Expenditure, Capital Structure

The R Square value is 0.126, which represents 12.6%. This indicates that the variables of capital structure and capital expenditure collectively account for 12.6% of the variation in profitability, with the remaining 87.4% influenced by other variables not examined in this study.

4) ANOVA TEST

Table 7. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.829	2	.415	11.625	.000[b]
	Residual	5.779	162	.036		
	Total	6.609	164			

a. Dependent Variable: Profitability

b. Predictors: (Constant), Capital Expenditure, Capital Structure

The significance value is 0.000, which is less than 0.05. The F table value is 3.05. The F value is 11.625, which is greater than 3.05, indicating that the variables of capital structure and capital expenditure have a significant simultaneous effect on profitability.

3.1 SOBEL TEST

X1 – Z – Y

	Input:		Test Statistic:	Std. Error:	*p-value:*
a	-0.04	Sobel test:	-2.17065623	0.0277704	0.02995717
b	1.507	Aroian test:	-2.11967853	0.02843827	0.03403316
s_a	0.011	Goodman test:	-2.22549818	0.02708607	0.02604781
s_b	0.557	Reset all		Calculate	

X2 – Z – Y

	Input:		Test Statistic:	Std. Error:	*p-value:*
a	0.024	Sobel test:	2.24105743	0.01613881	0.02502236
b	1.507	Aroian test:	2.1944996	0.01648121	0.02819951
s_a	0.006	Goodman test:	2.29071009	0.01578899	0.02198019
s_b	0.557	Reset all		Calculate	

The P value in the Sobel test regression for variable X1 on Y through Z is 0.029, which is less than 0.05. Therefore, H0 is rejected and H6 is accepted, indicating that the profitability variable mediates the effect of the capital structure variable on firm value.

The P value in the Sobel test regression for variable X2 on Y through Z is 0.025, which is also less than 0.05. Therefore, H0 is rejected and H7 is accepted, indicating that the profitability variable mediates the effect of the capital expenditure variable on firm value.

IV. CONCLUSION

From the regression test results above:

Variable X1 on Y: The significance value is 0.000, indicating a positive influence of capital structure on firm value with a coefficient of 0.608. These findings align with previous studies [4] [11] [7], suggesting that an appropriate level of debt or increasing capital structure can increase firm value.

Variable X2 on Y: The significance value is 0.164, indicating no significant effect of capital expenditure on firm value, with a coefficient of -0.060. This contrasts with some previous studies that found a positive effect of capital expenditure on firm value [8]. suggesting that operational expenditures may not directly influence equity value or share prices.

Variable Z on Y: The significance value is 0.008, indicating a positive influence of profitability on firm value with a coefficient of 1.507. These findings are consistent with several previous studies [4] [11] [7] [6] [5] [8], highlighting the strong correlation between profitability and firm value. Profitability serves as a crucial signal to investors regarding returns on their investments.

Variable X1 on Z: The significance value is 0.000, indicating a significant negative effect of capital structure on profitability with a coefficient of -0.040. This suggests that higher debt levels relative to equity may impact investor perceptions of profitability and increase financial risk.

Variable X2 on Z: The significance value is 0.000, indicating a significant positive effect of capital expenditure on profitability with a coefficient of 0.024. This finding supports previous studies [10] [3] that note a positive relationship between capital expenditure and profitability, suggesting that such expenditures contribute to improved operational efficiency and funding capacity.

Regarding the Sobel test results:

X1-Z-Y Regression: The p-value is 0.02995717, indicating that profitability partially mediates the relationship between capital structure and firm value. This suggests that while capital structure directly affects firm value, profitability also plays a role in evaluating the effectiveness of capital structure decisions.

X2-Z-Y Regression: The p-value is 0.02502236, indicating that profitability fully mediates the relationship between capital expenditure and firm value. This implies that the impact of capital expenditure on firm value depends on its influence on profitability; effective capital expenditures should contribute to increased profitability to enhance firm value.

In conclusion, this study focuses on infrastructure sector companies listed on the IDX from 2018 to 2022, but its findings can apply broadly. It underscores that an optimal capital structure balances debt usage to enhance profitability and firm value. Capital expenditure, crucial for operational needs, indirectly impacts firm value through its effect on profitability rather than directly influencing equity valuation or investor perceptions.

V. REFERENCES

[1] B. A. Atiyet, "The Pecking Order Theory and The Static Trade Off Theory : Comparison of The Alternative Explanatory Power in French Firms," *Journal of Business Studies Quarterly,* vol. 4, no. 1, pp. 1-14, 2012.

[2] D. A. Harjito, "TEORI PECKING ORDER DAN TRADE-OFF DALAM ANALISIS STRUKTUR MODAL DI BURSA EFEK INDONESIA," *Jurnal SIASAT BISNIS,* vol. 15, no. 2, pp. 187-196, Juli 2011.

[3] O. Lidayat and F. Adrianto, "ANALYSIS OF CAPITAL EXPENDITURE EFFECT FOR FINANCIAL PERFORMANCE OF MINERAL MINING COMPANY," *ECONOMICA : Jurnal Program Studi Pendidikan Ekonomi,* vol. 9, no. 1, pp. 24-33, 28 10 2020.

[4] E. Nurdin, F. Fitriaman and W. N. Aqurat, "Empirical Testing of Capital Structure and Profitability as Mechanism to Enchance Firm Value," *JURNAL ASET (AKUNTANSI RISET),* vol. 15, no. 2, pp. 221-228, 1 December 2023.

[5] M. U. Mai, "KEPUTUSAN STRUKTUR MODAL, TINGKAT PRODUKTIVITAS, DAN PROFITABILITAS, SERTA NILAI PERUSAHAAN (Kajian Atas Perspektif Teori Dasar Struktur Modal)," *JURNAL EKONOMI DAN BISNIS,* vol. 12, no. 1, pp. 19-32, Juni 2013.

[6] N. P. I. K. Dewi and N. Abundanti, "PENGARUH LEVERAGE DAN UKURAN PERUSAHAAN TERHADAP NILAI PERUSAHAAN DENGAN PROFITABILITAS SEBAGAI VARIABEL MEDIASI," *E-Jurnal Manajemen,* vol. 8, no. 5, pp. 3028-3056, 2019.

[7] R. Yuliani and D. A. Hadi, "The Factors of Capital Expenditure, Leverage, Profitability, Company Value Affect the Property Sector," *Solid State Technology,* vol. 63, no. 3, pp. 2748-2754, 2020.

[8] Rahmiati and W. Sari, "PENGARUH CAPITAL EXPENDITURE, STRUKTUR MODAL, DAN PROFITABILITAS TERHADAP NILAI PERUSAHAAN (STUDI PADA PERUSAHAAN MANUFAKTUR YANG TERDAFTAR DI BURSA EFEK INDONESIA)," *Jurnal Kajian Manajemen Bisnis,* vol. 2, no. 1, pp. 1-14, Maret 2013.

[9] N. U. Rahmi and V. Danantho, "Pengaruh Corporate Social Responsibility, Capital Expenditure, Keputusan Investasi, dan Leverage Terhadap Nilai Perusahaan pada Perusahaan Sektor Consumer Goods yang Terdaftar di Bursa Efek Indonesia Tahun 2016-2019," *Owner : Riset & Jurnal Akuntansi,* vol. 6, no. 4, pp. 4210-4218, Oktober 2022.

[10] I. S. Suriawinata, E. T. Budiyanti, R. G. Mais and M. Anhar, "CASH CONVERSION CYCLE, ASSET TURNOVER, CAPITAL EXPENDITURE AND FIRM VALUE : THE MEDIATING ROLE OF PROFITABILITY," *Jurnal Reviu Akuntansi dan Keuangan,* vol. 13, no. 3, pp. 674-695, 10 November 2023.

[11] B. SUDIYANTO, E. PUSPITASARI, T. SUWARTI and M. M. ASYIF, "Determinants of Firm Value and Profitability : Evidence from Indonesia," *Journal of Asian Finance, Economics and Business,* vol. 7, no. 11, pp. 769-778, 15 October 2020.

[12] S. Muntahanah, H. Cahyo, S. Sundari, M. Surveyandini, K. S. Danuta and T. Murdijaningsih, "Analisis struktur modal pada perusahaan asuransi yang terdaftar di bursa efek Indonesia (BEI) periode 2014-2020," *AKUNTABEL : Jurnal Akuntansi dan Keuangan,* vol. 19, no. 2, pp. 275-283, 2022.

[13] F. Ahmeti and B. Prenaj, "A CRITICAL REVIEW OF MODIGLANI AND MILLER'S THEOREM OF CAPITAL STRUCTURE," *International Journal of Economics, Commerce and Management,* vol. 3, no. 6, pp. 914-924, June 2015.

[14] S. C. Myers, "Capital Structure," *The Journal of Economics Perspectives,* vol. 15, no. 2, pp. 81-102, 2001.

[15] M. Spence, "Job Market Signaling," *The Quarterly Journal of Economics,* vol. 87, no. 3, pp. 355-374, August 1973.