

A Moderating Effect of Profitability: Empirical Studi in Minning Industry

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Info Articles

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Abstract

This study aims to examine the impact of profitability on firm value in mining sector firms from 2009 to 2020. Data were collected from 12 years' worth of observational data from 19 companies, resulting in 228 data points across 51 populations. The collected data were analyzed using various methods such as descriptive analysis, conventional assumption testing, and hypothesis testing. The findings indicate that Firm Value is not significantly influenced by Firm Size, despite the potential for profitability to strengthen the association between its size and value.

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INTRODUCTION

Profitability serves as an important metric for evaluating the performance of a firm or sector, as it directly impacts the satisfaction level of investors. When a firm demonstrates a closer alignment between its profits and the expectations of investors, it tends to attract increased stock ownership from investors who seek to enhance its value. Conversely, when the actual results significantly deviate from anticipated profits, investors may react by reducing their investment portfolios in retailers, resulting in a decrease in value.

The mining sub-sector holds great significance in driving regional economic progress in Indonesia and plays a pivotal role in shaping the Gross Domestic Product (GDP) composition of the country. However, there has been a decline in its contribution since the second quarter of 2020. Study conducted by Bisnis.com revealed that the overall GDP share of the mining sub-sector decreased from 7.39 percent during the corresponding period in the previous year to 6.28 percent in May 2020. The performance of the mining sub-sector is evaluated using the price-earnings-based Firm Value indicator over time. The graph below shows the ratio for the years 2002 through 2020.

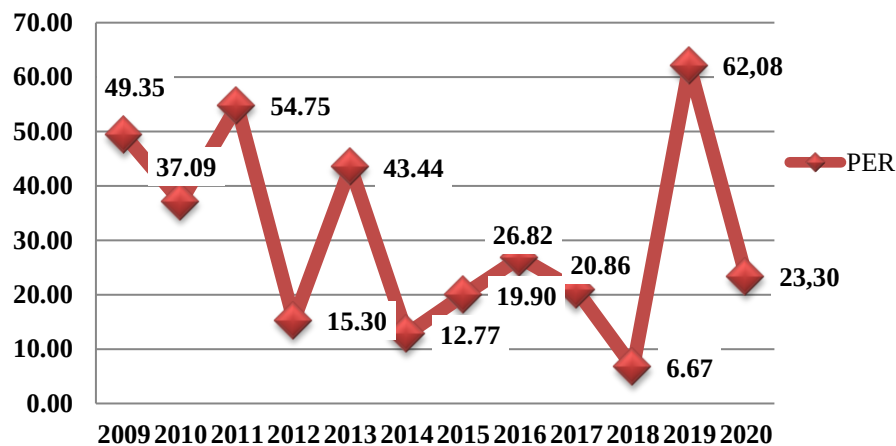


Figure 1. Mining Sub-Sector on the Indonesia Stock Exchange Development of Price to Earning Ratio for the Period 2009-2020

During the period from 2009 to 2020, the price-to-earnings ratio (PER) exhibited fluctuating trends. In 2018, the ratio was only 6.67 times higher than it was from 2009 to 2013, when it ranged from 37.09 to 49.35 times higher. However, there was a significant improvement in the price-earnings ratio in 2019 compared to previous years, reaching a peak ratio of 62.08 times. It is worth noting that investors generally prefer a stable or increasing PER ratio.

The value of a corporation can be influenced by various factors. According to Lumapow & Tumiwa (2017) and Bukit et al. (2018), firm size has an impact on firm value. Larger corporations tend to have easier access to the capital market due to their increased assets, which in turn enhances market trust and facilitates the potential for value appreciation. Ramdhonah et al. (2019) stated that larger firms may also face concerns regarding the effective utilization of existing assets, potentially resulting in a decrease in firm value. Meanwhile, Setiadharma & Machali (2017) and Astuti et al. (2018) reported differing perspectives on the relationship between firm size and value.

The study findings revealed variations, indicating an existing gap and the absence of a direct connection between a size of a firm and its worth. After examining several references, it was concluded that other factors significantly influence the relationship between these two variables. Profitability emerged as one such influential factor, supported by studies conducted by Niresh & Velnampy (2014), Alarussi & Alhaderi (2017), and Isik (2017). These studies suggest that larger enterprises exhibit greater stability, have

improved access to financial resources, and generate higher returns on investment by reducing costs. Additionally, relevant studies by Tui et al. (2017), Komarudin and Affandi (2019), and Zuhroh (2019) support the notion that investors are more likely to invest in companies with higher levels of profitability. This is because strong profitability indicates the potential for offering shareholders higher returns, leading to an increase in the value of firms.

The arguments presented suggest that larger-scale firms have the potential to be more profitable due to factors such as stability and improved access to funding sources with lower costs of capital. The significant levels of profitability observed in such firms indicate their ability to provide substantial returns to investors, consequently driving an increase in the overall value of the business. Given these considerations, this study aims to explore the role of profitability as a mediating variable in the relationship between business size and firm value.

LITERATURE REVIEW

Signaling Theory

According to the interpretation of Spence (Gayatri et al., 2019), a signal refers to the act of providing relevant information by the owner to the recipient. The purpose of this signal is to influence the behavior of the recipient based on the interpretation of that information. In contrast, signals can also be actions undertaken by the management of a firm with the intention of informing investors about their assessment and prospects. This is carried out to minimize information asymmetry between insiders (management) and outsiders (investors) (Saraswati & Herawaty, 2019).

Critical Resources Theory

Kumar et al. in (Habsari & Akhmadi, 2018) stated that entrepreneurs have the ability to control intangible variables capable of driving organizations toward greater profitability. As these intangible factors gain importance, the influence of a firm scale on profitability also increases. The critical resource theory developed by Rajan & Zingales (Aji & Atun, 2019) underscored the significance of investor control over firm resources. It also emphasized the need for investors to control firm resources to prevent anomalies in their use.

Firm Value

According to Fuad et al. (2006), a worth of a firm is determined by the market size and the amount at which potential investors are willing to invest when it is being sold. Harmono (2014), Pasaribu et al. (2016), and Purnaya (2016) further reported that the capital market share price is a key factor in assessing a value of a firm. However, it is important to note that firms define their values based on the market price for shares traded on a stock exchange.

Firm Size

The size of a firm is measured using various indicators such as equity, sales, and asset values (Riyanto, 2008; Mustanda & Suwardika, 2017). Meidiawati and Mildawati (2016) stated that the size of a corporation is determined by a combination of factors, including total assets, average total assets, total sales, and average business sales level.

Profitability

Profitability is influenced by factors such as sales, total assets, and a firm ability to generate revenue (Sartono in Ambarwati et al., 2015). According to Novari and Lestari (2016), as well as Dewinta and Setiawan (2016), profitability is determined by the combined impact of sales, investment income, assets, and share capital. These elements collectively contribute to the ability of the firm to generate profits.

The Effect of Firm Size on Value

The relationship between firm size and value has been studied in the context of signaling theory. According to Cheryta et al. (Astuti & Yadnya, 2019), large businesses serve as a positive signal for investors. Sujoko and Soebiantoro (Habsari & Akhmadi, 2018) also stated that investors are more receptive to large-scale firms as they indicate growth and development. Additionally, Wahyuningsih (2019) reported that significant business size is an encouraging sign that the firm is performing as expected by shareholders. Limbong and Chabachib (2016) further stated that a large corporate scale reflects the stability of business operations and fosters trust among potential investors. Consequently, the relationship between firm size and value is an important consideration for investors.

A huge business signifies a growing firm has a performance that meets the expectations and stability of shareholders in corporate activities based on these multiple arguments. This sends a positive message to investors and encourages an increase in Firm Value, which led to the following hypothesis.

H1: As a firm grows in size, its value increases.

The Effect of Firm Size on Profitability

Growing businesses often have a better chance of obtaining significant profit (Adreani & Putra, 2019). Falirat et al. (2018) stated that larger firms are more likely to become profitable than smaller ones. Businesses of all sizes and scales increasingly have the ability to generate more revenue than smaller ones (Puspita & Hartono, 2018; Falirat & Associates, 2018). This led to the second theory, which is as follows:

H2: The profitability of a firm increases with scale.

The Effect of Profitability on Firm Value

According to Wijayanto et al. (2019) and Sujoko in Al-Awawdeh (2019), Signalling Theory is a high level of profitability, which indicates the current success and potential for future growth of a firm. This positive signal has the effect of boosting the stock price of the firm. Limbong and Chabachib (2016) stated that investors generally respond favorably to a high level of profitability as it provides promising prospects for the company. Furthermore, study conducted by Roman et al. (2018) stated that investors react positively to an increasing level of profitability exhibited by a firm.

Rising profitability serves as evidence of successful current operations and indicates the potential for future growth of a firm. It offers optimistic firm future prospects to generate a positive response from investors. Ultimately, the objective is to enhance the value of the firm and increase its overall worth. This led to the development of the third hypothesis:

H3: The value of a firm increases with the rise in profitability.

METHODS

The study population comprises all 51 mining industry companies listed on the Indonesia Stock Exchange (IDX) between 2011 and 2015. A purposive sampling approach was employed to select a sample of 19 firms from the entire population. The study utilized 95 panels of secondary data collected from Idx.com and Sahamok.com, which included financial information from companies in the mining sector listed on the IDX during the period of 2011 to 2015.

The price-earnings ratio (PER), which represents the market value divided by earnings per share, can be used interchangeably with the value of the firm (Beliana & Budiantara, 2015). In terms of firm size as an independent variable, Dewi and Christy (2019) utilized LnTA, the natural logarithm of the total asset value. Net profit margin (NPM), which represents the ratio of net profit to sales, was employed as an intermediary variable to represent profitability (Dewi & Hidayat, 2014).

Descriptive statistics and the frequency parameter are used to explore key metrics in the observational data, including the maximum, minimum, mean, and standard error. Inferential statistics, such as the classical assumption test, are then employed to investigate the relationship between the study variables. This test includes various assessments like normality, multicollinearity, heteroscedasticity,

autocorrelation, and linearity tests. These tests aim to obtain a realistic assessment of the regression model. Subsequently, path analysis is conducted using common regression coefficients. The regression equation will initially undergo the following partial test:

$$PER = \beta_0 + \beta_1 LnTA + \varepsilon \dots \dots \dots sub - struktural 1$$

$$NPM = \beta_0 + \beta_1 LnTA + \varepsilon \dots \dots \dots sub - struktural 2$$

$$PER = \beta_0 + \beta_1 LnTA + \beta_2 NPM + \varepsilon \dots \dots \dots sub - struktural 3$$

Information:

PER : *price earning ratio*

NPM : *net profit margin*

LnTa : *log total natural assets*

The Sobel test parameter can be obtained by calculating the standard error and the coefficient of the indirect effect (Sab) using the following formula.

$$sab = \sqrt{b^2 sa^2 + a^2 sb^2 + sa^2 sb^2}$$

Use the indirect effect formula to evaluate the mediating impact. Subsequently, the t-value can be determined using the following formula to assess the significance of the indirect effect.

$$t = \frac{ab}{sab}$$

RESULT AND DISCUSSION

Descriptive Statistics

The price-earnings ratio (PER), which is an indicator of the value of a firm, exhibited a range from a high of 1,912.88 to a low of -230.18 during the specified period, with an average of 37.82. However, the standard deviation 173.09 indicated a higher level of variability than usual. In terms of business size, measured by Ln Total Assets (LnTA), the range spans from a high of 18.49 to a low of 11.33, with an average of 15.69. The standard deviation for LnTA is 1.66, which is lower than the average deviation. Regarding profitability, the net profit margin (NPM) ranged from 1,397.77 to a minimum of -5,395.38. Currently, the average NPM is -23.78. Although this value is higher than the average 406.55, the standard deviation is not specified.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Firm Value	228	-230.18	1912.88	37.8199	173.09206
Firm Size	228	11.33	18.49	15.6870	1.65754
Profitability	228	-5395.38	1397.77	-23.7761	406.55349
Valid N (listwise)	228				

Source: Processed data

Classic Assumption Test

Normality Test

The normality test was conducted using the Kolmogorov-Smirnov parameter. The Kolmogorov-Smirnov test is used to generate the Asymp value. It was discovered that the sig.(2-tailed) values in Sub-structural 2 were 0.116, 0.241, and 0.051, respectively. All the resulting Asymp values were evaluated. The resulting 2-tailed Sig. is significant at a level above 5%.

Table 2. Multicollinearity Test Results

Model	Sub-Structural	Asymp.Sig (2-tailed) (before treatment)	Asymp.Sig (2-tailed) (after treatment)
1	1	0,000	0,051
2	2	0,000	0,116
3	3	0,000	0,241

According to Ghozali (2018), when the significance level is greater than 0.05, it indicates that the residuals are regularly distributed. Therefore, the residuals are assumed to follow a normal distribution in the generated regression model.

Multicollinearity Test

In sub-structural 3 testing, the tolerance value for LnTA and net profit margin (NPM) is 0.903 each, greater than 0.1. Although the LnTA variance inflation factor (VIF) and net profit margin (NPM) values are 1.108, less than 10, there is no multicollinearity across variables in the regression model.

Table 3. Multicollinearity Test Results

Model	Tolerance	VIF
LnTA	0,903	1,108
LgNPM	0,903	1,108

In a regression model, multicollinearity is not present, assuming the tolerance value in the multicollinearity test is greater than 0.1 or the VIF value is less than 10 (Ghozali, 2018). As a result, the regression model's multicollinearity is not indicated.

Heteroscedasticity Test

The heteroscedasticity test was conducted using the White test parameters. The computed c2 values for sub-structurals 1, 2, and 3 in the test results are 0.86, 0.172, and 16.34, respectively. Comparing these values to the c2 of 201.423 in Table C2, it can be observed that it combinations are lower, as shown in the table.

Table 4. Heteroskedasticity Test Result

Model	Sub-Struktural	R Square	C ² Hitung (n x R ²)
1	1	0,005	0,86
2	2	0,001	0,172
3	3	0,095	16,34

According to Ghozali (2018), when the computed c2 counts are lower than the c2 value in the c2 table, the alternative hypothesis of heteroscedasticity in the model is rejected, indicating no evidence of heteroscedasticity (Ghozali, 2018).

Autocorrelation Test

The autocorrelation test was conducted using the Cochrane-Orcutt transformation and the Durbin-Watson (DW) parameter. The results of the DW value test for sub-structural 1, 2, and 3 were 2.037, 1.958, and 2.022, respectively. Contrarily, the value of DW in sub-structural 1 falls within the range of dudw 4-du, with dL, Du, and 4-dU values of 1.7389, 1.7622, and 2.2378. The DW value in substructural 2 is in the dudw4-du region with dL, dU, and 4-dU values of 1.7389, 1.7622, and 2.2378. Substructural 3's DW value

is in the range of $dU - 4 \cdot dU$, similar to substructural 2, which has dL , dU , and $4 \cdot dU$ values of 1.7271, 1.7741, and 4 2.2259.

Table 5. Autocorrelation Test Results

Model	Sub-Structural	Durbin-Waston (DW)
1	1	2,037
2	2	1,958
3	3	2,022

When the DW value falls within the $dU - 4 \cdot dU$ range, it indicates the absence of autocorrelation symptoms in the regression model (Ghozali, 2018). The results show that the regression model shows no signs of autocorrelation.

Linearity Test

The computed c^2 values obtained from the linearity test using the Lagrange Multiplier test parameter are 1.032, 16,684, and 28,036 for sub-structural 1, sub-structural 2, and sub-structural 3, respectively. When comparing these values to the c^2 table, with a c^2 count of 201,423, it can be concluded that all the computed c^2 values are lower.

Table 6. Linearity Test Result

Model	Sub-Structural	R Square	C^2 count ($n \times R^2$)
1	1	0,006	1,032
2	2	0,097	16,684
3	3	0,163	201,423

The linearity test using the Lagrange Multiplier test parameter achieved an estimated c^2 value of 1.032, 16,684, and 28,036 for sub-structural 1, 2, and 3. Specifically, the c^2 table with 201,423 degrees of freedom is used for comparison.

Hypothesis Test

Effect of Firm Size on Firm Value

Based on the output data in Table 4.28, the first hypothesis in this study examines the impact of firm size on firm value. The results show that the count value is 1.411, the table's actual level is 5%, its df value is $172 - 1 = 171$, and the table as a whole has a value of 1.97393. According to these results, the count value is 1.411 table of 1.97393 and has a significant threshold of $0.160 > 0.05$. The size coefficient value of 1.687 denotes a positive trend. Therefore, based on these findings, the initial null hypothesis is accepted, suggesting that firm size has a positive but limited impact on firm value.

The results contradict the proposed explanation (H1) regarding the relationship between firm size and firm value. These findings also challenge the signaling theory, suggesting that larger firms send positive signals to investors, increasing value (Cheryta et al. in Astuti & Yadnya, 2019). These results are inconsistent with the findings of Sujoko and Soebiantoro, who found that large-scale enterprises attract investor interest due to their growth potential and promising performance (Habsari & Akhmadi, 2018; Wahyuningsih, 2019; Limbong & Chabachib, 2016).

Table 7. Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.670	.743		2.248	.026
	LgLnTA	1.687	1.195	.108	1.411	.160

a. Dependent Variable: LgPER

The results of the study align with the findings of Rachmawati et al. (2015) and Manoppo & Arie (2016), indicating that as firms assets increase, they may require more debt. Consequently, this elevated debt level raises the firm risk and reduces investors interest in their stock investment portfolio, ultimately leading to a decrease in firm value. The findings suggested that the size of a firm, determined by its substantial asset base and high value, can potentially amplify the risks associated with poorly managed debt, posing a greater threat to the organization.

When businesses undergo rapid expansion, accompanied by increased assets, it often leads to a decline in investor interest and a reduction in their stock investment portfolio. Consequently, investors may perceive lower prospects for the firm to achieve its investment goal, which involves meeting its expected returns. This downward shift in investor sentiment contributes to a continuous drop in firm value, as indicated by the declining price-earnings ratio (PER).

Effect of Firm Size on Profitability

Based on the output data in Table 4.29, the second hypothesis is aimed at ascertaining whether the firm size affects profitability. The findings indicate that the observed count value is 2,531, while the corresponding critical value from the table at a significance level of 5% and degrees of freedom (df) of 171 is 1.97393. The results suggest a statistically significant effect with a count value of 2.531, exceeding the table value of 1.97393, and a significance level of $0.012 < 0.05$. The positive coefficient value of 3.147 for firm size implies a favorable and significant impact on profitability. Consequently, the second null hypothesis was rejected, and it can be concluded that firm size has a meaningful influence on profitability.

The results confirm the second hypothesis (H2), which posits that profitability is positively and significantly influenced by business size. Adreani and Putra (2019) reported that these findings align with the critical resources hypothesis that larger companies have an increased capacity to generate profits. Previous studies by Niresh and Velnampy (2014), Putu et al. (2014), Ilaboya and Ohiohka (2016), Charles et al. (2018), Hastuti and Ghazali (2019), Hou and Van Dijk (2019), Octaviany et al. (2019), and Azhar also supported the notion that larger companies tend to be more profitable.

Table 8. Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.698	.864		-1.966	.051
	LgLnTA	3.147	1.243	.191	2.531	.012

a. Dependent Variable: LgNPM

The findings of the study demonstrate that as a firm increases in size, as evident from the rise in total assets, its capacity to optimize internal operations is enhanced, including the ability to boost sales and revenues. This is typically accompanied by an assumption that as sales and revenues increase, manufacturing and operating costs decrease, ultimately leading to a rise in the profitability of the firm.

Effect of Profitability on Firm Value

By analyzing the output data in Table 4.30, the study focuses on the third hypothesis, which investigates the relationship between profitability and business value. The findings reveal a count value of 5.057, while the corresponding table value at a 5% significance level and degrees of freedom (df) of 170 is 1.97402. These results indicate that the count value of 5.057 is statistically significant ($p < 0.05$) as it exceeds the table value. The positive coefficient value of 0.333 for net profit margin (NPM) signifies a favorable direction. This suggests that profitability has a positive and significant impact on firm value. Therefore, the third null hypothesis was rejected, supporting the notion that profitability plays a crucial role in determining the worth of a firm.

The results of the analysis support the third hypothesis (H3), indicating that profitability and business value are positively associated. These findings are in line with the signaling theory, which suggests that higher levels of profitability signal a promising outlook for a firm. Positive investor sentiment, reflected in increasing stock prices, contributes to the overall growth in value of a firm. These results are consistent with previous studies conducted by Safitri et al. (2014), Putu et al. (2014), Al-Awawdeh (2015), Limbong and Chabachib (2016), Sabin et al. (2016), Pratama and Wiksuana (2016), Istamarwati and Suseno (2017), Mainul Q. et al. (2018), Iswara and Setyabudi (2018), further emphasizing the link between improving profitability and enhancing firm value.

Table 9. Coefficient

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.200	.727		1.652	.100
1 LgLnTA	.584	1.108	.038	.527	.599
LgNPM	.333	.066	.368	5.057	.000

a. Dependent Variable: LgPER

Given the potential for investment profitability, it was concluded that an upturn in profitability, as evidenced by an increasing net profit margin, is a favorable indicator for investors. The growth in net margin reflects efficiency in production and business operations, indicating effective management of costs and expenses by the firm. This rising profitability significantly expands the opportunities for companies to enhance shareholder welfare through increased investment returns. Consequently, this could lead to higher stock prices and instill investor confidence in the firm, ultimately boosting its overall value.

Path Analysis

The firm value in sub-structural 1 that is not described by fit size (1) is stated as follows:

$$\begin{aligned}\varepsilon_1 &= \sqrt{1 - R^2} \\ &= \sqrt{1 - 0,012} \\ &= 0,99\end{aligned}$$

The following is the firm value in sub-structural 2 that fits size (1) and cannot explain:

$$\begin{aligned}\varepsilon_1 &= \sqrt{1 - R^2} \\ &= \sqrt{1 - 0,037} \\ &= 0,98\end{aligned}$$

The following is the firm value in sub-structural 3 that fits size (1) and cannot explain:

$$\begin{aligned}\varepsilon_3 &= \sqrt{1 - R^2} \\ &= \sqrt{1 - 0,142} \\ &= 0,92\end{aligned}$$

The following is the firm value in sub-structural 3 that fits size (1) and cannot explain:

$$\text{PER} = -1,670 + 1,687 \text{ SIZE} + 0,99$$

$$\text{NPM} = -1,698 + 3,147 \text{ SIZE} + 0,98$$

$$\text{PER} = 1,552 + 0,584 \text{ SIZE} + 0,333 \text{ NPM} + 0,92$$

The following is a breakdown of the total, direct influence, and indirect effect.:

$$\text{Direct Effect} = 1,687$$

$$\text{Indirect Effect} = 3,147 \times 0,333 = 1,047$$

$$\text{Total Effect} = 1,687 + (3,147 \times 0,333) = 2,734$$

According to the mediation and Sobel tests, profitability has the potential to mediate the impact of firm size and value. As shown in the following:

$$\begin{aligned} S_{ab} &= \sqrt{b^2 sa^2 + a^2 sb^2 + sa^2 sb^2} \\ &= \sqrt{0,333^2 \cdot 1,195^2 + 3,147^2 \cdot 0,066^2 + 1,195^2 \cdot 0,066^2} \\ &= \sqrt{0.158352264 + 0.043140121 + 0.006220477} \\ &= \sqrt{0.207712862} \\ &= 0.455755265 \end{aligned}$$

The statistical t value is determined by factoring in the value of *sab*.:

$$T_{\text{count}} = \frac{ab}{sab} = \frac{1.0480}{0.4558} = 2.2993$$

In comparison to the critical value of 1.974 in Table 0.05, the obtained count value of 2.299 is higher. This implies that profitability plays a significant role in mediating the relationship between the size of an organization and its market value. The findings suggest that an increase in the firm size, reflected by a rise in total assets, is a driving factor for the improvement in net profit margin. This is facilitated by higher sales and revenues, accompanied by reduced operating costs and expenses. As a result, the price-to-book value, a measure of corporate worth, increases, indicating greater investor confidence in the business.

CONCLUSIONS

Meanwhile, as a firm experiences growth, it also faces heightened risk. When its debts are poorly managed, it can reduce the attractiveness of the firm to investors and potentially lead to a decline in the stock investment portfolio. The potential for increasing sales and revenues, driven by expanded operations and improved firm profitability, is positively correlated with the scale of the business. An increase in profitability indicates effective cost and expense management, which can enhance investor confidence and elevate firm value. Profitability serves as a crucial factor that strengthens the relationship between firm size and value, implying that any expansion in scale accompanied by improved profitability has the potential to elevate the overall worth of the firm.

The generalizability of the findings may be limited as the analysis only utilized one proxy for each observed variable, and it is unclear whether the results hold with the inclusion of additional proxies. Additionally, the scope of the study was restricted to a single segment of the Indonesia Stock Exchange, making it difficult to extend the conclusions to other sub-sectors. In order to enhance future studies, it is recommended to incorporate a broader range of proxies and expand the investigation to encompass multiple sectors or sub-sectors of the Indonesia Stock Exchange.

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