

AUDITING | RESEARCH ARTICLE

The Role of ESG in Moderating Effects on Profitability in the Pharmaceutical Industry

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ABSTRACT

This study aims to examine the effect of exchange rate fluctuations, capital structure, and growth opportunities on profitability, with Environmental, Social, and Governance (ESG) factors as a moderating variable, in officially listed pharmaceutical companies on the Indonesia Stock Exchange (IDX). The observation period covers 2019 to 2023. The analytical method used is Multiple Linear Regression Analysis, with SPSS version 30 as the data processing tool. This study finds that within Indonesia's pharmaceutical industry, capital structure has a significantly negative effect on profitability, while growth opportunities exert a significantly positive influence. Meanwhile, exchange rate fluctuations show no significant effect. Crucially, good ESG management is proven to moderate and reduce the profitability losses arising from high debt levels, but it does not affect other variable relationships. The practical implication is that pharmaceutical companies should minimize debt dependence and optimize ESG investments as a fundamental risk mitigation strategy to safeguard and enhance long-term profitability.

Keywords: Capital Structure, ESG, Exchange Rate Fluctuations, Growth Opportunity, Profitability.

JEL Code: G32, F31, L25, Q56, M14

I. Introduction

Public health is a fundamental pillar of a nation's development, and the pharmaceutical industry plays a vital role in ensuring the availability and accessibility of essential and innovative medicines for all levels of society. In Indonesia, pharmaceutical companies not only contribute to the health sector but also represent a significant component of the national economic dynamics. As a non-oil and gas manufacturing sector, the pharmaceutical industry is one of the largest revenue contributors to Indonesia's economy. This strategic role became particularly evident during the Covid-19 pandemic, when the pharmaceutical industry managed to maintain positive growth, in contrast to other industries that experienced contraction. The Indonesian pharmaceutical sector continues to expand in line with population growth and increasing health awareness. Companies in this sector operate in a dynamic business environment influenced by various economic and financial indicators. Their financial performance, particularly profitability, serves as an important indicator for investors, management, and regulators. However, achieving profitability in the pharmaceutical industry is driven by complex factors, both internal and external to the firm.



In this context, profitability is not merely a measure of financial success but also the foundation for sustainability and long-term growth. Profitability represents a company's ability to generate income within a specific period and serves as a key indicator of overall corporate performance (W, 2021). In the pharmaceutical industry, it functions not only as a measure of operational success but also as a determinant of investor confidence and long-term sustainability (Prabowo & Sutanto, 2019; Lestari & Agustiniingsih, 2023). However, maintaining profitability in this sector is challenging due to the interplay of multiple internal and external factors that influence financial performance. A healthy level of profitability enables companies to allocate significant resources into research and development, which are critical for pharmaceutical innovation and the creation of advanced therapies. Profitability reflects a company's ability to generate profit from its operations, and maintaining strong profitability is essential for business continuity, attracting investment, and creating shareholder value. The profitability of Indonesian manufacturing firms, particularly in the pharmaceutical sector, remains vulnerable to both internal and external factors. However, maintaining profitability in this sector is challenging due to the interplay of multiple internal and external factors. Regarding external factors, one of the most influential is exchange rate fluctuation.

One crucial external factor is exchange rate fluctuations, as Indonesia's pharmaceutical industry is highly dependent on imported active ingredients, packaging materials, and production equipment. Handayani defines the exchange rate as the ratio between domestic and foreign currencies used as the basis for international transactions (Handayani et al., 2022). Currency values serve as a benchmark for conducting international trade, and exchange rate fluctuations significantly impact the profitability of pharmaceutical companies that rely heavily on imported inputs. Fikri's research indicates that exchange rate volatility leads to exchange rate risk (Fikri & Manda, 2021), which indirectly affects raw material prices. A depreciation of the rupiah increases the cost of imported materials, potentially squeezing corporate profit margins. Exchange rate fluctuations, therefore, constitute a major external factor affecting manufacturing companies reliant on imports and international markets. Such volatility directly influences production costs, sales revenue, and ultimately, profitability, while also creating uncertainty that hampers financial planning, investment, and expansion. Hence, pharmaceutical companies must carefully manage exchange rate risk to safeguard profitability amid global economic uncertainty. From an internal financial perspective, capital structure plays a pivotal role in determining financing costs and risks in the pharmaceutical industry.

Internally, capital structure plays a pivotal role in determining financing costs and financial risks in the pharmaceutical industry. According to Sabakoni, capital structure represents the accumulation of long-term liabilities and equity used to support an entity's operations (Sabakodi & Andreas, 2024). Whether sound or weak, capital structure directly affects a company's financial condition, making it a critical factor in corporate performance (Prabowo & Sutanto, 2019). Debt financing can enhance profitability through leverage effects but simultaneously increases financial risks due to interest obligations and principal repayments. Conversely, equity financing provides greater financial flexibility but comes at a higher cost of capital and may dilute shareholder ownership. The composition of debt and equity in a company's capital structure influences profitability outcomes. While high leverage may amplify returns, it also heightens exposure to financial risk; in contrast, equity-heavy structures are safer but may constrain profit growth potential. Therefore, pharmaceutical firms must strike a balance between debt and equity to optimize their capital structure, enhance firm value, and sustain long-term profitability.

In addition to financing decisions, growth opportunities also serve as a key determinant of long-term profitability. Beyond operational efficiency and financing, growth opportunities represent another driver of long-term profitability in the pharmaceutical industry. Alviani defines growth opportunity as the anticipated future growth that is expected to generate significant returns, particularly through investment options. Suhartono highlights that improvements in financial management capabilities positively correlate with corporate profitability, as efficient investment allocation and effective use of equity improve productivity and operational efficiency (Suhartono, Jeffry, 2024). This process ultimately leads to higher profitability. Growth opportunities allow firms to increase profits by optimizing asset utilization. Pharmaceutical companies with strong growth opportunities tend to invest in research and development (R&D), expand their market presence

geographically or through product diversification, and pursue strategic acquisitions. Although such investments often require significant upfront costs, they are expected to yield higher cash flows and support profitability in the long run. Nevertheless, the effectiveness of growth opportunities in enhancing profitability depends heavily on the company's ability to manage investments efficiently and adapt to market dynamics.

In today's global context, with increasing attention to sustainability issues, ESG (Environmental, Social, and Governance) has emerged as a key factor influencing corporate performance and perception—particularly in the pharmaceutical sector, which has direct implications for public health and the environment. In the Indonesian pharmaceutical sector, ESG is particularly relevant due to high regulatory scrutiny, environmental waste from production, and public trust issues concerning health products. According to Leony, ESG disclosure is an essential metric for ensuring transparency regarding the environmental, social, and governance practices implemented by corporations (Egasa Leony et al., 2024). Through ESG reporting and regulatory policies, the public is expected to gain better insight into sustainable investment practices (Egasa Leony et al., 2024). In recent years, ESG has attracted significant attention from investors, regulators, and other stakeholders. Strong ESG practices reflect a company's commitment to environmental stewardship, social responsibility, and effective governance, which are increasingly believed to contribute to sustainable financial performance. While initially viewed as an additional cost, evidence suggests that firms implementing ESG effectively often demonstrate lower risk profiles, better access to financing, stronger reputations, and ultimately superior financial outcomes. Thus, ESG is not only a measure of corporate responsibility but also a determinant of operational efficiency, reputation, access to capital, and profitability.

Previous research has examined the effects of exchange rate fluctuations, capital structure, and growth opportunities on profitability across various industries. However, studies that specifically analyze these factors in the context of Indonesian pharmaceutical companies, while considering ESG as a moderating variable, remain relatively limited. Given the unique characteristics of the pharmaceutical sector and the growing importance of ESG practices, this study seeks to provide a more comprehensive understanding of the determinants influencing profitability performance in Indonesia's pharmaceutical industry. Despite the growing relevance of ESG in global business research, limited empirical studies have examined its moderating role in the Indonesian pharmaceutical sector. Therefore, this study aims to fill this gap by analyzing how ESG moderates the relationship between exchange rate fluctuations, capital structure, and growth opportunities on profitability.

II. Literature Review and Hypothesis Development

2.1. Agency Theory

According to Gharchia and Mindosa (2023), agency theory explains that the principal refers to shareholders or equity owners, while the agent refers to management, who is responsible for operating and controlling the company on behalf of the owners. This aligns with Jensen and Meckling (1976), who define the agency relationship as a contractual arrangement in which the principal delegates decision-making authority to the agent. Within this framework, a company's capital structure—the proportion of debt to equity—can serve as a mechanism to mitigate agency conflicts. A higher level of debt may limit managerial opportunism because it imposes mandatory interest and principal payments, thereby increasing managerial discipline. The conflict of interest between managers and shareholders provides a crucial lens through which to analyze the influence of capital structure and growth opportunities on profitability. Managerial incentives that diverge from shareholders' objectives can lead to suboptimal financing or investment decisions. For instance, excessive debt increases financial risk, while an optimal leverage ratio can enhance asset utilization and operational efficiency, ultimately improving profitability. Conversely, overinvestment in low-return projects may reduce asset productivity and diminish returns on assets (ROA), reflecting inefficient use of shareholders' capital. In this context, ESG practices, particularly in the governance dimension, function as an additional mechanism to minimize agency conflicts. Strong governance and transparent ESG disclosures help

reduce information asymmetry, align managerial actions with shareholder interests, and improve corporate accountability. Consequently, ESG performance may moderate the relationship between capital structure, growth opportunities, and profitability by fostering prudent financial management and ethical decision-making. Profitability, as reflected in indicators such as ROA, thus represents a tangible measure of managerial efficiency in utilizing shareholders' assets. Higher profitability not only signals effective agency alignment but also enhances investor confidence and long-term firm value.

2.2. Signaling Theory

According to Spence (1973), signaling theory explains that firms communicate information asymmetries between management and investors through observable actions that serve as signals of company quality and future performance. This perspective is supported by Connelly et al. (2011), who argue that corporate signals—such as financial structure, investment choices, and disclosure practices—shape investors' perceptions and expectations about a firm's long-term value. In the context of corporate management, signaling theory emphasizes that every strategic action undertaken by management can convey implicit messages to external stakeholders regarding firm quality and growth potential. For example, capital structure decisions, such as maintaining a balanced level of debt, can signal managerial confidence in the company's capacity to meet future obligations and sustain profitability. Similarly, investment in growth opportunities—including R&D spending and market expansion—serves as a positive market cue, indicating strong future prospects and innovation capability. In the pharmaceutical sector, such signals are particularly crucial because investors closely monitor research intensity, product innovation, and ESG disclosure as indicators of ethical standards and long-term stability. Consistent profitability and transparent ESG reporting further strengthen investor trust by demonstrating sound governance and effective risk management. Therefore, ESG performance can serve as a credible and reinforcing signal that moderates how external (exchange rate fluctuations) and internal (capital structure and growth opportunities) factors influence profitability.

2.3. Stakeholder Theory

This theory argues that corporate responsibility extends beyond shareholders, encompassing a broader range of stakeholders, including management, customers, suppliers, employees, regulators, and the wider community. Freeman et al. (1984) define stakeholders as individuals or groups that can affect, or are affected by, the achievement of an organization's objectives. ESG practices reflect a company's commitment to addressing stakeholder interests through environmental stewardship, social responsibility, and sound governance. In the context of the pharmaceutical industry, stakeholder theory is particularly relevant because firms must balance profitability with ethical obligations related to drug safety, accessibility, and environmental impact. In relation to exchange rate fluctuations, companies that prioritize stakeholder welfare may absorb some cost pressures to maintain stable drug prices, potentially reducing short-term profits but strengthening long-term trust.

Capital structure decisions must also account for creditor expectations, while the pursuit of growth opportunities should consider social and environmental consequences. Companies that successfully manage stakeholder relationships—by maintaining fair pricing, responsible financing, and sustainable growth—are more likely to achieve long-term business continuity and profitability. For example, several Indonesian pharmaceutical companies have implemented community health programs and waste reduction initiatives, illustrating how stakeholder-oriented strategies enhance both corporate legitimacy and financial performance. Therefore, strong ESG performance can moderate the effects of exchange rate fluctuations, capital structure, and growth opportunities on profitability by strengthening stakeholder trust and reinforcing the firm's social legitimacy. Sustainability reporting has become an essential mechanism for enhancing corporate transparency and long-term value creation. According to Sonnya and Wardhani (2025), companies

that integrate sustainability report disclosures into their core strategies demonstrate stronger stakeholder trust and more stable firm value, even though profitability may not always moderate this relationship effectively. This finding underscores the importance of ESG disclosure as part of a company's strategic communication with stakeholders. These three theories complement one another in explaining the dynamics that shape pharmaceutical companies' profitability. Agency theory highlights potential conflicts of interest and governance mechanisms, signaling theory explains how firms communicate with the market through their strategic actions, and stakeholder theory emphasizes the importance of integrating stakeholder interests into corporate decision-making. Together, they provide a comprehensive theoretical foundation for analyzing how exchange rate fluctuations, capital structure, and growth opportunities influence profitability, with ESG serving as a moderating factor.

2.4. The Effect of Exchange Rate Fluctuations on Profitability

Exchange rate fluctuations can significantly influence production costs and sales revenue, especially in industries that depend on imported raw materials. When the Rupiah depreciates, import costs increase, exerting pressure on profit margins and overall profitability. Conversely, Rupiah appreciation can lower input costs but may reduce the competitiveness of export-oriented products. According to Nugrahaeni and Nugraeni (2024) and Sasmita et al. (2019), exchange rate fluctuations have a significant impact on profitability, with results varying between positive and negative effects depending on firm characteristics and industry exposure. Similarly, Fikri and Manda (2021) found that exchange rate movements contribute to variations in profitability levels, particularly through their effect on import prices and operating costs. However, Jyana and Affandi (2019) reported a positive but statistically insignificant effect of exchange rate fluctuations on Return on Assets (ROA), suggesting that firms may have hedging strategies or cost pass-through mechanisms to stabilize profits. In contrast, Suhartono (2024) found no significant impact of exchange rate volatility on profitability among manufacturing companies, possibly due to differences in import dependency and financial risk management practices. Overall, previous studies show inconsistent results regarding the relationship between exchange rate fluctuations and profitability. These variations may arise from differences in sectoral characteristics, foreign exchange exposure, and the ability of firms to manage currency risk.

2.5. The Effect of Capital Structure on Profitability

Capital structure, which represents the composition of debt and equity financing, plays a crucial role in determining a company's financial performance. A balanced structure can optimize the cost of capital and maximize shareholder value, whereas excessive reliance on debt increases financial risk, defined as the potential inability to meet interest and principal obligations. For manufacturing companies in the pharmaceutical sector, the choice between debt and equity financing significantly affects profitability, given the industry's high investment requirements for research, development, and regulatory compliance. A high level of leverage may provide tax shield benefits, thereby enhancing profitability, but excessive debt also raises financing costs and risk exposure, potentially reducing returns. According to Sabakodi and Andreas (2024), the Debt to Equity Ratio (DER) is positively correlated with the profitability of manufacturing firms in the consumer sector. Similarly, Prabowo and Sutanto (2019) found that capital structure significantly influences profitability in the automotive industry, indicating that appropriate leverage levels can enhance operational efficiency and return on equity. In contrast, Lestari and Agustini (2023) found no significant relationship between capital structure and profitability in the healthcare sector, suggesting that companies with stable revenue streams may rely less on debt financing. Likewise, Fathoni and Syarifudin (2021) reported similar findings in firms listed on the Jakarta Islamic Index (JII), emphasizing that the effect of leverage on profitability may depend on firm-specific risk tolerance and industry characteristics. Overall, previous studies present mixed evidence on the effect of capital structure on profitability, indicating that the relationship may vary depending on the firm's operational environment, financial strategy, and sectoral context.

2.6. The Effect of Growth Opportunity on Profitability

The opportunities for improving a company's performance in the future have important implications for its current or expected profitability. Companies facing significant growth prospects are likely to invest more in assets, research and development, or market expansion. These investments are expected to enhance revenue and future profitability, although they may require initial expenditures that could affect short-term profitability. This is supported by Suhartono, who stated that growth opportunities positively affect the profitability of manufacturing companies (Suhartono, Jeffry, 2024). Furthermore, research conducted by Sihombing and Alviani also found that growth opportunities positively and significantly affect the profitability of consumer goods manufacturing companies (Alviani & Universitas, 2020; Sihombing et al., 2024). However, Febriani reported contrasting results, indicating that growth opportunities do not significantly affect profitability (Febriani & Sari, 2019).

2.7. The Effect of Exchange Rate Fluctuations on Profitability with ESG as a Moderating Variable

The implementation of Environmental, Social, and Governance (ESG) practices may alter the strength or direction of the relationship between exchange rate fluctuations and profitability. Entities that effectively apply ESG practices tend to be better equipped to manage risks related to exchange rate changes, for instance through supply chain diversification or strong reputation among investors and consumers. Thus, the negative (or positive) impact of exchange rate fluctuations on profitability may be either weakened or strengthened by the level of ESG practices in a company. Research by (Sasmita et al., 2019). found that exchange rate changes significantly affect ROA in the banking sector. Research by (Tyas & Prastiwi, 2025). also supports this, showing that ESG can strengthen the correlation between independent and dependent variables, specifically profitability and firm value.

2.8. The Effect of Capital Structure on Profitability with ESG as a Moderating Variable

The level of ESG practices within a company may influence how capital structure (the proportion of debt and equity) relates to profitability. Companies that consistently apply ESG principles tend to have better access to financing at lower costs, including debt, as investors increasingly consider ESG factors in their investment decisions. Furthermore, efficient and responsible debt management is more likely to be achieved through strong corporate governance, which in turn can affect profitability. Consistent with this, Yudha et al. (2023) emphasize that companies exposed to external financial risks, such as exchange rate fluctuations, tend to adopt more prudent financial decisions when supported by effective governance and transparent financial disclosure. This aligns with the governance dimension of ESG, which promotes accountability and risk management in corporate financial strategies. ESG has the potential to strengthen the correlation between profitability and firm value (Tyas & Prastiwi, 2025). Therefore, the author also expects ESG to moderate the relationship between variables in this study. Similarly, Corporate Social Responsibility (CSR) has been found to play a moderating role similar to ESG in influencing firm value. Fatkur (2025) found that companies with strong financial performance and consistent CSR implementation tend to experience higher firm value. This suggests that responsible financial management, when aligned with social and environmental initiatives, can reinforce profitability and enhance long-term corporate sustainability.

2.9. The Effect of Growth Opportunity on Profitability with ESG as a Moderating Variable

According to Sihombing, growth opportunities positively and significantly influence profitability (Sihombing et al., 2024). Companies with attractive growth opportunities, supported by strong ESG practices, are likely to be more appealing to long-term investors and achieve more sustainable and profitable growth. Conversely, growth opportunities pursued without considering ESG factors may face reputational or

operational risks in the future that could hinder profitability. Cecilia's research also supports this, stating that ESG can moderate the relationship between these variables (Cecilia & Putri, 2025).

H1: Exchange rate fluctuations affect the profitability of pharmaceutical manufacturing companies listed on the IDX.

H2: Capital structure affects the profitability of pharmaceutical manufacturing companies listed on the IDX.

H3: Growth opportunities affect the profitability of pharmaceutical manufacturing companies listed on the IDX.

H4: ESG practices moderate the effect of exchange rate fluctuations on the profitability of pharmaceutical manufacturing companies listed on the IDX.

H5: ESG practices moderate the effect of capital structure on the profitability of pharmaceutical manufacturing companies listed on the IDX.

H6: ESG practices moderate the effect of growth opportunities on the profitability of pharmaceutical manufacturing companies listed on the IDX.

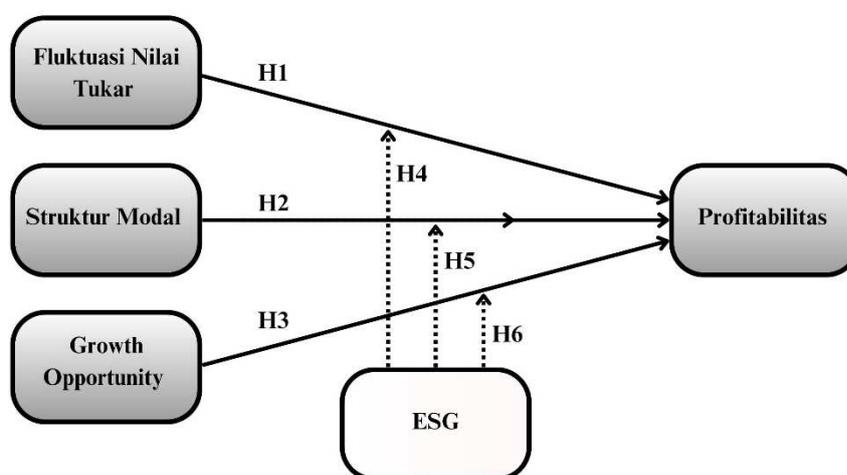


Figure 1. Conceptual Framework

III. Research Method

This study adopts a quantitative approach with an associative research framework, aiming to investigate and analyze the relationships among variables. Specifically, the research seeks to examine the impact of independent variables—namely exchange rate fluctuations, capital structure, and growth opportunities—on profitability as the dependent variable. Furthermore, this study explores the moderating role of Environmental, Social, and Governance (ESG) practices in influencing these relationships within pharmaceutical manufacturing companies listed on the Indonesia Stock Exchange (IDX). This research seeks to contribute to existing literature by integrating ESG as a moderating variable within the context of Indonesia's pharmaceutical industry—an approach that remains limited in prior studies. The study population consists of all manufacturing companies in the pharmaceutical sector officially listed on the IDX during the research period. This includes pharmaceutical manufacturing companies in Indonesia that have publicly available annual financial statements as well as sustainability reports. The sample is determined using a purposive sampling technique, selected based on the following criteria: (1) companies must consistently publish audited financial statements and sustainability reports during 2019–2023; (2) all required variables—exchange rate, capital structure, growth opportunity, ESG score, and profitability—must be available; and (3) companies must remain listed throughout the study period. The study does not employ a pilot test due to the use of publicly available secondary data; however, all variables and measurement indicators are derived from prior validated research to ensure consistency and reliability. The analysis period covers five years (2019–

2023), chosen based on the availability of data and the presence of economic fluctuations that may affect the study variables. A total of seven companies met the inclusion criteria, yielding 35 firm-year observations. The data collected are secondary in nature, obtained through documentation of financial statements, annual reports, and sustainability reports available on the IDX and each company's official website. To reduce potential sampling bias, only companies that provide complete and consistent data for all variables were included. This approach enhances the internal validity of the analysis.

Each variable is operationally defined and measured using standard financial ratios adopted from previous studies—for instance, profitability using Return on Assets (ROA), capital structure using the Debt-to-Equity Ratio (DER), and growth opportunity using the Market-to-Book Value ratio. ESG scores are derived from sustainability reports using content analysis. Data were analyzed using multiple linear regression and Moderated Regression Analysis (MRA) to test the moderating effect of ESG. The analysis was conducted using EViews software, and results are interpreted based on the significance of regression coefficients, effect size, and model fit indicators.

3.1. Operational Definition of Variables

a. Profitability

Profitability is measured using Return on Assets (ROA). ROA is selected as it reflects the company's ability to generate net income from its total assets.

$$ROA = \frac{\text{Net Profit}}{\text{Total Assets}}$$

b. Exchange Rate Fluctuations (Independent Variable)

The standard deviation of the Rupiah exchange rate against the U.S. Dollar (USD) over a one-year period is used as the indicator of exchange rate fluctuations. The exchange rate data are obtained from monthly observations, which are then accumulated and averaged annually. The use of standard deviation as a volatility indicator follows previous studies such as Fikri and Manda (2021), which define exchange rate fluctuation as a measure of currency instability that may affect company profitability.

$$\text{Fluctuation} = \frac{\text{Current Year Exchange Rate} - \text{Previous Year Exchange Raterang}}{\text{Previous Year Exchange Rate}}$$

c. Capital Structure (Independent Variable)

Capital structure is measured using the Debt-to-Equity Ratio (DER). DER is employed to assess the proportion of a company's financing derived from debt relative to its equity. This ratio is used because it reflects the company's financial leverage and risk exposure, serving as a common proxy in profitability research (Sabakodi & Andreas, 2024).

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

d. Growth Opportunity (Independent Variable)

According to Sihombing et al. (2024), growth opportunity refers to the potential for an entity's future growth, which is measured through changes in its total assets. The formula adopted from Kasmir (2017) is as follows:

$$\text{Growth Opportunity} = \frac{\text{Total Aset Sekarang} - \text{Total Aset Tahun Sebelumnya}}{\text{Total Aset Tahun Sebelumnya}}$$

e. Environmental, Social, and Governance (ESG) (Moderating Variable)

The ESG variable is assessed through content analysis of annual and sustainability reports from 2019 to 2023. The assessment identifies whether each company discloses key ESG indicators within environmental, social, and governance dimensions. Each dimension is scored based on disclosure completeness, where full disclosure earns the maximum score and partial disclosure receives proportionate weighting according to the ESG scoring framework. This scoring method aligns with global ESG disclosure guidelines such as the GRI Standards, adjusted to reflect data availability for Indonesian pharmaceutical firms. Formula is as follows:

$$ESG = \text{Total Score} / \text{Score Maksimum}$$

3.2. Data Analysis Technique

To test the hypotheses, this study employs multiple linear regression and Moderated Regression Analysis (MRA) using SPSS version 30 for Windows. Classical assumption tests—normality, multicollinearity, heteroskedasticity, and autocorrelation—are performed to ensure model validity. If violations occur, data transformation or robust estimation methods will be applied to maintain the reliability of the results. The interpretation of results focuses on the significance of regression coefficients, adjusted R², and the direction of moderating effects, providing both statistical and managerial implications for pharmaceutical companies listed on the IDX.

IV. Results and Discussion

4.1. Analysis Result

a. Normality Test

The normality test was conducted to determine whether the residuals in the regression model were normally distributed, as this is a prerequisite for the validity of linear regression analysis. Table 2. presents the results of the normality test using the Kolmogorov–Smirnov (K–S) Test.

Table 1. Results of the Normality Test

K-S Test	
A.Sig. (2-tailed)	0,200 ^d
MC Sig. (2-tailed)	0,426

The P-value obtained was 0.200, which exceeds the significance threshold of 0.05, indicating that the data are normally distributed. Based on the results shown in Table 1, the data meet the assumption of normality. This finding ensures that the regression analysis can be appropriately applied without the need for data transformation.

b. Multicollinearity Test

Tabel 2. Uji Multikolinearitas

Variables	Tolerance	VIF.	Result
Exchange Rate Fluctuations	0,95	1,053	No Multicollinearity
Capital Structure	0,561	1,783	No Multicollinearity
Growth Opportunity	0,551	1,814	No Multicollinearity
ESG	0,962	1,039	No Multicollinearity

Based on the analysis of tolerance values and VIF for all independent variables (Exchange Rate Fluctuations, Capital Structure, Growth Opportunity, and ESG), the regression model is free from multicollinearity issues. Each independent variable meets the criteria (Tolerance > 0.10 and VIF < 10), indicating that there is no excessively high correlation among the independent variables. Therefore, the multicollinearity assumption is fulfilled.

c. Heteroskedasticity Test

Table 3. Spearman Heteroskedasticity Test

		<i>Unstandardized Residual</i>
Exchange Rate Fluctuations	ρ	0,012
	p-value	0,945
Capital Structure	ρ	-0,272
	p-value	0,114
Growth Opportunity	ρ	0,097
	p-value	0,581
ESG	ρ	0,093
	p-value	0,593

Based on the results, the significance values (Sig. (2-tailed)) for all independent and moderating variables (Exchange Rate Fluctuations, Capital Structure, Growth Opportunity, and ESG) are greater than 0.05. This indicates that the regression model does not suffer from heteroskedasticity. In other words, the variance of the residuals is constant (homoskedasticity), and thus the homoskedasticity assumption is satisfied.

d. Autocorrelation Test

Table 4. Autocorrelation Test

	R	R²	Adjust. R²	SEE	DW
1	0,752	0,566	0,508	0,05688	0,892

The autocorrelation test was conducted to determine whether residuals in the regression model are independent from one another, which is an essential assumption in multiple regression analysis. Based on the Durbin–Watson (DW) value of 0.892, and referring to the accepted threshold of -2 to +2, the regression model shows no indication of autocorrelation in the residuals. Although the DW value is slightly below 1, it still falls within the tolerance range, suggesting that the residuals are not serially correlated. Therefore, the non-autocorrelation assumption is met, confirming that the residuals are independent and that the regression coefficient estimates remain unbiased and reliable for interpretation.

4.2. Hypothesis Testing

a. Coefficient of Determination Test

Table 5. Coefficient of Determination Test

	R	R²	Adjust. R²	SEE
1	0,752 ^a	0,566	0,508	0,05688

The constructed regression model demonstrates a moderate to good explanatory power. Based on the results, the independent and moderating variables employed in this study (Exchange Rate Fluctuation, Capital Structure, Growth Opportunity, and ESG) collectively account for approximately 56.6% of the variation in profitability. This indicates that the model is sufficiently relevant in predicting or explaining the behavior of the dependent variable.

b. F-Tes

Table 6. F-Test

	SS	df	MS	F	Sig.
Reg.	0,127	4	0,032	9,781	<0,001 ^b
Residu.	0,097	30	0,003		
Total	0,224	34			

a. Dependent Variable: Profitability

b. Independent Variable: (Constant), Growth Opportunity, Exchange Rate Fluctuation, Capital Structure

Following the F-test, the obtained significance value (Sig.) was <0.001, which is far below the threshold of 0.05 (<0.001 < 0.05). Based on this result, it can be concluded that all independent variables in the model (Exchange Rate Fluctuation, Capital Structure, Growth Opportunity, and ESG) simultaneously exert a significant influence on the dependent variable, Profitability. Therefore, the regression model is considered valid and appropriate for use in analyzing, predicting, or explaining Profitability based on the combination of these independent variables.

c. Partial t-Test

Tabel 7. T-Test

Vari.	Unst.Coef.		Stand. Coef.	t	Sig.
	B	Std. Error	Beta		
Exchange Rate Fluctuation	0,283	0,47	0,084	0,603	0,551
Capital Structure	-0,077	0,017	-0,835	-4,586	<,001
Growth Opportunity	0,077	0,033	0,428	2,324	0,027

a. Dependent Variable: Profitability

The t-test was conducted to examine the partial influence of each independent variable on profitability while controlling for the effects of the others. The results presented in Table 7 show that Exchange Rate Fluctuation has no significant effect on profitability, as indicated by the significance value of 0.551 > 0.05; thus, H1 is rejected. This suggests that fluctuations in the exchange rate do not directly impact short-term profitability in the pharmaceutical manufacturing sector. In contrast, Capital Structure and Growth Opportunity both have significant effects on profitability, with significance values of <0.001 < 0.05 and 0.027 < 0.05, respectively; therefore, H2 and H3 are accepted. A negative coefficient for Capital Structure indicates that higher leverage reduces profitability due to increased financial risk, whereas Growth Opportunity positively contributes to profitability, reflecting the firm's ability to expand and generate future income.

d. Moderated Regression Analysis (MRA) t-Test

Table 8. MRA Test

Variable	Unst.Coef.		Stand. Coef.	t	Sig.
	B	SE	Beta		
Exchange Rate Fluctuation	0,059	0,062	0,215	0,948	0,356
X1_Z	-0,045	0,036	-0,277	-1,223	0,237
Capital Structure	-0,078	0,011	-0,85	-7,375	<,001
X2_Z	-0,138	0,05	-0,319	-2,772	0,009
Growth Opportunity	2,655E-05	0,01	0,001	0,003	0,998
X3_Z	-0,047	0,024	-0,383	-1,924	0,067

a. Dependent Variable: Profitability

The Moderated Regression Analysis (MRA) was conducted to examine whether Environmental, Social, and Governance (ESG) practices influence the strength or direction of the relationship between the independent variables and profitability. Based on the results shown in Table 9, X1_Z does not moderate the relationship between Exchange Rate Fluctuation and Profitability, with a significance value of 0.237 > 0.05, thus H4 is rejected. This finding suggests that ESG practices do not significantly buffer or amplify the effect of exchange rate volatility on profitability within the pharmaceutical sector. Similarly, X3_Z does not significantly

moderate the relationship between Growth Opportunity and Profitability, as indicated by the significance value of $0.067 > 0.05$; therefore, H6 is rejected. This result implies that ESG practices may not immediately translate into enhanced financial outcomes when firms pursue growth opportunities, possibly due to the long-term nature of ESG investments. However, $X2_Z$ significantly moderates the relationship between Capital Structure and Profitability, with a significance value of $0.009 < 0.05$; therefore, H5 is accepted. This indicates that firms with strong ESG practices are better able to manage the financial risks associated with leverage, leading to improved profitability stability. Overall, these findings highlight that ESG's moderating role is selective—it strengthens the effect of capital structure decisions on profitability but does not substantially alter the influence of exchange rate fluctuations or growth opportunities.

e. The Effect of Exchange Rate Fluctuations on Profitability

Exchange rate fluctuations play a crucial role in shaping the performance of industries that depend on imported raw materials and international trade, such as the pharmaceutical sector. The test results indicate that exchange rate fluctuations do not have a significant effect on the profitability of pharmaceutical companies. This means that changes in the rupiah's value against foreign currencies do not directly or substantially influence profitability, leading to the rejection of H1. This result may occur due to other factors, such as the implementation of hedging strategies to mitigate exchange rate risk. Moreover, although most pharmaceutical raw materials are imported and their prices are affected by exchange rates, companies may have cost structures that allow cost pass-through to consumers or rapid price adjustments. If the proportion of imported costs is not dominant relative to total production costs, or if companies have strong local suppliers, exchange rate fluctuations may not significantly erode profitability margins.

This finding implies that the ability of firms to manage operational and financial risks—such as through hedging, local sourcing, or flexible pricing—may effectively neutralize the negative effects of currency volatility on profits. This finding is consistent with Handayani et al. (2022), who reported that exchange rate changes do not significantly affect ROA, and with Suhartono (2024), who concluded that exchange rate fluctuations have no significant impact on manufacturing company profitability. Therefore, this study strengthens the evidence that in industries with adaptive financial strategies, such as pharmaceuticals, exchange rate volatility may have a limited short-term influence on profitability but could still be relevant for long-term financial planning.

f. The Effect of Capital Structure on Profitability

Capital structure is also an important indicator for the pharmaceutical industry, as an optimal structure can help maximize firm value, reduce financial risk, and maintain credibility. The test results show that capital structure has a negative and significant effect on profitability; thus, H2 is accepted. This indicates that capital structure and profitability are inversely related. Higher debt levels increase interest expenses and financial risk, which may suppress profitability. An increase in debt also raises financial risk for the company. Higher financial risk may increase expected returns demanded by investors and creditors, thereby raising the cost of capital. Furthermore, agency theory suggests that excessive debt may trigger conflicts of interest between shareholders and bondholders, potentially leading to agency costs and inefficient resource allocation, which ultimately reduce profitability. This finding aligns with Prabowo, who found that capital structure has a negative and significant impact on profitability due to reduced opportunities for profit generation as long-term debt obligations increase. Similarly, Lorenza reported that capital structure significantly and negatively influences profitability (Lorenza et al., 2025).

g. The Effect of Growth Opportunity on Profitability

Growth opportunity represents a company's potential to expand operations, innovate, and strengthen its competitive position in the market, making it an essential determinant of long-term profitability. The test results demonstrate that growth opportunity has a positive and significant effect on the profitability of pharmaceutical companies; therefore, H3 is accepted. This finding suggests that firms with stronger growth prospects are more capable of generating sustainable profits, as expansion and innovation often create long-term value and competitive advantage. This is logical, as growth opportunities are often associated with profitable investments, market expansion, or innovation, which ultimately increase revenue and profits. Companies with high growth opportunities often have the potential to expand market share, develop innovative products, or enter untapped markets. Although such investments may require significant upfront costs, they are expected to generate greater cash flows and revenues in the future.

In the context of the pharmaceutical industry, these opportunities frequently stem from investments in research and development (R&D), technology partnerships, and new drug commercialization—strategies that drive future profitability once the innovations reach the market. This result is consistent with prior studies that found profitability to be positively influenced by growth opportunities (Kopong & Nurzanah, 2016; Sihombing et al., 2024; Suhartono, Jeffry, 2024; Suhi et al., 2023). Therefore, the findings reinforce existing literature while extending it by confirming that, within Indonesia's pharmaceutical sector, growth-oriented strategies remain a critical pathway for achieving profitability despite high research costs and regulatory challenges.

h. The Effect of Exchange Rate Fluctuations on Profitability with ESG as a Moderating Variable

The MRA results indicate that ESG does not play a significant moderating role in the relationship between exchange rate fluctuations and profitability, leading to the rejection of H4. This is in line with Nisaakmala who found that ESG values do not moderate the effect of independent variables on dependent variables (Nisaakmala & Umar, 2024). This means that regardless of how well companies implement ESG principles, the impact of exchange rate fluctuations on profitability does not substantially change. Exchange rate fluctuations are macroeconomic phenomena heavily influenced by global factors and national monetary policies, which are largely beyond the direct control of individual firms. While firms with strong ESG practices may enjoy better reputations, this may not be sufficient to filter or alter the direct impact of currency movements on import costs, export revenues, or the valuation of foreign-denominated assets and liabilities.

i. The Effect of Capital Structure on Profitability with ESG as a Moderating Variable

The MRA results demonstrate that ESG significantly moderates the relationship between capital structure and profitability; thus, H5 is accepted. This finding supports prior research showing that ESG can moderate the relationship between independent and dependent variables (Tyas & Prastiwi, 2025). This implies that the implementation of ESG principles can alter the nature or strength of the relationship between capital structure and profitability. However, as emphasized by Wulandari and Saleh (2024), ESG effects are not always uniformly positive. Their study on high-profile companies in Asia found that ESG controversies can weaken the positive association between ESG implementation and firm performance. This suggests that while ESG can enhance governance and reduce financing risk, inconsistency or reputational controversies in its application may offset potential financial benefits. Effective ESG practices can reduce risks related to litigation, regulatory fines, or social protests, all of which can disrupt operations and profitability. With lower non-financial risks, companies may pursue more aggressive or efficient capital structure strategies, as bankruptcy risk from non-financial factors is reduced. This enables firms to adopt bolder capital structures to optimize returns on equity. Additionally, an optimal capital structure combined with ESG practices may further minimize the cost of capital, thereby directly enhancing profitability.

j. The Effect of Growth Opportunity on Profitability with ESG as a Moderating Variable

The MRA results reveal that ESG does not significantly moderate the relationship between growth opportunity and profitability, leading to the rejection of H6. This finding is consistent with Nisaakmala who also found that ESG does not moderate the effect of independent variables on dependent variables (Nisaakmala & Umar, 2024). This suggests that the ability of firms to exploit growth opportunities and translate them into profitability is not substantially influenced by ESG implementation. Growth opportunities such as entering new markets, developing innovative products, or undertaking strategic acquisitions are often driven by internal factors like innovation capacity, aggressive marketing strategies, and managerial ability to identify and leverage opportunities. While ESG may contribute to reputation and public acceptance of new products, its role in moderating the relationship between growth opportunities and profitability is likely limited compared to the core factors of innovation and market strategy.

V. Conclusion

The findings of this study indicate that exchange rate fluctuations, capital structure, and growth opportunities simultaneously have a significant impact on the profitability of pharmaceutical manufacturing companies in Indonesia, particularly those listed on the Indonesia Stock Exchange (IDX). However, when examined individually, each independent variable demonstrated varying effects on profitability. Exchange rate fluctuations were found to have no statistically significant effect on profitability. In contrast, capital structure exhibited a significant negative influence on profitability, while growth opportunities showed a

significant positive correlation with profitability. These results highlight the multifaceted nature of profitability determinants in the pharmaceutical industry, where financial structure and expansion potential play more decisive roles than macroeconomic volatility. Environmental, Social, and Governance (ESG) as a moderating variable also played a role in influencing the relationship between independent variables and the profitability of pharmaceutical companies in Indonesia. The results reveal that ESG does not significantly moderate the effect of exchange rate fluctuations on profitability. Similarly, ESG was not found to significantly moderate the relationship between growth opportunities and profitability. However, in the case of capital structure, ESG was shown to significantly moderate its effect on profitability. This finding reinforces the growing relevance of ESG in shaping financial decision-making, especially in capital-intensive sectors such as pharmaceuticals, where sustainability practices can enhance investor confidence and reduce perceived risk. For future research, it is recommended to increase the sample size in order to provide more robust evidence. Expanding the scope of analysis is expected to generate more comprehensive insights and potentially reveal stronger significant effects of these variables on corporate profitability. In addition, future studies could incorporate qualitative or case-based approaches to better capture managerial strategies behind ESG implementation and financial structuring decisions, thereby deepening theoretical understanding.

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