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The Influence of Investment Efficiency and Financial Flexibility on Financial Sustainability with Solvency as a Variable Moderator

Hasim As'ari[1*], Diana Airawaty[2], Ika Wulandari[3], Effiyaldi[4]
[1]Universitas Mercu Buana Yogyakarta, Indonesia, hasim@mercubuana-yogya.ac.id
[2]Universitas Mercu Buana Yogyakarta, Indonesia, diana@mercubuana-yogya.ac.id
[3]Universitas Mercu Buana Yogyakarta, Indonesia, ikawulandari@mercubuana-yogya.ac.id
[4]Universitas Dinamika Bangsa, Jambi, Indonesia, tanjab67@yahoo.co.id

[*]Corresponding Author: hasim@mercubuana-yogya.ac.id[1]

Abstract: Study this to discuss how investment efficiency and financial flexibility affect financial sustainability in the Indonesian manufacturing sector. Research also explores the role of Solvency, measured by the Debt to Equity Ratio (DER), as a mediating variable between investment efficiency and financial flexibility towards financial sustainability. Analysis in the study. This uses the Partial Test (t-Test) and the Moderated Regression Analysis (MRA) to analyze the influence of moderator variables on the relationship between independent and dependent variables. Investment efficiency has a significant positive influence on Corporate Sustainable Finance. Financial flexibility is not a significant factor in financial sustainability. The interaction between investment efficiency and Solvency significantly influences financial sustainability. The interaction between Financial Flexibility and Solvency significantly influences Financial Sustainability. Based on the research findings, investment efficiency affects financial sustainability, whereas financial flexibility does not. Solvency moderates the effect of investment efficiency on financial sustainability, and financial flexibility moderates the effect of financial sustainability on financial flexibility. The novelty of this research lies primarily in addressing gaps in previous research. It is also expected to advance knowledge in the field by using empirical evidence from financial report data, sustainability reports, and companies' annual reports. How investment efficiency and financial flexibility influence financial sustainability in the Indonesian manufacturing sector. It also explores the role of Solvency, as measured by the Debt-to-Equity Ratio (DER), as a mediating variable between investment efficiency and financial flexibility, and between financial flexibility and financial sustainability.

Keywords: Financial Flexibility, Financial Sustainability, Investment Efficiency, Solvency.

INTRODUCTION

In an increasingly competitive business environment, companies are expected to maintain financial stability while creating long-term value for shareholders. Firm value reflects investors' assessments of a company's current performance and future prospects, which are often reflected in its stock price. Achieving sustainable firm value requires companies to manage their financial resources effectively, maintain profitability, and make investment decisions that support long-term business continuity. Investment efficiency is particularly important because it determines how effectively a company allocates capital to productive activities. Efficient investment decisions help companies avoid overinvestment in projects with low returns and underinvestment in profitable opportunities. Safi et al. (2023) examined the relationship between corporate social and environmental responsibility, investment efficiency, and company performance, highlighting the relevance of investment efficiency in corporate financial decision-making. Similarly, Bimo et al. (2022) investigated the relationship between corporate governance and investment efficiency in Indonesia, emphasizing the importance of governance mechanisms in improving investment allocation.

Financial flexibility is another factor that can influence a company's financial performance and long-term sustainability. It refers to a company's ability to obtain and allocate financial resources to respond to unexpected circumstances and take advantage of profitable opportunities without compromising its financial stability. Companies with adequate financial flexibility can manage fluctuations in cash flow, respond to changing market conditions, and finance strategic investments when necessary. Teng et al. (2021) discussed the role of financial flexibility in supporting enterprise sustainable development during the COVID-19 crisis, particularly through the consideration of tangible assets. Furthermore, Erin (2025) examined the influence of financial flexibility, financial distress, and tax policies on company performance in companies listed on the Indonesia Stock Exchange. These studies indicate that financial flexibility is an important consideration in managing corporate resources and maintaining business performance under uncertain economic conditions.

Financial sustainability represents a company's ability to maintain stable financial conditions and continue its operations over the long term without becoming excessively dependent on external financing or accumulating unsustainable debt. Irianto and Adiatma (2023) examined publication trends in financial sustainability, demonstrating the relevance of this concept in contemporary academic research. Duong et al. (2022) also investigated how innovation and ownership concentration affect the financial sustainability of energy enterprises in a transition economy. Although their research focused on the energy sector, the concept of financial sustainability is relevant to other industries, including manufacturing, where financial stability is essential for maintaining production, meeting market demand, and supporting future growth. In this context, sustainable financial management involves balancing profitability, investment decisions, and financial resources to preserve a company's capacity to operate continuously.

The relationship between investment efficiency, financial flexibility, and financial sustainability is particularly relevant to manufacturing companies because their operations often require substantial capital investment, working capital, and continuous resource allocation. Inefficient investment decisions may reduce the returns generated from corporate assets, while limited financial flexibility may constrain a company's ability to respond to economic uncertainty. These conditions can weaken financial sustainability and threaten business continuity. Wanof and Kusuma (2024) discussed the role of investment efficiency in corporate sustainable finance, reinforcing the relevance of efficient capital allocation in achieving sustainable financial outcomes. In addition, Pangestu and Hati (2024) examined

bankruptcy prediction in real estate and property companies listed on the Indonesia Stock Exchange, demonstrating the importance of evaluating financial conditions in relation to potential business failure. Although bankruptcy prediction and financial sustainability are distinct concepts, both are relevant to assessing a company's ability to maintain its operations over time.

The relationship between these financial factors can also be understood through agency theory, which explains the potential conflicts of interest between managers as agents and shareholders as principals. Jensen and Meckling (1976) argued that differences in objectives and information asymmetry can create agency problems, particularly when managers possess more information about the company than shareholders. In this situation, investment decisions and financial resource management may not always align with shareholders' interests. Effective governance and appropriate financial policies are therefore important for encouraging managers to allocate resources efficiently and maintain the company's long-term financial condition. Company size may also be relevant because companies of different sizes can have different resource capacities, investment requirements, and abilities to access external financing. Consequently, company size can be considered a moderating variable when examining the relationships between financial flexibility, profitability, financial leverage, and firm value.

Despite the growing attention given to investment efficiency, financial flexibility, and financial sustainability, these concepts represent different dimensions of corporate financial management. Investment efficiency concerns the quality of capital allocation, financial flexibility concerns the capacity to respond to financial needs and opportunities, and financial sustainability concerns the ability to maintain financial stability over time. Understanding their respective roles is important for explaining how companies preserve financial performance and support long-term business continuity. Previous studies have examined these concepts in different contexts, including corporate governance, enterprise performance, sustainable development, and sustainable finance (Bimo et al., 2022; Erin, 2025; Safi et al., 2023; Teng et al., 2021; Wanof & Kusuma, 2024). However, further investigation is needed to clarify how the relevant financial factors interact within a specific corporate context and how company characteristics may influence these relationships. Therefore, this study aims to examine the relationship between financial flexibility, profitability, and financial leverage and firm value, with company size serving as a moderating variable, while considering the relevance of investment efficiency and financial sustainability to long-term corporate financial management. The findings are expected to contribute to a better understanding of corporate financial decision-making and provide insights for managers and investors in evaluating companies' financial prospects and sustainability.

METHODS

The population used in this study is 73 manufacturing companies in the basic and chemical industry sector listed on the IDX. The sample determination used purposive sampling, a sampling method based on research objectives or research criteria. The sample criteria used are as follows: First, manufacturing companies operating in the Basic and Chemical Industry Sector listed on the Indonesia Stock Exchange during 2019 to 2024. Second, companies operating in the Basic and Chemical Industry Sector that publish complete annual reports related to the variables in this study during 2019 - 2024. The data used in this study are secondary. The data used in this study were obtained from the Indonesia Stock Exchange website (www.idx.co.id) and each company's website. This study uses the Partial Test (t-Test) and the Moderated Regression Analysis (MRA) to examine the effect of moderator variables on the relationship between the independent and dependent variables.

RESULTS AND DISCUSSION

Results

This study contains independent variables, namely investment efficiency and financial flexibility, and the dependent variable is financial sustainability; moreover, Solvency is a moderating variable. The population for this study comprised 73 manufacturing companies in the basic and chemical industries sectors listed on the IDX. The sample was determined using purposive sampling, a method based on research objectives or criteria. The sample criteria used are as follows: First, manufacturing companies operating in the Basic Industry and Chemical Sector listed on the Indonesia Stock Exchange during 2019 to 2024. Second, companies operating in the Basic and Chemical Industry Sector that publish complete annual reports related to the variables in this study during 2019 – 2024. The data used in this study are secondary. The data used in this study were obtained from the Indonesian Stock Exchange website (www.idx.co.id) and from each company's website. His study uses the Partial Test (t-Test) and the Moderated Regression Analysis (MRA) to examine the influence of moderator variables on the relationships among independent and dependent variables.

Table 1: Sampling Determination Process

No	Criteria	Amount
1	Manufacturing companies operating in the Basic Industry and Chemical Sector are listed on the Indonesia Stock Exchange from 2019 to 2024.	73
2	Companies that do not publish complete annual reports related to the variables in this study during 2019 – 2024	(20)
Sample companies that meet the criteria		53

Normality Test

The results of the normality test above show that the p-value for Asymp. Sig. 2-tailed) of 0.200 is greater than 0.05; therefore, the calculation results show that the sig. If the value is > 0.05, the data are normally distributed. Hence, the assumption or requirement of normality in the regression model has been met.

Heteroscedasticity Test

Heteroscedasticity testing was performed using the Glejser test. he test results showed that the significance values for both independent variables were greater than 0.05. The significance values for X1 (0.607) and X2 (0.258) were greater than 0.05, so there was no evidence of heteroscedasticity. Hence, there was no heteroscedasticity problem in the regression model, meaning the model is homoscedastic, or, in other words, there is no heteroscedasticity assumption problem.

Multicollinearity Test

If the tolerance value is > 0.10 or the VIF value is < 10, there is no multicollinearity. The results of the **multicollinearity test** show that the Tolerance Values for variables X1 and X2 are greater than 0.10. Meanwhile, the VIF values for the variables X1 and X2 are both less than 10.00. The **conclusion is that the variables used do not experience multicollinearity.**

Table 2: t-Test Results

Coefficients [a]						
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	2519.173	5531.050		.455	.649
	X1	.428	.052	.494	8,210	.000
	X2	.122	.178	.041	.687	.493

a. Dependent Variable: Y

Information: X1: Investment Efficiency, X2: Financial Flexibility Y: Financial Sustainability

From the table, it can be seen that:

1. Investment Efficiency (X1) is significant to Financial Sustainability. This is evident from the Investment Efficiency variable's significance value being below the alpha level of 0.05. The results of this study indicate that Investment Efficiency affects Financial Sustainability, as supported by the data.
2. Financial Flexibility (X2) is not significant to Financial Sustainability. This is evident from the significance value of the Financial Flexibility variable being above the alpha level of 0.05. The results of this study indicate that Financial Flexibility does not affect Financial Sustainability, as supported by the data.

Discussion

H1: Influence Investment Efficiency on Financial Sustainability

Table 2 presents the relationship between investment efficiency (X1) and financial sustainability. Table 2 shows that investment efficiency significantly impacts financial sustainability. This is evident from the investment efficiency variable's significance value, which is less than the alpha level of 0.05 (0.000 <0.05). The results of this study indicate that investment efficiency influences financial sustainability, and the data support this. This demonstrates that the first hypothesis is supported: investment efficiency influences financial sustainability because efficient investment can improve productivity, reduce costs, and increase profit margins, all of which contribute to a company's long-term financial health and stability. By maximizing resources, efficient investment enables a company to operate profitably and fulfill its financial responsibilities without relying on continuous financial assistance or debt. Investment efficiency in a company is achieved when its investment has a positive net present value (NPV), whereas inefficiency occurs when there is over- or under-investment (Bimo et al., 2022).

Investment efficiency can affect financial performance because companies with higher investment efficiency incur lower agency costs, which refer to reduced conflicts of interest between shareholders, controllers, and non-investment stakeholders (Safi et al., 2023). Investment efficiency can also help companies expand their businesses and increase market share, thereby boosting company profits. With high profits, companies can obtain additional funding to enhance financial sustainability. The research findings align with Wanof & Kusuma's (2024) study, which found that investment efficiency has a significant positive impact on corporate sustainable finance. This is because investment efficiency is related to cash inflows from investment activities, which are then used to fund ESG activities.

H2: Influence financial flexibility on financial sustainability

Table 2 presents the relationship between financial flexibility (X2) and financial sustainability. Table 2 shows that financial flexibility is not significantly associated with financial sustainability. This is evident from the financial flexibility variable's significance value, which is greater than the alpha level of 0.05 (0.493 > 0.05). The results of this study indicate that financial flexibility does not affect financial sustainability, supporting the data. This shows that the second hypothesis has not been proven that financial flexibility affects financial sustainability. The claim that financial flexibility does not affect financial sustainability contradicts previous research. Poor financial flexibility means the company cannot improve its ability to achieve financial sustainability. This is because, firstly, the company's financial flexibility is limited in its management's ability to overcome internal and external financial shocks and to effectively address investment opportunities, such as declining income or urgent needs, so it is unable to prevent major losses and maintain business continuity. Both companies cannot access and restructure financing at the minimum cost to respond to unforeseen needs and capitalize on critical opportunities for long-term sustainability. The three

companies lack sufficient capital and the ability to easily access it to adapt and survive in various market conditions that support sustainable growth.

Previous research results showed that financial flexibility did not have a significant effect on company performance in the asset-light manufacturing industry or the semiconductor industry. His study also shows that Taiwan's asset-light manufacturing industry suffered the most from the COVID-19 crisis, which is not conducive to its sustainable development (Teng et al., 2021). Financial flexibility has no significant impact on company performance (Erin, 2025).

Table 3: Moderation Test Results

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	7397.071	4394.163		1,683	.094
	X1Z	4.879E-6	.000	.418	6,645	.000
	X2Z	2.231E-6	.000	.130	2,070	.040

a. Dependent Variable: Y

H3: The Influence of Investment Efficiency on Financial Sustainability with Solvency as a Moderating Variable

Based on Table 3, which presents the relationship between investment efficiency (X1) and Solvency (Z) as a moderator. From Table 3, it can be seen that financial sustainability is significantly influenced by the interaction between investment efficiency (X1) and Solvency (Z). This can be seen from the significance value of the interaction variable between investment efficiency (X1) and Solvency. investment efficiency * solvency) on financial sustainability, which is below the alpha level of 0.05 (0.000 < 0.05). The results of this study support the third hypothesis: Solvency moderates the effect of investment efficiency on financial sustainability.

Solvency can act as a moderating variable, influencing the relationship between investment efficiency and financial sustainability. Insolvency, as a measure of a company's ability to meet its long-term obligations, often shapes the extent to which investment efficiency influences a company's financial sustainability. Companies with strong Solvency tend to use investment efficiency more effectively, thereby positively impacting financial sustainability.

Solvency indicates a company's ability to meet long-term obligations and reflects its financial stability and risk. When Solvency is at a healthy level, efficient investment has a stronger positive impact on a company's financial sustainability, as it can optimize resource use and manage debt effectively. Conversely, if Solvency is low, investment efficiency may not directly contribute to financial sustainability because high risks and debt burdens can disrupt long-term financial sustainability. Investment efficiency itself is a capital investment effort aimed at maximizing profits and minimizing risks, thereby supporting business growth and sustainability. With strong Solvency, investments will be more targeted toward achieving financial sustainability goals. For companies seeking to improve their financial sustainability through efficient investment, a strong solvency position is a crucial prerequisite.

H4: The Influence of Financial Flexibility on Financial Sustainability with Solvency as a moderating variable

Based on Table 3, which presents the relationship between Financial Flexibility (X2) and Solvency (Z) as a moderator. From Table 3, it can be seen that Financial Sustainability is significantly influenced by the interaction between Financial Flexibility (X2) and Solvency (Z). This can be seen from the significance value of the interaction variable between Financial

Flexibility (X2) and Solvency (Financial Flexibility * Solvency) on Financial Sustainability, which is below the alpha level of 0.05 (0.040 < 0.05). he results of this study support the fourth hypothesis: Solvency moderates the influence of Financial Flexibility on Financial Sustainability. This is because a company's solvency level determines how effectively it can leverage its financial flexibility to achieve long-term sustainability.

Solvency moderates the relationship between financial flexibility and financial sustainability. Studies show that Solvency, which measures a company's ability to meet short-term and long-term obligations, can strengthen or weaken the effect of financial flexibility on a company's ongoing financial performance. Financial flexibility allows companies to manage risks and fund needs without relying on excessive debt, improving financial sustainability. When solvency levels are high, companies must be cautious, as the risk of financial distress also increases if external funds are not managed effectively. However, companies with strong Solvency are better able to use financial flexibility effectively to support sustainable growth. Insolvency can amplify the positive impact of financial flexibility on sustainability by helping companies manage risk and funding more effectively. Hence, Solvency moderates the relationship between financial flexibility and financial sustainability: a company's financial resilience is stronger when a healthy level of Solvency supports financial flexibility. The interaction between financial flexibility and Solvency is crucial for a company's financial resilience and long-term survival.

CONCLUSION

The findings indicate that investment efficiency has a significant effect on financial sustainability, whereas financial flexibility does not demonstrate a significant effect. Solvency moderates the relationship between investment efficiency and financial sustainability. However, the reported moderating relationship between financial flexibility and financial sustainability requires further clarification to ensure consistency with the research model. This study also has several limitations, including difficulties in measuring investment efficiency, financial flexibility, and solvency, as well as limitations in accessing complete and reliable financial data. Other constraints include limited research time and funding, analytical complexity, changing market conditions, macroeconomic uncertainty, and potential regulatory changes. These factors may affect the research process and the generalizability of the findings. Therefore, the results should be interpreted by considering the limitations of the available data and the research context.

Based on these findings, companies are encouraged to improve financial management strategies, allocate investment resources efficiently, and maintain adequate solvency to support long-term financial sustainability. Investors may also use information about investment efficiency and financial conditions to evaluate companies' financial prospects and potential risks, while policymakers can support market transparency and stability through appropriate regulations. Future research should consider additional variables that may influence financial sustainability, expand the research sample, and examine companies across different industrial sectors to improve the generalizability of the findings. Furthermore, researchers are encouraged to employ more diverse analytical methods and longer observation periods to capture changes in corporate financial conditions over time. These improvements may provide a more comprehensive understanding of the relationships among investment efficiency, financial flexibility, solvency, and financial sustainability, thereby contributing to the development of business theory and corporate financial management practices.

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