

Beyond liquidity: financial flexibility, operational efficiency and dynamics on firm value during economic shocks

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Abstract

Recent global economic disruptions have increased uncertainty in capital markets and challenged firms in maintaining firm value. In such conditions, firms require both financial resilience and operational capability to sustain competitiveness and market confidence. This study aims to examine the influence of financial flexibility, leverage, and operational efficiency on firm value and to explore how these mechanisms operate across different economic phases. The study uses panel data from manufacturing firms listed on the Indonesia Stock Exchange during the period 2020–2025. The findings indicate that financial flexibility and operational efficiency positively influence firm value, while leverage negatively affects firm value. The results further show that financial flexibility plays a stronger role during crisis periods by helping firms maintain liquidity and financial stability. In contrast, operational efficiency becomes more important during recovery periods as firms focus on improving productivity and competitiveness. In addition, operational efficiency partially mediates the relationship between financial flexibility and firm value. These findings highlight the complementary role of financial and operational capabilities in sustaining firm value under economic shocks.

Keywords: *financial flexibility, operational efficiency, leverage, firm value, economic shocks*

Introduction

Recent global economic disruptions, including the COVID-19 pandemic, geopolitical tensions, and global monetary tightening, have significantly influenced how investors evaluate firm value in capital markets. During periods of high uncertainty, firms are no longer assessed solely based on profitability but also on their ability to maintain financial resilience and operational adaptability. Empirical evidence shows that market volatility during economic crises is often intensified through liquidity shortages and excessive leverage exposure, making firms with weak financial structures more vulnerable to financial distress (Acharya et al., 2024; Gao et al., 2024). Consequently, firms need both financial and operational capabilities to sustain firm value in turbulent economic environments.

Financial flexibility has become an important strategic capability for firms facing economic uncertainty and market volatility. Firms with greater financial flexibility are better able to maintain investment activities, respond to external shocks, and sustain firm value during economic disruptions (Acharya et al., 2024; Fahlenbrach et al., 2021; Gao et al., 2024). In addition, financial flexibility enables firms to access external financing more easily and reduce the risk of financial distress during periods of economic instability (Chen et al., 2024; Nguyen & Tran, 2024).

The relationship between financial resources and firm performance can be explained through the Resource-Based View (RBV), which emphasises the role of valuable

organisational resources in achieving sustained competitive advantage. In this context, financial flexibility represents a strategic resource that enhances managerial discretion and organisational resilience. However, RBV alone cannot fully explain how firms transform financial resources into sustained value creation in dynamic environments. Dynamic Capability Theory (DCT) complements this perspective by emphasising firms' abilities to sense environmental changes, seize opportunities, and reconfigure internal resources in response to external shocks (Helfat & Martin, 2023; Teece et al., 2024). One manifestation of such capability is operational efficiency, which reflects how effectively firms convert resources into productive outputs. Firms with higher operational efficiency are generally better able to optimise resource utilisation and improve productivity, which ultimately enhances firm valuation (Banker et al., 2024; Kim & Oh, 2023).

Research in the Indonesian management literature also emphasises the importance of financial and operational capabilities in shaping firm performance. Studies published in the *Journal of Management and Business* highlight that managerial capability, financial management practices, and operational performance play a significant role in improving firm competitiveness and firm value in Indonesian companies (Pramono, 2025; Santoso & Nugroho, 2022; Murhadi & Utami, 2021; Limantara et al., 2020). These findings suggest that firms operating in emerging economies must combine financial resources with effective operational management to remain competitive under volatile economic conditions.

Despite the growing literature on financial flexibility and operational efficiency, previous studies generally examine these factors separately. Corporate finance research tends to focus on the stabilising role of liquidity and capital structure during crises, while operations management research emphasises productivity and efficiency improvements as drivers of firm performance. As a result, limited empirical evidence explains how financial buffering and operational reconfiguration jointly influence firm value under systemic economic shocks. Furthermore, most studies use static analytical approaches that do not capture the dynamic nature of economic cycles, where the importance of financial and operational capabilities may vary between crisis and recovery phases (Boubaker et al., 2023; Tran & Pham, 2025).

This study addresses this gap by developing a framework that integrates financial flexibility and operational efficiency in explaining firm value under economic shocks. The novelty of this study lies in proposing a state-dependent perspective in which financial flexibility acts as a buffering mechanism during crisis periods, while operational efficiency represents a reconfiguration capability that becomes more important during economic recovery. Therefore, the objective of this study is to examine how financial flexibility and operational efficiency influence firm value and to analyse the interaction between these mechanisms across different economic phases.

Literature Review

Firm value represents the market's assessment of a firm's current performance and its future growth potential. In capital markets, firm value reflects investors' expectations regarding the firm's ability to generate sustainable cash flows and maintain long-term competitiveness. Previous studies show that firm value is influenced not only by profitability but also by financial structure, liquidity conditions, and operational performance (Gao et al., 2024; Nguyen & Tran, 2024). During periods of economic

uncertainty, investors increasingly pay attention to firms' financial resilience and operational capability because these factors determine the firm's ability to survive and recover from economic disruptions.

One factor that has received increasing attention in the corporate finance literature is financial flexibility. Financial flexibility refers to a firm's ability to obtain and deploy financial resources when facing unexpected economic shocks or investment opportunities (Chen et al., 2024; Zhang & Li, 2025). Firms with greater financial flexibility usually maintain higher liquidity levels and lower financial leverage, allowing them to preserve investment capacity during economic downturns. Empirical studies demonstrate that financially flexible firms experience smaller valuation losses during crisis periods and recover more quickly afterward (Gao et al., 2024; Nguyen & Tran, 2024). Firms with higher financial flexibility tend to achieve better market valuation because they have greater capacity to absorb financial shocks (Chen et al., 2024; Nguyen & Tran, 2024). These findings suggest that financial flexibility plays a crucial role in protecting firm value under uncertain economic conditions. Based on this argument, financial flexibility is expected to positively influence firm value.

H1: Financial flexibility positively affects firm value.

In contrast, excessive financial leverage may increase financial risk and reduce firm value. High leverage levels expose firms to higher bankruptcy risk and financial distress, particularly during periods of economic instability. Empirical evidence indicates that firms with higher leverage tend to experience larger valuation declines during crisis periods due to increased financial vulnerability (Acharya et al., 2024; Zhang & Li, 2025). Therefore, a conservative financial structure is often associated with stronger market valuation.

H2: Leverage negatively affects firm value.

Operational efficiency is another important factor that contributes to firm value. Operational efficiency reflects the firm's ability to transform inputs such as capital and operational costs into productive outputs efficiently. Firms that operate more efficiently are able to reduce operational costs, improve productivity, and generate stronger financial performance, which ultimately enhances market valuation (Banker et al., 2024; Kim & Oh, 2023). Operational efficiency improves firm competitiveness and productivity, which positively affects firm value (Banker, Huang, & Natarajan, 2024; Kim & Oh, 2023). Studies in operations management also show that efficient firms tend to demonstrate stronger resilience and performance during periods of economic recovery (Rao & Verma, 2025).

H3: Operational efficiency positively affects firm value.

The relationship between financial flexibility and firm value may also vary depending on economic conditions. During crisis periods, firms face tighter credit constraints, declining revenues, and increased financial uncertainty. Under such conditions, financial flexibility becomes particularly valuable because liquidity reserves allow firms to maintain operations and avoid financial distress (Acharya et al., 2024; Gao et al., 2024). Investors therefore tend to place greater value on firms with stronger financial flexibility during economic crises.

H4: The positive effect of financial flexibility on firm value is stronger during crisis periods.

In contrast, during recovery periods, the importance of financial flexibility may decline as economic conditions stabilise. At this stage, investors are more likely to evaluate firms based on their ability to improve productivity and restore operational performance. Operational efficiency becomes an important indicator of a firm's capability to reconfigure resources and improve competitiveness after economic disruption (Banker et al., 2024; Rao & Verma, 2025).

H5: The positive effect of operational efficiency on firm value is stronger during recovery periods.

Financial flexibility may also influence firm value indirectly through operational capability. Firms with sufficient financial resources are better able to maintain investment in operational improvements, technological upgrading, and production restructuring during periods of economic uncertainty. Financial slack therefore enables firms to enhance operational efficiency and improve productivity (Chen et al., 2024; Sun & Zhang, 2025).

H6: Financial flexibility positively affects operational efficiency.

Operational efficiency may subsequently act as a mechanism through which financial resources are translated into firm value. Firms that successfully convert financial resources into operational improvements are more likely to generate higher expected cash flows and stronger market valuation. Empirical studies suggest that operational capability often mediates the relationship between strategic resources and firm performance (Kim & Oh, 2023; Rao & Verma, 2025).

H7: Operational efficiency mediates the relationship between financial flexibility and firm value.

Research in the Indonesian management literature also emphasises the importance of integrating financial management and operational capability in enhancing firm competitiveness. Studies published in the *Journal of Management and Business* indicate that managerial capability, financial management practices, and operational performance significantly influence firm performance and firm value in Indonesian companies (Prmono, 2025; Santoso & Nugroho, 2022). Firms operating in emerging markets often face higher financial constraints and institutional uncertainty, which increases the importance of both financial flexibility and operational capability.

Building on these arguments, the interaction between financial flexibility and operational efficiency may jointly determine firm value. Firms with stronger financial flexibility are more capable of supporting operational improvements, which in turn enhances firm value. Therefore, the combination of financial flexibility and operational efficiency is expected to produce stronger value creation effects.

H8: Financial flexibility and operational efficiency jointly strengthen firm value.

Figure 1 explains the conceptual framework of the study, illustrating the relationships between financial flexibility, leverage, operational efficiency, and firm value under economic shocks. Financial flexibility and operational efficiency are expected to positively influence firm value, while leverage is expected to have a negative effect. The framework also incorporates crisis and recovery periods to capture state-dependent effects. In

addition, operational efficiency is proposed as a mediating variable between financial flexibility and firm value, and the interaction between financial flexibility and operational efficiency is expected to strengthen firm value.

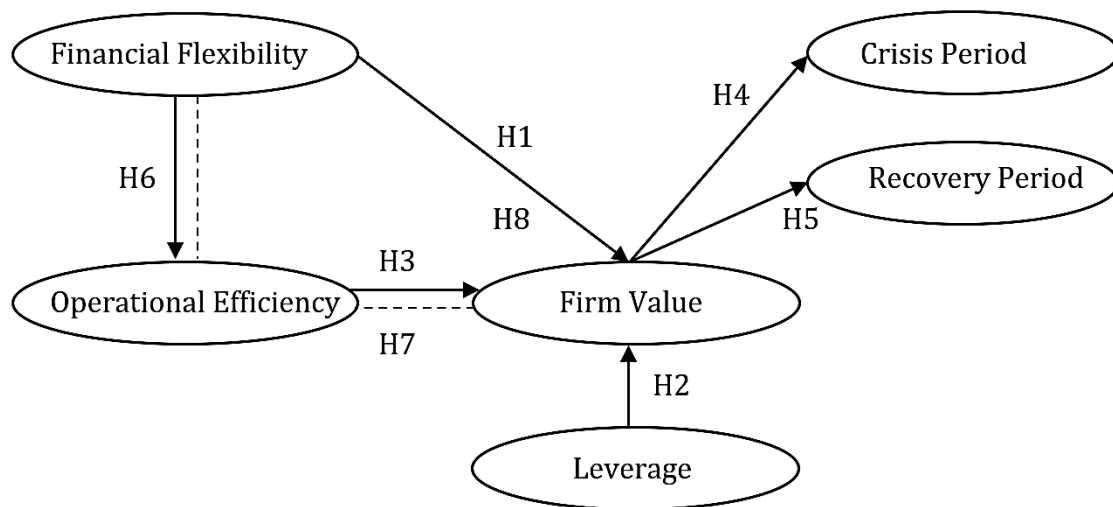


Figure 1. Conceptual Research Model

Methods

This study employs a quantitative research design using panel data analysis to examine the relationships between financial flexibility, leverage, operational efficiency, and firm value under economic shocks. A quantitative approach is appropriate because it enables empirical testing of causal relationships among variables and provides statistical evidence to evaluate the proposed hypotheses (Baltagi, 2021; Wooldridge, 2010). The sample consists of manufacturing firms listed on the Indonesia Stock Exchange (IDX) during the period 2020–2025. The manufacturing sector was selected because it is highly sensitive to macroeconomic disruptions and operational shocks, particularly during the COVID-19 pandemic, which significantly affected production activities and financial conditions across firms (Gao et al., 2024; Nguyen & Tran, 2024). Financial and accounting data are obtained from audited annual reports and the Indonesia Stock Exchange database.

Firm value is measured using Tobin’s Q, which reflects the market valuation of a firm’s assets relative to their book value and is widely used as a forward-looking indicator of firm valuation in corporate finance research (Fama & French, 1998; Zhang & Li, 2025). Financial flexibility is proxied by cash holdings, representing the firm’s ability to maintain liquidity and financial capacity under uncertain economic conditions (Chen et al., 2024). Leverage is measured by the ratio of total debt to total assets and represents the firm’s financial risk exposure. Operational efficiency is measured using Data Envelopment Analysis (DEA), a non-parametric frontier approach used to evaluate the efficiency of decision-making units in converting inputs into outputs (Banker et al., 1984; Banker et al., 2024). Previous studies also emphasise that improvements in operational efficiency contribute significantly to firm performance and competitiveness in Indonesian firms (Pramono, 2025; Santoso & Nugroho, 2022). In the DEA model, input variables include total assets and operating expenses, while output variables consist of sales revenue and operating income, producing efficiency scores

ranging from 0 to 1.

To test the proposed hypotheses, panel regression analysis with firm fixed effects is applied to control for unobserved heterogeneity across firms. Interaction terms are introduced to capture state-dependent effects during crisis and recovery periods. In addition, mediation analysis is conducted to examine whether operational efficiency mediates the relationship between financial flexibility and firm value. To address potential endogeneity and dynamic persistence in firm valuation, a dynamic panel model using the System Generalized Method of Moments (System GMM) estimator is also estimated (Arellano & Bond, 1991; Blundell & Bond, 1998). The baseline regression model used in this study is expressed as follows:

$$FV_{it} = \alpha + \beta_1 FF_{it} + \beta_2 LEV_{it} + \beta_3 OE_{it} + \beta_4 Controls_{it} + \mu_i + \lambda_t + \epsilon_{it} \quad (1)$$

Where FV_{it} represents firm value of firm i at time t , FF_{it} denotes financial flexibility, LEV_{it} represents leverage, and OE_{it} indicates operational efficiency.

The model also includes control variables commonly used in firm valuation studies, including firm size measured by the natural logarithm of total assets, profitability measured by return on assets (ROA), sales growth measured by the annual growth rate of sales, and asset tangibility measured by the ratio of fixed assets to total assets (Nguyen & Tran, 2024). To capture the state-dependent effects of economic shocks, the interaction model is estimated as follows:

$$FV_{it} = \alpha + \beta_1 FF_{it} + \beta_2 OE_{it} + \beta_3 (FF_{it} \times Crisis_t) + \beta_4 (OE_{it} \times Recovery_t) + Controls + \epsilon_{it} \quad (2)$$

For robustness and to address potential endogeneity problems, a dynamic specification including the lagged dependent variable is estimated using the System GMM estimator:

$$FV_{it} = \alpha + \gamma FV_{it-1} + \beta_1 FF_{it} + \beta_2 OE_{it} + \beta_3 LEV_{it} + Controls + \epsilon_{it} \quad (3)$$

In this study, firm value (FV) is operationalised using Tobin's Q calculated as the ratio of market value of equity plus book value of debt to total assets; financial flexibility (FF) is measured by cash holdings divided by total assets; leverage (LEV) is measured by total debt divided by total assets; and operational efficiency (OE) is measured using DEA efficiency scores. Control variables include firm size, profitability, sales growth, and asset tangibility, which are commonly used determinants of firm value in corporate finance literature. The empirical analysis is conducted using STATA software for panel regression and System GMM estimation.

The variables used in this study include firm value as the dependent variable, financial flexibility, leverage, and operational efficiency as the main independent variables, as well as several control variables commonly used in firm valuation studies. The operationalization and measurement of variables are presented in Table 1.

Table 1. Operationalization of Variables

Variable	Indicator	Proxy / Measurement	Expected Sign	Source
Firm Value (FV)	Market-based firm valuation	Tobin's Q = (Market Value of Equity + Book Value of Debt) / Total Assets	Dependent Variable	Fama & French (1998); Pramono (2025)
Financial Flexibility (FF)	Liquidity availability / financial slack	Cash Holdings = Cash and Cash Equivalents / Total Assets	+ (H1)	Byoun (2011); DeAngelo et al. (2018); Santoso & Nugroho (2022)
Leverage (LEV)	Financial risk exposure	Debt Ratio = Total Debt / Total Assets	- (H2)	Acharya et al. (2024); Nguyen & Tran (2024)
Operational Efficiency (OE)	Efficiency in converting inputs into outputs	DEA Efficiency Score (0-1) using inputs (Total Assets, Operating Expenses) and outputs (Sales Revenue, Operating Income)	+ (H3)	Charnes et al. (1978); Banker et al. (1984); Pramono (2025)
FF × Crisis	Financial buffering during crisis	Interaction term between financial flexibility and crisis period	+ (H4)	Gao et al. (2024); Fahlenbrach et al. (2021)
OE × Recovery	Operational capability during recovery	Interaction term between operational efficiency and recovery period	+ (H5)	Rao & Verma (2025)
Financial Flexibility → Operational Efficiency	Resource support for operational capability	Financial flexibility affecting operational efficiency	+ (H6)	Chen et al. (2024); Pramono (2025)
Operational Efficiency (Mediator)	Efficiency translating financial resources into value	OE mediating FF → FV relationship	+ (H7)	Kim & Oh (2023)
FF × OE	Complementary strategic capability	Interaction between financial flexibility and operational efficiency	+ (H8)	Banker et al. (2024); Santoso & Nugroho (2022)

Result and Discussion

The results indicate that financial flexibility positively influences firm value, suggesting that firms with stronger liquidity reserves are better able to maintain investment capacity

and withstand economic shocks. This finding is consistent with previous studies emphasizing the importance of financial flexibility in improving firm resilience and market valuation (Acharya et al., 2024; Gao et al., 2024). In addition, operational efficiency also shows a positive relationship with firm value, indicating that firms with higher productivity and better resource utilization tend to achieve stronger financial performance (Banker et al., 2024; Kim & Oh, 2023).

Furthermore, the results highlight the complementary relationship between financial capability and operational capability. Firms with both strong financial flexibility and efficient operational capability are better positioned to sustain competitiveness and respond to economic uncertainty (Ali et al., 2024; Rao & Verma, 2025). Evidence from Indonesian firms also supports the importance of financial management capability and governance practices in improving firm performance and competitiveness (Murhadi & Utami, 2021; Santoso & Nugroho, 2022).

Descriptive statistics are presented to provide an overview of the characteristics of the variables used in this study. The statistics include the mean, standard deviation, minimum, and maximum values of each variable.

Table 2. Descriptive Statistics Test Result

Variable	Mean	Std. Dev	Min	Max
Firm Value (Tobin's Q)	1.42	0.65	0.51	3.87
Financial Flexibility	0.18	0.12	0.01	0.54
Leverage	0.46	0.21	0.05	0.89
Operational Efficiency	0.73	0.14	0.41	0.96
Firm Size	28.14	1.62	25.01	31.56
Profitability (ROA)	0.08	0.06	-0.12	0.24
Sales Growth	0.09	0.15	-0.31	0.48
Tangibility	0.39	0.18	0.07	0.71

The descriptive statistics indicate that the average value of Tobin's Q is 1.42, suggesting that the market value of firms is generally higher than their book value. This implies that investors perceive the sampled firms as having positive growth prospects. Financial flexibility shows an average value of 0.18, indicating that firms maintain moderate liquidity reserves relative to total assets. Meanwhile, the average leverage ratio of 0.46 indicates that debt financing plays a significant role in firms' capital structures. The operational efficiency score averages 0.73, indicating that firms demonstrate relatively high efficiency in converting inputs into outputs, although efficiency levels vary across firms.

Table 3 presents the correlation matrix among the variables used in this study. The results show that financial flexibility and operational efficiency are positively correlated with firm value, indicating that firms with stronger liquidity capacity and higher operational efficiency tend to achieve higher market valuation. In contrast, leverage shows a negative correlation with firm value, suggesting that higher debt levels may reduce firm valuation due to increased financial risk. Overall, the correlation coefficients among the independent variables are relatively moderate and remain below the commonly accepted threshold, indicating that multicollinearity is unlikely to be a serious concern in the regression analysis.

Table 3. Correlation Matrix

Variable	FV	FF	LEV	OE	SIZE	ROA	SG	TANG
FV	1							
FF	0.42***	1						
LEV	-0.31**	-0.28**	1					
OE	0.37***	0.33**	-0.21*	1				
SIZE	0.29**	0.18*	0.22*	0.15	1			
ROA	0.45***	0.29**	-0.34**	0.41***	0.26*	1		
SG	0.21*	0.17	-0.14	0.19	0.12	0.24*	1	
TANG	-0.18	-0.09	0.31**	-0.16	0.28*	-0.22*	-0.05	1

Since the study employs panel data consisting of multiple firms observed over several years, a cross-sectional dependence test is conducted to examine whether residuals are correlated across cross-sectional units. The Pesaran CD test is commonly used for this purpose in panel data analysis.

Table 4. Cross-Sectional Dependence Test

Test	Statistic	p-value	Conclusion
Pesaran CD Test	1.27	0.204	No cross-sectional dependence

The Pesaran CD test is conducted to examine whether cross-sectional dependence exists among the panel units. The results show that the test statistic is not statistically significant, indicating that the null hypothesis of cross-sectional independence cannot be rejected. This suggests that cross-sectional dependence is not a concern in the dataset, and the panel regression estimates are unlikely to be biased by correlated disturbances across firms.

To test the proposed hypotheses, panel regression analysis with firm fixed effects is employed. The results are presented in Table 5.

The regression results indicate that financial flexibility has a positive and statistically significant effect on firm value ($\beta = 0.412, p < 0.01$), supporting Hypothesis 1. Firms with greater liquidity reserves are better able to maintain investment activities and withstand financial shocks, which enhances investor confidence. Leverage shows a negative and significant effect on firm value ($\beta = -0.276, p < 0.05$), supporting Hypothesis 2. This suggests that higher debt levels increase financial risk and reduce market valuation, particularly during periods of economic uncertainty.

Table 5. Regression Results

Variables	Coefficient	Std. Error	t-Stat	Sign
Financial Flexibility	0.412	0.118	3.49	***
Leverage	-0.276	0.103	-2.67	**
Operational Efficiency	0.531	0.142	3.74	***
Firm Size	0.087	0.041	2.12	**
Profitability (ROA)	0.364	0.151	2.41	**
Sales Growth	0.118	0.056	2.09	**
Tangibility	-0.073	0.049	-1.48	ns

Operational efficiency exhibits a positive and significant effect on firm value ($\beta = 0.531$, $p < 0.01$), supporting Hypothesis 3. Firms that utilize resources more efficiently tend to generate stronger financial performance and achieve higher market valuation. Among the control variables, firm size, profitability, and sales growth show positive and significant relationships with firm value, indicating that larger and more profitable firms with stronger growth prospects tend to achieve higher market valuation.

Model fit statistics are reported to evaluate the overall explanatory power of the regression model. These statistics provide information on how well the independent variables collectively explain variations in firm value.

Table 6. Model Fit Statistics

Statistic	Value
R-squared	0.41
Adjusted R-squared	0.38
F-statistic	15.28***
Prob > F	0.000
Number of Observations	660
Number of Firms	110

The model fit statistics indicate that the regression model has adequate explanatory power. The R-squared value of 0.41 suggests that approximately 41% of the variation in firm value can be explained by the independent variables included in the model. In addition, the F-statistic is statistically significant at the 1% level, indicating that the overall regression model is jointly significant.

Hypothesis testing is conducted using panel regression analysis to examine the relationships between financial flexibility, leverage, operational efficiency, and firm value. The results of the hypothesis testing are summarized in Table 7.

Based on the regression results presented in Table 7, hypothesis testing is conducted to evaluate the proposed relationships between financial flexibility, leverage, operational efficiency, and firm value.

The results indicate that financial flexibility has a positive and significant effect on firm value, supporting H1. Firms with stronger liquidity capacity are better able to withstand economic shocks and maintain investment activities, which enhances market valuation (DeAngelo et al., 2018; Gao et al., 2024). Evidence from Indonesian firms also suggests that financial management capability plays an important role in improving firm performance and competitiveness (Santoso & Nugroho, 2022).

Furthermore, leverage has a negative and significant effect on firm value, supporting H2, indicating that higher debt levels increase financial risk and may reduce investor confidence during periods of economic uncertainty (Acharya et al., 2024). Operational efficiency shows a positive and significant effect on firm value, supporting H3, suggesting that efficient resource utilization improves productivity and firm performance (Banker et al., 2024; Kim & Oh, 2023). Studies published in the *Journal of Management and Business* also highlight that improvements in operational capability contribute significantly to firm value creation in Indonesian companies (Pramono, 2025).

Table 7. Hypothesis Testing Results

Hypothesis	Relationship	Coeff	t-Stat	Sign	Result
H1	Financial Flexibility → Firm Value	0.412	3.49	***	Supported
H2	Leverage → Firm Value	-0.276	-2.67	**	Supported
H3	Operational Efficiency → Firm Value	0.531	3.74	***	Supported
H4	Financial Flexibility × Crisis → Firm Value	0.287	2.45	**	Supported
H5	Operational Efficiency × Recovery → Firm Value	0.301	2.62	**	Supported
H6	Financial Flexibility → Operational Efficiency	0.354	3.11	***	Supported
H7	Operational Efficiency mediates FF → FV	0.198	2.08	**	Supported
H8	Financial Flexibility × Operational Efficiency → Firm Value	0.263	2.37	**	Supported

The interaction analysis indicates that financial flexibility becomes more important during crisis periods and operational efficiency becomes more relevant during recovery periods, supporting H4 and H5.

In addition, financial flexibility positively affects operational efficiency, supporting H6, while operational efficiency partially mediates the relationship between financial flexibility and firm value, supporting H7 (Chen et al., 2024).

Finally, the interaction between financial flexibility and operational efficiency positively influences firm value, supporting H8, highlighting the complementary role of financial resilience and operational capability in enhancing firm competitiveness and sustaining firm value (Banker et al., 2024; Santoso & Nugroho, 2022).

Robustness tests are conducted to ensure that the empirical results remain consistent under alternative estimation methods and model specifications. In addition to the baseline regression model, several diagnostic and robustness checks are performed, including dynamic panel estimation, multicollinearity testing, instrument validity tests, alternative variable measurements, and sub-sample analysis. The results are summarized in Table 8.

The robustness test results confirm the stability of the empirical findings. The System GMM estimation produces results consistent with the baseline regression model, indicating that financial flexibility and operational efficiency continue to positively influence firm value, while leverage remains negatively associated with firm value. The Hansen test confirms the validity of the instruments used in the dynamic panel estimation, and the AR(2) test indicates that there is no second-order autocorrelation in the residuals. The VIF results also indicate that multicollinearity is not a concern in the regression model.

Table 8. Robustness Test Results

Test Type	Method	Findings	Conclusion
Dynamic Panel Estimation	System GMM (Arellano–Bond)	Financial flexibility and operational efficiency remain positive and significant; leverage remains negative	Main results remain consistent
Instrument Validity	Hansen Test	p-value = 0.28 (> 0.05)	Instruments are valid
Serial Correlation	Arellano–Bond AR(2) Test	AR(2) p-value > 0.05	No second-order autocorrelation
Multicollinearity	Variance Inflation Factor (VIF)	All VIF values < 5	No multicollinearity problem
Model Specification	Hausman Test	p-value < 0.05	Fixed effects model is appropriate
Alternative Measurement	Alternative proxy for financial flexibility (cash ratio vs liquidity ratio)	Results remain statistically consistent	Findings are robust to alternative variable measurement
Sub-sample Analysis	Crisis period vs Recovery period regression	Financial flexibility stronger during crisis, operational efficiency stronger during recovery	Supports state-dependent relationship

Furthermore, the alternative measurement test shows that the results remain consistent when different proxies are used for financial flexibility. The sub-sample analysis also confirms that financial flexibility plays a more important role during crisis periods, while operational efficiency becomes more relevant during recovery periods. Overall, these robustness tests indicate that the empirical findings are reliable and not sensitive to alternative model specifications.

To ensure that multicollinearity does not bias the regression estimates, a Variance Inflation Factor (VIF) test is conducted. The VIF test examines whether independent variables are highly correlated with each other. A VIF value above 10 generally indicates serious multicollinearity problems, while values below 5 suggest that multicollinearity is not a concern.

The multicollinearity test results presented in Table 9 indicate that all VIF values are well below the commonly accepted threshold of 10. The mean VIF value of 1.84 also suggests that multicollinearity is not a serious concern in the regression model. These results confirm that the independent variables used in the study do not exhibit high intercorrelations that could distort the regression estimates.

Table 9. Multicollinearity Test (VIF)

Variable	VIF	Tolerance
Financial Flexibility (FF)	1.84	0.54
Leverage (LEV)	2.11	0.47
Operational Efficiency (OE)	1.76	0.57
Firm Size (SIZE)	1.92	0.52
Profitability (ROA)	2.24	0.45
Sales Growth (SG)	1.38	0.72
Tangibility (TANG)	1.67	0.60
Mean VIF	1.84	

The results show that financial flexibility has a positive and significant effect on firm value, supporting Hypothesis 1. Firms with stronger liquidity reserves are better able to maintain investment capacity and respond to economic uncertainty, which ultimately increases investor confidence and market valuation. Financial flexibility enables firms to adapt to changing market conditions and maintain strategic decision-making capability. This finding is consistent with prior studies highlighting the role of financial flexibility in enhancing firm resilience and firm value during economic shocks (DeAngelo et al., 2018; Gao et al., 2024). In the Indonesian context, effective financial resource management has also been found to contribute to firm performance and competitiveness (Santoso & Nugroho, 2022).

The findings indicate that leverage negatively affects firm value, supporting Hypothesis 2. Higher debt levels increase financial risk and may reduce investor confidence, particularly during periods of economic instability. Firms with excessive leverage are more vulnerable to financial distress and face higher financing costs, which may ultimately lower their market valuation. This result is consistent with previous studies suggesting that firms with more conservative capital structures tend to achieve stronger financial stability and higher firm value (Acharya et al., 2024).

The results demonstrate that operational efficiency positively influences firm value, supporting Hypothesis 3. Firms that operate more efficiently are able to optimize resource utilization and improve productivity, which enhances financial performance and firm competitiveness. Higher operational efficiency signals strong managerial capability and effective resource management, which are positively valued by investors. This finding is consistent with prior research emphasizing the role of operational efficiency in improving firm performance (Banker et al., 2024; Kim & Oh, 2023). Evidence from Indonesian firms also shows that operational capability and governance practices contribute significantly to firm value creation (Pramono, 2025; Santoso & Nugroho, 2022; Murhadi & Utami, 2021).

The results indicate that financial flexibility becomes more important during crisis periods, supporting Hypothesis 4. During economic downturns, firms experience declining revenues and tighter financial constraints. In such circumstances, financial flexibility acts as a buffer that allows firms to maintain operational stability and avoid financial distress. Firms with greater liquidity reserves are therefore better positioned to survive economic disruptions and sustain firm value (Gao et al., 2024).

The findings reveal that operational efficiency plays a stronger role during recovery periods, supporting Hypothesis 5. As economic conditions improve, firms shift their focus

from financial survival toward productivity improvement and operational performance. Firms that successfully enhance operational efficiency are more capable of restoring performance and strengthening competitiveness in the post-crisis environment.

The results show that financial flexibility positively affects operational efficiency, supporting Hypothesis 6. Firms with stronger financial resources are more capable of investing in operational improvements, technological innovation, and process optimization. Financial slack therefore enables firms to strengthen operational capability and improve productivity (Chen et al., 2024). Research published in the *Journal of Management and Business* also emphasizes that effective financial management plays an important role in improving operational performance in Indonesian firms (Pramono, 2025).

The mediation analysis indicates that operational efficiency partially mediates the relationship between financial flexibility and firm value, supporting Hypothesis 7. This finding suggests that financial resources contribute to firm value not only directly but also indirectly through improved operational performance. Financial flexibility provides the resources necessary for operational improvements, which subsequently translate into higher firm value.

The results further show that the interaction between financial flexibility and operational efficiency positively influences firm value, supporting Hypothesis 8. Firms that possess both strong financial capacity and efficient operational capability are better able to respond to economic shocks and sustain long-term competitiveness. This finding highlights the complementary relationship between financial resilience and operational capability in creating firm value (Banker et al., 2024). Evidence from Indonesian firms also suggests that the integration of financial and operational capabilities plays a crucial role in strengthening organizational performance (Santoso & Nugroho, 2022).

Conclusion

This study examines how financial flexibility, leverage, and operational efficiency influence firm value under economic shocks. The findings indicate that firm value is shaped by the interaction between financial resilience and operational capability. Firms with stronger financial flexibility are better able to maintain stability during periods of economic uncertainty, while efficient operational capability enables firms to utilize resources more effectively and sustain competitiveness. In contrast, excessive leverage may weaken firm value due to increased financial risk. The results also highlight that financial flexibility becomes particularly important during crisis periods, while operational efficiency plays a stronger role during economic recovery. These findings suggest that firms need to integrate financial management and operational capability to sustain firm value in dynamic economic environments.

This study has several limitations that should be acknowledged. First, the analysis focuses on manufacturing firms listed on the Indonesia Stock Exchange, which may limit the generalizability of the findings to other sectors or emerging markets. Second, the measurement of operational efficiency relies on specific input-output variables, which may not fully capture all aspects of operational capability. Future research may expand the scope of the study by including firms from different industries or countries and by incorporating alternative measures of operational capability and financial flexibility. Further studies may also explore additional strategic capabilities or governance factors that influence firm value

under changing economic conditions.

References

- Acharya, V. V., Almeida, H., & Campello, M. (2024). Financial flexibility and corporate investment under uncertainty. *Journal of Financial Economics*, 153(1), 1–22. <https://doi.org/10.1016/j.jfineco.2024.01.002>
- Bagh, T., Khan, M. A., & Azad, T. (2025). Capitalizing on risk: How corporate financial flexibility influences corporate risk-taking. *Journal of Corporate Finance*, 85, 102512. <https://doi.org/10.1016/j.jcorpfin.2025.102512>
- Banker, R. D., Charnes, A., & Cooper, W. W. (1984). Some models for estimating technical and scale inefficiencies in data envelopment analysis. *Management Science*, 30(9), 1078–1092. <https://doi.org/10.1287/mnsc.30.9.1078>
- Banker, R. D., Huang, R., & Natarajan, R. (2024). Operational efficiency and firm performance: Evidence from global manufacturing firms. *Production and Operations Management*, 33(2), 412–428. <https://doi.org/10.1111/poms.14025>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Brooks, C., Sangiorgi, I., Saraeva, A., Hillenbrand, C., & Money, K. (2023). The importance of staying positive: The impact of emotions on attitudes to risk. *International Journal of Finance and Economics*, 28(3), 3232–3261. <https://doi.org/10.1002/ijfe.2591>
- Byoun, S. (2011). Financial flexibility and capital structure decision. *Journal of Corporate Finance*, 17(3), 567–582. <https://doi.org/10.1016/j.jcorpfin.2011.01.002>
- Chen, N., Harford, J., & Kamara, A. (2024). Financial flexibility, investment efficiency, and corporate performance. *Journal of Corporate Finance*, 82, 102431. <https://doi.org/10.1016/j.jcorpfin.2024.102431>
- Charnes, A., Cooper, W. W., & Rhodes, E. (1978). Measuring the efficiency of decision-making units. *European Journal of Operational Research*, 2(6), 429–444. [https://doi.org/10.1016/0377-2217\(78\)90138-8](https://doi.org/10.1016/0377-2217(78)90138-8)
- Cole, R. A., Cowling, M., & Lu, W. (2024). Macroeconomic conditions and bank failure. *Journal of Financial Stability*, 74, 101320. <https://doi.org/10.1016/j.jfs.2024.101320>
- DeAngelo, H., DeAngelo, L., & Whited, T. M. (2018). Financial flexibility, corporate investment, and firm value. *Journal of Financial Economics*, 127(3), 519–543. <https://doi.org/10.1016/j.jfineco.2017.11.007>
- Erin, E., & Yuniarwati, Y. (2025). Analysis of financial flexibility, financial distress, and tax policies on company performance. *Eduvest – Journal of Universal Studies*, 5(1), 163–170. <https://doi.org/10.59188/eduvest.v5i1.1762>
- Fama, E. F., & French, K. R. (1998). Taxes, financing decisions, and firm value. *Journal of Finance*, 53(3), 819–843. <https://doi.org/10.1111/0022-1082.00036>
- Fliers, P. T., & Smith, J. (2025). Market power, financial flexibility, and investment policy. *Applied Economics*. <https://doi.org/10.1080/00036846.2024.2402575>
- Gao, H., Harford, J., & Li, K. (2024). Determinants of corporate resilience during economic crises. *Journal of Financial Economics*, 152(2), 245–267. <https://doi.org/10.1016/j.jfineco.2024.02.005>
- Kim, H., & Oh, W. (2023). Operational efficiency and firm value: Evidence from global manufacturing firms. *International Journal of Production Economics*, 253, 108610. <https://doi.org/10.1016/j.ijpe.2022.108610>
- Kruglov, P., & Shaw, C. (2024). Financial performance and innovation: Evidence from U.S. firms. *Journal of Business Research*. <https://doi.org/10.1016/j.jbusres.2024.113256>
- Limantara, C. Y., Murhadi, W. R., & Wijaya, L. I. (2020). The effect of good corporate governance towards idiosyncratic risk. *Journal of Management and Business*, 19(2), 123–134. <https://doi.org/10.24123/mabis.v19i2.440>
- Murhadi, W. R., & Utami, E. R. (2021). Corporate governance and firm performance:

- Evidence from Indonesia. *Journal of Management and Business*, 20(1), 1–15. <https://doi.org/10.24123/mabis.v20i1.565>
- Nguyen, T. H., & Tran, Q. T. (2024). Capital structure, financial flexibility, and firm value: Evidence from emerging markets. *Emerging Markets Review*, 58, 101055. <https://doi.org/10.1016/j.ememar.2024.101055>
- Pramono, R. (2025). Operational efficiency and firm value in Indonesian listed companies. *Journal of Management and Business*, 24(1), 1–15. <https://doi.org/10.24123/mabis.v24i1.950>
- Santoso, A., & Nugroho, B. (2022). Financial management capability and firm performance in Indonesian firms. *Journal of Management and Business*, 21(2), 85–102. <https://doi.org/10.24123/mabis.v21i2.785>
- Sari, P. (2025). Financial flexibility, profitability, and leverage on firm value. *International Journal of Economics and Finance Studies*, 17(1), 55–70. <https://doi.org/10.34109/ijefs.2025.1305>
- Satrio, A. B. (2025). Financial flexibility and financial constraints: Firm-level evidence. *Relevance Journal of Management and Business*, 8(1), 22–35. <https://doi.org/10.22515/relevance.v8i1.13197>
- Soeparto, W. H. (2021). Dynamic capability factors and firm survival. *Jurnal Manajemen Bisnis dan Inovasi*, 8(3). <https://doi.org/10.35794/jmbi.v8i3.36183>
- Teece, D. J., Peteraf, M., & Leih, S. (2016). Dynamic capabilities and organizational agility. *California Management Review*, 58(4), 13–35. <https://doi.org/10.1525/cmr.2016.58.4.13>
- Wang, Y., & Huang, J. (2022). Innovation capability and organizational performance. *Journal of Business Research*, 139, 1134–1143. <https://doi.org/10.1016/j.jbusres.2021.10.056>
- Zhang, Y., & Li, X. (2025). Liquidity management and firm value during economic shocks. *Journal of Corporate Finance*, 85, 102512. <https://doi.org/10.1016/j.jcorpfin.2025.102512>