**Reviu Akuntansi, Manajemen, dan Bisnis (RAMBIS)**
*ISSN: 2797-958X, Vol 5, No 4, 2026, 17-35* https://doi.org/10.35912/rambis.v5i4.6278

# Determinants of Stock Price Volatility: The Role of Sustainability Disclosure in Manufacturing Firms

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**Article History**
Received on 05 February 2026
1st Revision 12 February 2026
2nd Revision 01 March 2026
3rd Revision 16 March 2026
Accepted on 02 April 2026

**Abstract**
**Purpose:** This study investigates whether earnings volatility, dividend policy, and asset growth affect stock price volatility in Indonesian manufacturing firms and examines the moderating role of sustainability disclosures.
**Research Methodology:** Using secondary data from the annual and sustainability reports of manufacturing firms listed on the Indonesia Stock Exchange (IDX) for the period 2020–2024, the sample was selected through purposive sampling, resulting in 35 firms (175 firm-year observations). Panel data regression with interaction terms was employed, and model selection tests indicated that the random effects model was the most appropriate.
**Results:** The findings show that earnings volatility and asset growth significantly influence stock price volatility, whereas dividend policy does not have a significant effect. Sustainability disclosure significantly moderates the relationships between earnings volatility and stock price volatility, as well as between asset growth and stock price volatility; however, it does not moderate the dividend policy volatility relationship.
**Conclusions:** Stock price volatility is driven by firm fundamentals and is conditional on a firm's sustainability transparency.
**Limitations:** This study focuses on manufacturing firms in a single emerging market and measures sustainability disclosure using an index approach that captures the extensiveness rather than the disclosure quality.
**Contributions:** This study enriches capital market research by integrating financial and sustainability information to explain volatility formation.

**Keywords:** *Asset Growth, Dividend Policy, Earnings Volatility, Stock Price Volatility, Sustainability Disclosure*

**How to Cite:** Hapsari, D. P., Kurnia, D. (2026). Determinants of Stock Price Volatility: The Role of Sustainability Disclosure in Manufacturing Firms. *Reviu Akuntansi, Manajemen, dan Bisnis,* 5(4) 17-35.

## 1. Introduction

This study offers novelty by developing a conditional framework for stock price volatility that integrates firm fundamentals and sustainability transparency within an emerging market context. Unlike prior research that primarily examines earnings volatility, dividend policy, and asset growth as direct predictors of market risk, this study positions sustainability disclosure as a moderating mechanism that explains why the impact of fundamental variables on stock price volatility varies across firms (Xu, Chen, Zhou, Dong, & He, 2023). By empirically testing interaction effects in Indonesian manufacturing firms listed on the Indonesia Stock Exchange (IDX), this study demonstrates that volatility formation is not solely driven by accounting-based performance indicators but is contingent upon the firm's sustainability transparency, which shapes investor interpretation and risk perception. This integrative approach advances capital market literature by linking financial fundamentals and non-financial disclosures to explain how volatility emerges in an emerging market setting.

Capital markets play a pivotal role in the economic system by reflecting investors' perceptions, expectations, and confidence in corporate performance and broader macroeconomic conditions. Movements in market indices and stock prices are frequently employed as key indicators of economic health, given the high sensitivity of capital markets to new information arising from both firm-specific fundamentals and external shocks, including macroeconomic developments, policy interventions, and increased global uncertainty (Bimenyimana, Dong, & Jallow, 2025; Mazumder, Shourov, Rasul, Akter, & Miah, 2025). In particular, abrupt and substantial declines in stock prices may function as early warning signals of emerging financial stress, as they often coincide with elevated risk perceptions, intensified information uncertainty, and shifts in investor sentiment, which can ultimately undermine financial market stability (Hemakom et al., 2016; Soltani et al., 2021).

In this context, stock price volatility constitutes a critical issue, as it captures the magnitude of stock price fluctuations over a given period and reflects market uncertainty regarding a firm's intrinsic value (Baltussen, Van Bekkum, & Van Der Grient, 2014). Elevated volatility indicates that stock prices are more sensitive to information updates, thereby signaling greater investor uncertainty in assessing corporate risks and future prospects (Escobari & Jafarinejad, 2018). For investors, stock price volatility is closely associated with market risk and directly influences investment strategies and portfolio-allocation decisions (Escobari & Jafarinejad, 2018). From the corporate perspective, excessive volatility may reduce a firm's attractiveness in the capital market, increase its cost of capital, and ultimately erode firm value, as investors perceive greater instability in operational performance and business risks (Dessaint, Foucault, Frésard, & Matray, 2018). Accordingly, stock price volatility is not only relevant as a measure of investment risk, but also serves as an important indicator of market confidence in the sustainability of corporate performance.

In Indonesia, stock price instability remains a persistent issue, particularly in the capital-intensive manufacturing sector, which is highly sensitive to changes in production costs, demand fluctuations, and broader macroeconomic conditions. Manufacturing firms listed on the Indonesia Stock Exchange (IDX) span several major subsectors, including the basic and chemical industries, miscellaneous industries, and consumer goods, each exhibiting distinct operational risk profiles and competitive dynamics. During certain periods, especially under unstable economic conditions, many manufacturing firms have experienced performance pressures that translated into declining stock prices. Stock price declines observed across various manufacturing segments, such as cement, animal feed/poultry, pulp and paper, ceramics and porcelain, and chemical products, indicate that manufacturing stocks are relatively vulnerable to shifts in investor perception and market sentiment. This highlights the urgency of research examining the determinants of stock price volatility in manufacturing firms.

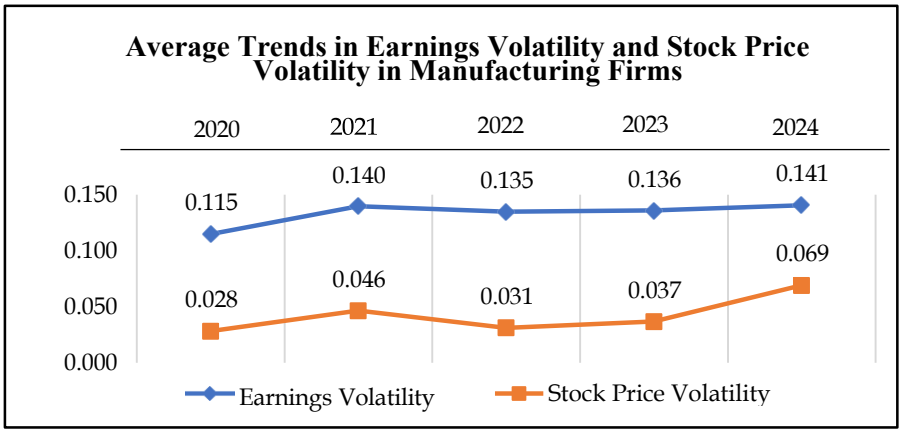


Figure 1. Average trends in earnings volatility and stock price volatility

Figure 1 presents the average trends in earnings and stock price volatility among manufacturing firms over the 2020–2024 period. Overall, the figure shows that both indicators fluctuate over time, suggesting that the manufacturing sector experiences varying degrees of earnings stability and market

risks. With respect to earnings volatility, the pattern indicates a relatively higher instability in the earlier part of the observation window. Earnings volatility peaked in 2020 (0.141), followed by a gradual decline in subsequent years, decreasing to 0.136 in 2021 and 0.135 in 2022. The downward trend continued in 2023, when earnings volatility fell to 0.115, and further declined to its lowest level in 2024 (0.100).

This suggests that, on average, manufacturing firms demonstrate improved earnings stability in the later years. In contrast, stock price volatility exhibits a different trajectory. Stock price volatility remained low in 2020–2022, recorded at 0.037 (2020), 0.031 (2021), and its lowest point in 2022 (0.028). However, volatility increased substantially thereafter, rising to 0.050 in 2023 and reaching its highest level in 2024 (0.069). This pattern indicates that although earnings volatility declined, market-based volatility increased in the later period, implying that stock price movements may have been driven more strongly by external shocks, investor sentiment, and broader market dynamics, rather than accounting earnings variability alone.

Theoretically, stock price volatility is understood as the market's response to information deemed relevant in firm valuation. Such information is not only driven by market conditions but also stems from firm-specific fundamentals reflected in financial statements and corporate strategies. Earnings volatility, which refers to the degree of instability in earnings over time, is one of the most influential fundamental indicators. High earnings volatility signals uncertainty in operating performance and future cash flow projections, thus conceptually increasing investors' perceived risk and triggering greater stock price volatility. A growing body of research supports a positive association between earnings volatility and stock price volatility, highlighting several underlying mechanisms, including declining earnings quality, greater valuation uncertainty, and more frequent revisions of investor expectations (Aditama & Suriawinata, 2024; Borochin, Cicon, DeLisle, & Price, 2018; Khasanah, Wijaya, & Sidik, 2025; C. Liu, Hu, Yao, & Li, 2025a; Mehmood, Ullah, & Sabeeh, 2019). These studies collectively support the argument that high earnings fluctuations signal uncertainty in operating performance, increase investors' perceived risk, and ultimately lead to greater volatility in stock prices.

However, other studies suggest that the effect of earnings volatility is not always significant, as it may depend on contextual factors such as the information environment, firm performance reputation, reporting quality, and broader institutional settings that shape investor reactions (Asiaei & Jusoh, 2017; Chairani & Siregar, 2021; Pelcher & Bolton, 2021; Sherif, El-Diftar, & Shahwan, 2024). The findings of this study reinforce that market mechanisms do not always respond to earnings volatility in a direct and uniform manner; rather, such responses are shaped by contextual characteristics such as industry type, the level of information transparency, and the macroeconomic conditions of the country in which the firm operates. This mixed evidence indicates that the relationship between earnings volatility and stock price volatility is conditional and may require further explanation through context-sensitive factors.

Beyond earnings volatility, dividend policy represents a key determinant of stock price dynamics, as dividends are often perceived as a credible signal of a firm's profitability prospects and financial stability (Chairunisa, 2024). Within the signaling theory framework, dividend decisions, particularly changes in dividend policy, convey management's private information and may trigger market reactions through revisions in investor expectations. Empirical studies suggest that dividend announcements and policy changes can influence stock price volatility by stimulating trading activity and widening differences in investor interpretations, especially in emerging markets where information asymmetry tends to be relatively high Click or tap here to enter text. Collectively, this literature confirms that, within the signaling theory framework, changes in dividend policy trigger market reactions through revisions of investor expectations, particularly in emerging markets, where dividends are perceived as a credible signal of future performance.

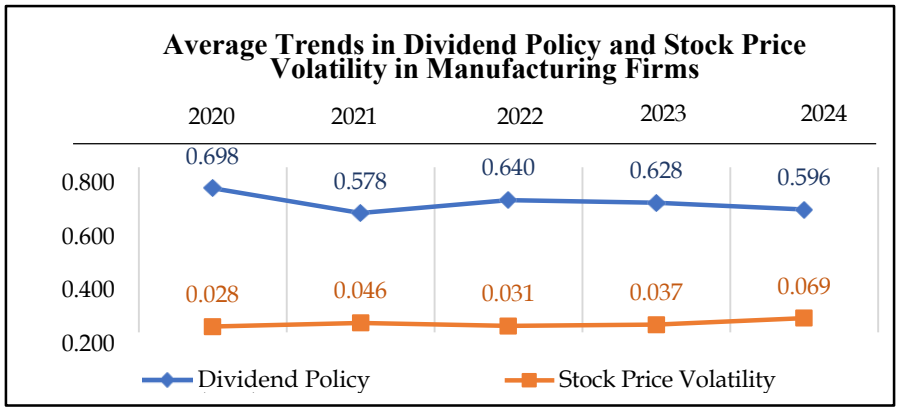


Figure 2. Average trends in dividend policy and stock price volatility

Figure 2 presents the average trends in dividend policy and stock price volatility among manufacturing firms over the period 2020–2024. Dividend policy increased from 0.596 (2020) to 0.640 (2022), declined to its lowest level in 2023 (0.578), and then rose sharply to its highest level in 2024 (0.698). Meanwhile, stock price volatility decreased to its lowest point in 2022 (0.028) but increased substantially thereafter, reaching its peak in 2024 (0.069). Overall, the figure suggests that despite the recovery in dividend payouts, market volatility continued to intensify, indicating that dividend policy alone may not be sufficient to stabilize stock price movements.

The determinants of stock price volatility also reflect firms' growth strategies, particularly their asset growth. In principle, asset growth signals expansion and enhances production capacity. However, when expansion is perceived as overinvestment or increases financial rise, especially if financed through high leverage without corresponding improvements in operating performance, it may amplify stock price volatility. However, empirical findings on this association remain mixed. Some studies have documented that aggressive asset growth increases volatility by elevating uncertainty regarding investment efficiency and project outcomes (Ardiansyah & Isbanah, 2017; Chauhan, Mishra, & Spahr, 2021).

In contrast, other evidence suggests that asset growth does not necessarily induce higher volatility when expansion is consistent, anticipated by the market, and effectively communicated to investors (Burcă et al., 2025). Recent research further indicates a non-linear relationship, whereby moderate asset growth is associated with relatively stable market responses, while expansion beyond a certain threshold increases volatility due to concerns over declining efficiency and overexpansion risk (Artikis, Diamantopoulou, Papanastasopoulos, & Sorros, 2022). Taken together, this mixed evidence suggests that firm fundamentals alone may not fully explain stock price volatility, highlighting the need to consider contextual factors that shape investor interpretation

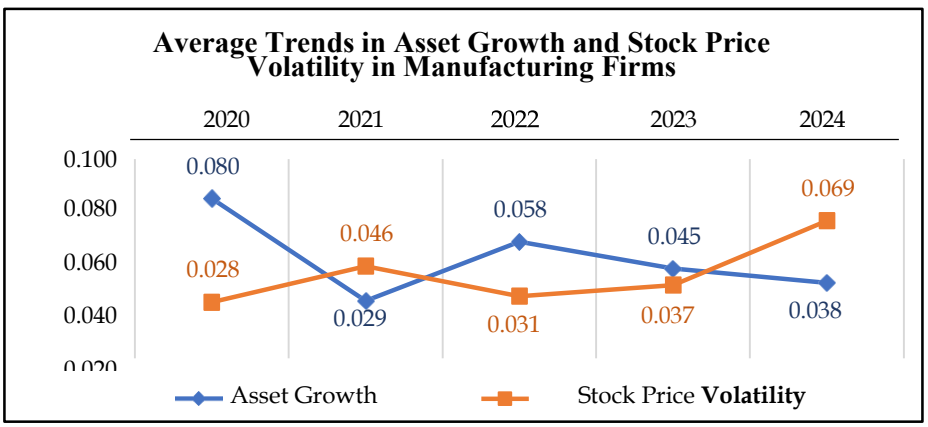


Figure 3. Average trends in asset growth and stock price volatility

Figure 3 presents the average trends in asset growth and stock price volatility among manufacturing firms over the period 2020–2024. Asset growth declines gradually from 0.038 (2020) to its lowest level in 2024 (0.028), indicating slower asset expansion in the later years. In contrast, stock price volatility decreased to 0.028 in 2022 but increased sharply thereafter, reaching its peak in 2024 (0.080). Overall, the diverging patterns suggest that stock price volatility in manufacturing firms may be driven not only by firm growth dynamics but also by broader market conditions and sentiments of investors.

The literature reveals a clear research gap, as empirical evidence on the effects of earnings volatility, dividend policy, and asset growth on stock-price volatility remains inconsistent. This mixed evidence suggests that market reactions to firm fundamentals are context-dependent and may be shaped by non-financial information, particularly sustainability disclosures. By enhancing transparency and legitimacy while reducing information asymmetry, sustainability disclosure is expected to moderate the link between firm fundamentals and stock price volatility by strengthening the credibility of information and mitigating investor uncertainty.

This study integrates fundamental and non-financial factors to explain stock price volatility in Indonesian manufacturing companies. The novelty of this research lies in examining sustainability disclosure as a moderating mechanism that helps explain why the effects of earnings volatility, dividend policy, and asset growth on stock price volatility may vary across firms. Unlike most prior studies that primarily treat fundamental variables as direct predictors of stock price volatility, this study emphasizes that market responses to firm fundamentals are conditional and shaped by the level of transparency and credibility of non-financial information disclosed by firms. Using sustainability disclosure as a proxy for transparency and sustainability commitment, this study contributes to the capital market literature by demonstrating how sustainability reporting may reduce information asymmetry and investor uncertainty, thereby potentially weakening or strengthening the sensitivity of stock prices to fundamental information.

Beyond its theoretical contribution, this study provides empirical evidence from manufacturing firms listed on the Indonesia Stock Exchange (IDX), a sector characterized by substantial operational risk exposure and sustainability-related challenges, and offers practical implications for managers in developing sustainability reporting strategies and for investors in evaluating stock-related risk. Accordingly, this study aims to analyze the effects of earnings volatility, dividend policy, and asset growth on stock price volatility and to test the moderating role of sustainability disclosure in Indonesian manufacturing firms listed on the IDX.

## 2. Literature Review

### *2.1 Signaling Theory and Market Reaction*

Signaling theory explains how managers communicate private information about a firm's conditions and future prospects to external investors, thereby reducing information asymmetry in the capital markets. Through corporate decisions and disclosures, such as financial reporting outcomes and dividend payout policies, managers send signals that investors interpret when assessing firm value and risk. Market reactions to these signals are reflected in stock price movements and, importantly, stock price volatility, which captures the degree of uncertainty and disagreement among investors.

Within this framework, earnings volatility, dividend policy, and asset growth are treated as fundamental signals that shape investors' perceptions of risk and, consequently, influence stock price volatility. High earnings volatility indicates instability in profitability and cash-flow expectations, thereby increasing valuation uncertainty and market volatility (Ilia D Dichev & Vicki Wei Tang, 2009; Do Nguyet, 2017; Y. Liu, Wu, Wang, & Zhang, 2025; Mottoh & Sutrisno, 2020). Dividend payout decisions provide relatively credible signals because they involve real cash commitments and can reduce uncertainty in emerging markets with higher information asymmetry (Al-Hiyari, Kolsi, Lutfi, & Shakkour, 2024; AlAli et al., 2024; Phan & Tran, 2019).

Asset growth signals expansion and future opportunities; however, aggressive growth may also be perceived as an overinvestment risk, potentially increasing volatility. Moreover, the signaling effects of

firm fundamentals are likely to be dependent on context. Sustainability disclosure can strengthen transparency and information credibility, reduce uncertainty, and shape investors' interpretations of fundamental signals. Accordingly, sustainability disclosure is expected to moderate the relationship between firm fundamentals and stock price volatility by mitigating information asymmetry and stabilizing market expectations (Albuquerque, Koskinen, Yang, & Zhang, 2020; Dhaliwal, Li, Tsang, & Yang, 2011; Gupta & Chaudhary, 2023; Patel, 2023; Santos & Coelho, 2018).

### *2.2 Information Asymmetry and Valuation Uncertainty*

Information asymmetry arises when managers possess superior information about firm fundamentals and risks compared to external investors. Under such conditions, investors face difficulties in estimating a firm's intrinsic value, resulting in valuation uncertainty, where market participants form heterogeneous expectations regarding future cash flows and performance. Higher valuation uncertainty typically increases investor disagreement and trading intensity, which ultimately translates into higher stock price volatility as prices adjust more frequently and sharply to new information. Firm fundamentals are expected to influence stock price volatility through the valuation uncertainty channel.

Earnings volatility increases uncertainty regarding profitability persistence and cash flow predictability, thereby amplifying price fluctuations (Dechow, Ge, & Schrand, 2010a; Lyle, 2025; Wang, Lee, & Wu, 2023). Likewise, asset growth may raise uncertainty when expansion is perceived as overinvestment or an inefficient capital allocation, particularly in capital-intensive industries. In contrast, a higher dividend payout ratio may reduce valuation uncertainty by signaling cash flow strength and mitigating information asymmetry, especially in emerging markets, where dividend signals are viewed as relatively credible. Importantly, the information environment also shapes investor uncertainty; therefore, enhanced sustainability disclosure is expected to improve transparency and information credibility, thereby moderating the effects of firm fundamentals on stock price volatility by stabilizing market expectations.

### *2.3 Legitimacy Theory and Sustainability Disclosure*

Legitimacy theory suggests that firms seek to align their activities with prevailing social norms, values, and stakeholder expectations to maintain organizational legitimacy and secure continued access to critical resources. In recent years, corporate legitimacy has been increasingly linked to sustainability-related practices, particularly in industries with higher environmental and social exposure. As a result, firms use sustainability disclosure to demonstrate accountability and responsible conduct, signaling that their operations are consistent with broader societal expectations (Afnan, Wijaya, Kartono, & Wibowo, 2024). Such legitimacy-building efforts can reduce reputational and regulatory risks, strengthen stakeholder trust, and improve the overall credibility of corporate communications (Deegan, 2019).

Within capital markets, sustainability disclosure serves an informational role by expanding transparency beyond financial statements and reducing uncertainty regarding long-term risk management. High-quality sustainability disclosure can mitigate information asymmetry by providing investors with relevant non-financial information on ESG risks, strategic orientation, and operational sustainability. Consequently, investors may perceive firms with stronger sustainability disclosures as less risky and more resilient, which can contribute to more stable stock price behavior. Recent evidence indicates that sustainability disclosure is associated with lower market risk and reduced stock price volatility, particularly in contexts where ESG information is increasingly incorporated into valuation and investment decisions (Utami, Setiany, Hidayah, & Azhar, 2024). Accordingly, sustainability disclosure is expected to function as a moderating mechanism that shapes how investors interpret firm fundamentals, such as earnings volatility, dividend payout, and asset growth, thereby influencing the magnitude of stock price volatility.

### *2.4 Stock Price Volatility*

Stock price volatility is widely recognized as a central indicator in investment analysis because it reflects the degree of price fluctuation of a security over a given period and serves as a direct proxy for the market risk. Volatility captures the magnitude of upward and downward movements in stock prices, representing uncertainty in market valuation and helping investors to assess the variability of future

investment returns (Bali, Engle, & Murray, 2016; Bekaert & Hoerova, 2016). When volatility is high, stock prices tend to fluctuate rapidly within a broad range between the peak and trough levels, making the price dynamics more irregular and difficult to forecast. Such conditions increase the likelihood of short-term gains and losses and consequently raise investment risk (Y. Liu et al., 2025). In contrast, lower volatility indicates relatively stable price behavior with smaller and less frequent fluctuations, implying greater predictability and reduced market risks. This study measures stock price volatility using the standard deviation of stock returns over the observation period. Stock returns are calculated as

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} \quad (1)$$

Where $R_{it}$ denotes the stock return of firm $i$ in period t, $P_{it}$ is the stock price in period t, and $P_{it-1}$ is the stock price in the previous period. Stock price volatility is then computed as the standard deviation of the returns:

$$SPV_{it} = \sigma(R_{it}) \quad (2)$$

A higher SPV indicates greater variability in returns and, therefore, higher stock market risk.

### *2.5 Earnings Volatility*

Earnings volatility refers to the degree of fluctuation in a firm's earnings over time and is widely used to evaluate profit generation stability and consistency. It reflects the extent to which earnings vary across periods relative to the firm's asset base, serving as an indicator of performance stability and earnings quality. A high level of earnings volatility signals unstable financial conditions and greater business risk, which investors may interpret as unfavorable information about firm performance and future cash flow prospects (Arianpoor & Esmailzadeh Asali, 2023; Brewer, Cominetti, & Jenkins, 2025). Consequently, firms with highly volatile earnings often experience lower investor confidence and increased pressure on stock prices. Conversely, low earnings volatility indicates more predictable and stable profitability, which can strengthen investor trust and support more favorable market valuations and risk perceptions. In this study, earnings volatility is measured using operating profit (EBIT) scaled by total assets, as EBIT better captures core operating performance and is less affected by external factors such as taxes and financing costs than net income. The operating profitability ratio is calculated as follows:

$$OP_{it} = \frac{EBIT_{it}}{Total\ Assets_{it}} \quad (3)$$

Earnings volatility is then computed as the standard deviation of OP over the observation period.

$$EV_i = \sigma(OP_{it}) \quad (4)$$

Where $EV_i$ represents earnings volatility for firm i, and σ denotes the standard deviation across the selected time window.

### *2.6 Dividend Policy*

Dividend policy refers to a firm's decision to distribute earnings to shareholders or retain them for reinvestment purposes. Dividends are widely viewed as a credible signal of profitability and financial stability; therefore, consistent or increasing dividend payments may strengthen investor confidence and enhance firm value (Thi, 2025; Wirama, Krisnadewi, Artini, & Ardiana, 2024). In this study, dividend policy is measured using the Dividend Payout Ratio (DPR), which reflects the proportion of net income paid out as dividends:

$$DPR_{it} = \frac{Dividend\ per\ Share_{it}}{Earnings\ per\ Share_{it}} \quad (5)$$

A higher DPR indicates a greater proportion of earnings distributed to shareholders, which may reduce investor uncertainty and support the stability of stock prices.

### *2.7 Asset Growth*

Asset growth represents the year-to-year change in a firm's total assets and reflects how effectively the company allocates and invests its resources to support its daily operations and strategic expansion. While rapid asset growth commonly signals business expansion and stronger competitive capacity, it often requires additional external funding, such as debt financing or equity issuance to sustain investment activities (Abdoh & Varela, 2021). From an investor's standpoint, higher asset growth is typically viewed as a favorable signal of future profitability and value creation, since firms with stronger growth prospects are generally expected to deliver higher long-term returns.
Asset growth is measured by the annual change in total assets.

$$AG_{it} = \frac{Total\ Assets_{it} - Total\ Assets_{it-1}}{Total\ Assets_{it-1}} \quad (6)$$

### *2.8 Sustainability Disclosure*

Sustainability disclosure reflects the extent to which a firm reports Environmental, Social, And Governance (ESG) information to enhance transparency and reduce information asymmetry in the capital market (Al Amosh & Khatib, 2021; Eng, Fikru, & Vichitsarawong, 2022; Tian, Cheng, Xue, Han, & Shan, 2023). In this study, sustainability disclosure is measured using a GRI-based Sustainability Disclosure Index (SDI) constructed through content analysis with dichotomous scoring (1 = disclosed; 0 = not disclosed). The index is calculated as follows:

$$SDI_{it} = \frac{\sum X_{it}}{n} \quad (7)$$

Where $SDI_{it}$ is the sustainability disclosure index of firm $i$ in year t, $\sum X_{it}$ represents the total number of items disclosed, and n is the total number of disclosure items assessed? A higher SDI indicates more extensive sustainability disclosure.

### *2.9 Hypothesis*

#### *2.9.1 Earnings Volatility and Stock Price Volatility*

Earnings volatility captures the extent to which a firm's profitability fluctuates over time, and therefore reflects the stability of its operating performance. When earnings become highly volatile, the predictive content of earnings declines, and investors face greater uncertainty in forming expectations about future cash flows. From an information and valuation perspective, earnings remain one of the most influential inputs in equity pricing; thus, unstable earnings increase valuation uncertainty and widen the gap in investors' beliefs about a firm's intrinsic value (dispersion of beliefs).

This environment encourages more frequent revisions of expectations and intensifies trading activity, leading to sharper and more irregular stock price adjustments (Cho, 2022; Fonou-Dombeu, Mbonigaba, Olarewaju, & Nomlala, 2022). Consistent with signaling theory, high earnings volatility is often interpreted as an unfavorable signal of elevated operating risk and weak earnings persistence, prompting stronger market reactions and higher volatility in stock prices. Prior empirical evidence largely supports this mechanism, documenting that firms with more volatile earnings tend to exhibit higher stock price volatility due to lower earnings quality and increased uncertainty in their market valuation (Rahmawati & Hadian, 2022).

*$H_1$:* Earnings volatility has a positive effect on stock price volatility

#### *2.9.2 Dividend Policy and Stock Price Volatility*

Dividend policy, particularly the Dividend Payout Ratio (DPR), represents a strategic managerial decision regarding how much of the current earnings are distributed to shareholders versus retained to

finance future growth. Within the signaling theory framework, dividends are widely considered credible signals because they involve an actual cash commitment and reflect management's confidence in the firm's current liquidity and future earning capacity (Thi, 2025; Wirama et al., 2024). Therefore, a higher DPR may reduce investor uncertainty by strengthening the perception that the firm generates stable cash flows and maintains sustainable profitability. In emerging markets, where information asymmetry tends to be relatively high, dividend payments can play an even more important role in shaping investor expectations, as investors may rely on dividend signals to evaluate firm quality and risk (Liviani & Rachman, 2021; Uche, Awa, Elom, & Okwu, 2025). By stabilizing expectations and reducing speculative trading motives, a higher DPR is expected to dampen stock price fluctuations and reduce stock price volatility. Consistent with this argument, prior studies suggest that dividend policies contribute to stock price stability by mitigating uncertainty and reinforcing investor confidence.

*$H_2$:* Dividend policy has a negative effect on stock price volatility

*2.9.3 Asset Growth and Stock Price Volatility*

Asset growth reflects a firm's expansion strategy and investment intensity, signaling its pursuit of future opportunities and its competitive capacity. However, from a market perspective, asset growth can have mixed interpretations. While moderate growth may be viewed positively as an indication of strategic progress, rapid or aggressive expansion may raise concerns regarding overinvestment, inefficient capital allocation, and increased financial pressure, particularly in capital-intensive sectors such as manufacturing. Such concerns heighten valuation uncertainty because investors may struggle to assess whether asset expansion translates into sustainable cash flows and improved performance. Consequently, asset growth may increase disagreement among investors and amplify trading responses, thereby strengthening stock price volatility. Empirical evidence supports this risk-based interpretation, suggesting that firms with aggressive asset growth tend to exhibit higher stock price volatility due to uncertainty about investment efficiency and long-term returns (Artikis et al., 2022; Handayani, Muharam, Mawardi, & Robiyanto, 2018; Mustoffa, Ulfah, & Wijianto, 2025; Song, 2016a).

*$H_3$:* Asset growth has a positive effect on stock price volatility

*2.9.4 Moderating Effect of Sustainability Disclosure*

Sustainability disclosure is expected to play a critical moderating role in shaping how investors interpret firm fundamentals and respond to the stock market. Earnings volatility is often perceived as a signal of unstable performance and uncertain future cash flows, which may increase valuation uncertainty and amplify the volatility of stock prices. However, when firms provide more comprehensive sustainability disclosures, the credibility of corporate information improves, and stakeholders perceive stronger risk management and long-term strategic orientation, which may reduce excessive market reactions to earnings instability. Likewise, dividend policy serves as a key financial signal due to its cash-based nature, but the extent to which dividend policy stabilizes stock prices may depend on whether investors view dividend payouts as sustainable and aligned with long-term value creation, an assessment that is strengthened through sustainability disclosure. In addition, asset growth may be interpreted as either a growth opportunity or a potential source of overinvestment risk, particularly for capital-intensive manufacturing firms. Thus, sustainability disclosure may provide additional context that shapes investor confidence in the quality and sustainability of firm expansion decisions.

*$H_{4a}$:* Sustainability disclosure moderates the effect of earnings volatility on stock price volatility
*$H_{4b}$:* Sustainability disclosure moderates the effect of dividend policy on stock price volatility
*$H_{4c}$:* Sustainability disclosure moderates the effect of asset growth on stock price volatility

## 3. Methodology

A quantitative approach with a causal-associative research design is employed to examine how firm fundamentals influence stock price volatility among manufacturing firms listed on the Indonesia Stock Exchange (IDX) during 2020–2024 (Takona, 2023). This design is appropriate because the analysis relies on numerical indicators and statistical procedures to evaluate proposed relationships. Earnings

volatility (EV), dividend policy proxied by the Dividend Payout Ratio (DPR), and Asset Growth (AG) are specified as independent variables, while Stock Price Volatility (SPV) is treated as the dependent variable (AlAli et al., 2024). In addition, Sustainability Disclosure (SD) is introduced as a moderating variable to assess whether the impact of firm fundamentals on stock price volatility varies across firms with different levels of non-financial transparency.

The analysis is based on secondary data drawn from audited annual reports and publicly available disclosures obtained through the IDX website and companies' official websites, ensuring consistency and reliability of the observations. The population comprises 228 manufacturing firms listed on the IDX between 2020 and 2024. Sample selection follows purposive sampling, applying criteria aligned with the research objectives: (1) firms that conducted an initial public offering (IPO) prior to 2020; (2) firms reporting positive earnings consecutively from 2020 to 2024; and (3) firms distributing dividends consecutively over the same period. These criteria yield 35 firms, generating 175 firm-year observations (35 firms × five years). Hypothesis testing is performed using panel data regression to account for cross-sectional heterogeneity and time variation, beginning with descriptive statistics and correlation analysis, followed by panel estimation using pooled Ordinary Least Squares (OLS), fixed effects, or random effects specifications. Model selection was conducted using the Chow, Breusch–Pagan Lagrange Multiplier, and Hausman tests to identify the most appropriate panel estimator for statistical inference.

Panel regression is used to evaluate the effects of earnings volatility, dividend policy, and asset growth on stock price volatility while simultaneously testing the moderating role of sustainability disclosure (Dhrymes & Guerard, 1978). This approach is particularly suitable given that the dataset combines cross-sectional and time-series dimensions, allowing the estimation to capture both firm-specific characteristics and temporal dynamics. The analytical procedure was performed in stages. Descriptive statistics and correlation analysis were first used to provide an overview of the variable distributions and relationships, followed by regression estimation under fixed effects or random effects, depending on the model adequacy. The Chow test was applied to compare pooled OLS and the fixed effects model, while the Hausman test determined whether fixed or random effects provided more consistent estimates (Baltagi & Liu, 2025). Where necessary, the Breusch–Pagan Lagrange Multiplier test is employed to assess the suitability of pooled OLS versus random effects. To test the moderating effect of sustainability disclosure, this study incorporates interaction terms between sustainability disclosure and each of the independent variables. The baseline model (direct effects) is specified as follows.

$$SPV_{it} = \alpha + \beta_1 EV_{it} + \beta_2 DPR_{it} + \beta_3 AG_{it} + \beta_4 SD_{it} + \varepsilon_{it} \quad (8)$$

The moderation model is estimated by adding the interaction terms.

$$SPV_{it} = \alpha + \beta_1 EV_{it} + \beta_2 DPR_{it} + \beta_3 AG_{it} + \beta_4 SD_{it} + \beta_5 (EV_{it} \, x \, SD_{it}) + \beta_6 (DPR_{it} \, x \, SD_{it}) + \beta_7 (AG_{it} \, x \, SD_{it}) + \varepsilon_{it} \quad (9)$$

## 4. Results and Discussions

### *4.1 Result*

Table 1. Statistic descriptive

| | SPV | EV | DP | AG | SD |
|---|---|---|---|---|---|
| Mean | 0.611747 | 0.096989 | 0.704018 | 26.02138 | 290.8729 |
| Median | 0.579885 | 0.073788 | 0.576757 | 27.70263 | 0.025222 |
| Maximum | 0.975611 | 1.007274 | 4.561360 | 32.04938 | 22431.95 |
| Minimum | 0.439112 | -0.031186 | 0.033764 | 14.65477 | -23284.82 |
| Std. Dev. | 0.125163 | 0.109344 | 0.610830 | 4.516803 | 3795.776 |
| Skewness | 0.878341 | 4.409484 | 2.337560 | -1.281970 | 0.216503 |
| Kurtosis | 3.180717 | 32.22314 | 12.55716 | 3.475864 | 18.35360 |
| Observations | 175 | 175 | 175 | 175 | 175 |

Table 1 shows the descriptive statistics (N = 175) indicate that Stock Price Volatility (SPV) has a mean value of 0.612 and a median of 0.580, with values ranging from 0.439 to 0.976. The standard deviation of 0.125 suggests a moderate dispersion around the mean, implying that most firms' stock price volatility deviates by approximately 0.13 points from the average value. This indicates relatively noticeable differences in price fluctuation intensity across manufacturing firms, although the spread remains within a reasonable range. The positive skewness (0.878) suggests that higher volatility values are more extreme than lower ones, while the kurtosis slightly above 3 (3.181) indicates a distribution close to normal but somewhat more peaked than normal.

Earnings Volatility (EV) reports a relatively low mean of 0.097, with a standard deviation of 0.109, which is slightly higher than its mean. This indicates substantial relative variability in earnings stability across firms. Although most firms exhibit low earnings volatility (median = 0.074), the maximum value of 1.007 and extremely high skewness (4.409) and kurtosis (32.223) reveal the presence of outliers. In other words, while most firms maintain stable earnings, a small number experience very high earnings fluctuations, significantly widening the dispersion.

Dividend Policy (DP) has a mean of 0.704 and a median of 0.577, with a relatively large standard deviation of 0.611. The magnitude of the standard deviation is almost as large as the mean, indicating high heterogeneity in payout decisions across firms. The wide range (0.034 to 4.561), combined with strong positive skewness (2.338) and high kurtosis (12.557), suggests that dividend distribution practices vary considerably, with some firms distributing dividends at disproportionately higher levels than others.

Asset Growth (AG) shows a mean of 26.021 and a median of 27.703, with a standard deviation of 4.517. Compared to its mean, this standard deviation indicates moderate variability, implying that most firms experience relatively consistent growth patterns, typically deviating by approximately 4–5 percentage points from the average growth rate. The negative skewness (−1.282) suggests that lower growth observations are more extreme than higher ones, indicating that some firms experienced significantly slower growth than the sector average.

Notably, Sustainability Disclosure (SD) demonstrates an exceptionally large standard deviation of 3,795.776, which is substantially higher than its mean (290.873). This indicates extreme dispersion and a very high variability across firms. The minimum (−23,284.82) and maximum (22,431.95) values confirmed the presence of extreme outliers. Although skewness appears relatively modest (0.217), the very high kurtosis (18.354) suggests a leptokurtic distribution characterized by heavy tail. Statistically, this means that sustainability disclosure values are highly concentrated around certain levels but include several extreme observations that drastically inflate the overall variability. From an econometric perspective, such large dispersion may influence regression estimates and suggest the potential need for transformation or robustness checks to mitigate outlier effects. Overall, the standard deviation values indicate that EV, DP, and especially SD exhibit substantial heterogeneity across firms, whereas SPV and AG show comparatively more stable distributions. This variability underscores the importance of using panel data techniques that can properly account for cross-sectional differences among the firms.

Following the descriptive analysis, the next stage of this study proceeds to panel data estimation to examine the relationship between firm fundamentals and stock price volatility across manufacturing firms over time. Given that panel data combine cross-sectional and time-series information, selecting the most appropriate econometric specification is essential for ensuring reliable and unbiased inferences. Therefore, this study compares alternative panel regression models, namely, the pooled Ordinary Least Squares (Pooled OLS), Fixed Effects Model (FEM), and Random Effects Model (REM), to determine which model best captures firm heterogeneity and the underlying data structure.

Table 2. Chow test

| **Effects Test** | **Statistic** | **d.f.** | **Prob.** |
|---|---|---|---|
| Cross-section F | 6.006389 | (34,136) | 0.0000 |

| | | | |
|---|---|---|---|
| Cross-section Chi-square | 160.462643 | 34 | 0.0000 |

Table 2 shows the Chow test (Redundant Fixed Effects Test) is used to determine whether the Fixed Effects Model (FEM) provides a better fit than the pooled OLS model by testing the presence of cross-sectional (firm-specific) effects. The results show a significant Cross-section F statistic of 6.006 with a probability value of 0.0000, which is supported by the Cross-section Chi-square statistic of 160.463 (p = 0.0000). These findings indicate that firm-specific effects are statistically significant and should not be ignored in the analysis. Therefore, the pooled OLS specification is rejected, and the fixed effects model is preferred as it better captures unobserved heterogeneity across manufacturing firms

Table 3. Hausman test

| **Test Summary** | **Chi-Sq. Statistic** | **Chi-Sq. d.f.** | **Prob.** |
|---|---|---|---|
| Cross-section random | 4.977410 | 4 | 0.2896 |

Table 3 shows the Hausman test was conducted to determine whether the Fixed Effects Model (FEM) or the Random Effects Model (REM) is more appropriate for panel estimation. The test result shows a chi-square statistic of 4.977 with 4 degrees of freedom and a probability value of 0.2896. As the p-value is greater than 0.05, the null hypothesis cannot be rejected, indicating that the random effects estimator is consistent and efficient. Therefore, the results suggest that the Random Effects Model (REM) is preferred over the fixed effects model for subsequent analysis.

Table 4. Model 1 main effect

| **Variables** | **Coefficient** |
|---|---|
| C | 0.584963 |
| EV | 0.005563 |
| DPR | 0.004552 |
| AG | 0.000870 |
| SD | 1.35E-06 |
| R-squared | 0.634822 |
| Adjusted R-squared | 0.532787 |
| S.E. of regression | 0.085553 |
| Sum squared resid | 0.995418 |
| Log likelihood | 204.0064 |

$$SPV_{it} = 0.584963 + 0.005563EV_{it} + 0.004552DPR_{it} + 0.000870AG_{it} + 1.35x10^{-6}SD_{it} + \varepsilon_{it} \quad (10)$$

Following the estimation in Table 4, which examines the direct effects of earnings volatility, dividend policy, asset growth, and sustainability disclosure on stock price volatility, the analysis proceeds to assess whether these relationships are conditional on firms' non-financial transparency. Theoretically, market reactions to fundamental signals may vary across firms, depending on the credibility and completeness of the information available to investors. Therefore, this study develops Model 2 by incorporating sustainability disclosure as a moderating variable through the interaction terms between sustainability disclosure and each fundamental determinant (EV×SDI, DPR×SDI, and AG×SDI). This moderated regression model enables a more nuanced test of whether sustainability disclosure strengthens or weakens the influence of firm fundamentals on the stock price volatility.

Table 5. Model 2 moderated regression

| **Variables** | **Coefficient** | **Prob.** |
|---|---|---|
| C | 0.575789 | 0.0000 |
| EV | -0.148059 | 0.0041 |

| | | |
|---|---|---|
| DPR | 0.002252 | 0.8284 |
| AG | -0.020197 | 0.0000 |
| EV*SD | 0.267127 | 0.0039 |
| DPR*SD | -0.003764 | 0.8261 |
| AG*SD | 0.034915 | 0.0000 |
| R-squared | 0.988363 | |
| Adjusted R-squared | 0.987947 | |
| S.E. of regression | 0.009431 | |
| F-statistic | 2378.043 | |
| Prob(F-statistic) | 0.000000 | |

$$SPV_{it} = 0.575789 - 0.148059EV_{it} + 0.002252DPR_{it} - 0.020197AG_{it} + 0.267127(EV_{it}\ x\ SD_{it}) - 0.003764(DPR_{it}\ x\ SD_{it}) + 0.034915(AG_{it}\ x\ SD_{it}) + \varepsilon_{it} \quad (11)$$

Table 5 shows the model 2 incorporates sustainability disclosure as a moderating variable through interaction terms (EV×SD, DPR×SD, and AG×SD). The overall model is statistically strong, as indicated by a highly significant F-statistic ($F = 2378.043$, $p < 0.05$) and a very high explanatory power (Adjusted $R^2 = 0.9879$), suggesting that the model explains most of the variation in stock price volatility. Regarding the main effects, Earnings Volatility (EV) shows a significant negative coefficient ($\beta = -0.1481$, $p = 0.0041$), while Asset Growth (AG) exhibits a significant negative effect ($\beta = -0.0202$, $p < 0.001$).

In contrast, the dividend payout ratio is statistically insignificant ($p = 0.8284$), indicating that dividend policy does not directly explain stock price volatility in the presence of the moderating structure. Importantly, the interaction terms provide evidence of moderation effects. The coefficient on EV×SD is positive and significant ($\beta = 0.2671$, $p = 0.0039$), indicating that sustainability disclosure significantly moderates the relationship between earnings and stock price volatility. Similarly, AG×SD is positive and highly significant ($\beta = 0.0349$, $p < 0.001$), confirming the moderating effect of sustainability disclosure on the asset growth–volatility relationship. However, the interaction term DPR×SD remains insignificant ($p = 0.8261$), suggesting that sustainability disclosure does not moderate the effect of dividend policy on the stock price volatility.

Overall, the conditional effect analysis strengthens the moderation interpretation: sustainability disclosure significantly moderates the impact of earnings volatility and asset growth on stock price volatility, as shown by the significant interaction terms EV×SD and AG×SD. In contrast, dividend policy shows neither a direct nor a moderated effect on stock price volatility. These results support the view that sustainability disclosure functions as a contextual information mechanism that changes how investors process fundamental signals, particularly those related to earnings stability and firm growth.

### *4.2 Discussions*

The findings of this study provide empirical support that stock price volatility in Indonesian manufacturing firms during 2020–2024 is shaped by firm fundamentals and the disclosure environment, reinforcing the argument presented in the introduction that market reactions in emerging economies are highly sensitive to both accounting information and broader uncertainty conditions (Baltussen, van Bekkum, & van der Grient, 2018; Escobari & Jafarinejad, 2019). The post-pandemic recovery period, supply chain pressures, and increasing ESG awareness have further intensified investor sensitivity to risk-relevant signals.

First, Earnings Volatility (EV) significantly influences Stock Price Volatility (SPV), supporting $H_1$. This result is consistent with signaling theory and the valuation uncertainty perspective, which argue that unstable earnings reduce the predictability of future cash flows and increase investor disagreement, thereby amplifying price fluctuations (Dechow, Ge, & Schrand, 2010b; Ilia D. Dichev & Vicki Wei Tang, 2009). The descriptive statistics support this interpretation. Although the mean EV is relatively modest (0.097), its extreme skewness (4.409) and very high kurtosis (32.223) indicate the presence of

substantial outlier values. This suggests that while most firms maintain relatively stable earnings, a small number exhibit extreme earnings instability that can trigger disproportionate market reactions. Such patterns align with evidence showing that higher earnings volatility increases perceived risk and return variability (Fonou-Dombeu et al., 2022; C. Liu, Hu, Yao, & Li, 2025b). In the Indonesian manufacturing context, characterized by capital intensity and exposure to input cost fluctuations, earnings instability may be particularly informative for investors assessing operational resilience.

Second, Dividend Policy (DP) does not show a statistically significant effect on stock price volatility in the moderated model, leading to the rejection of $H_2$. While dividend payouts are often considered credible signals because of their cash-based nature (Wirama et al., 2024), the findings suggest that, in this setting, dividend policy may not provide incremental explanatory power for volatility formation. The descriptive results reveal substantial heterogeneity in dividend payout ratios (standard deviation = 0.611; skewness = 2.338), indicating that some firms distribute exceptionally high dividends. However, despite this dispersion, dividend policy does not significantly shape volatility when earnings and growth signals are considered. This outcome differs from studies emphasizing strong dividend signaling effects in emerging markets (Phan & Tran, 2019; Uche et al., 2025) and suggests that investors in Indonesian manufacturing firms may prioritize forward-looking risk indicators, such as earnings stability and investment dynamics, over payout decisions when forming volatility expectations.

Third, Asset Growth (AG) significantly affects stock price volatility, supporting $H_3$. This result is consistent with investment- and risk-based explanations suggesting that expansion strategies can either signal growth opportunities or raise concerns about overinvestment and capital misallocation (Artikis et al., 2022; Song, 2016b). The descriptive statistics indicate moderate variability in asset growth (mean = 26.021; standard deviation = 4.517) but negative skewness (−1.282), implying that some firms experienced substantially slower growth than the majority. During periods of economic adjustment, uneven expansion patterns may increase uncertainty regarding investment efficiency and long-term returns. This is particularly relevant in capital-intensive industries, where aggressive expansion financed through leverage may elevate perceived financial risk(Handayani et al., 2018; Mustoffa et al., 2025). Thus, variations in asset growth translate into heterogeneous interpretations by investors, ultimately influencing stock price volatility.

Most importantly, Sustainability Disclosure (SD) emerges as a significant moderating factor in the relationships between earnings volatility, asset growth, and stock price volatility, supporting $H_{4a}$ and $H_{4c}$. This finding aligns with the theoretical integration of the signaling and legitimacy perspectives. From a signaling perspective, enhanced sustainability disclosure improves transparency and information credibility, thereby shaping how investors interpret fundamental risk signals (Dhaliwal et al., 2011). From the perspective of legitimacy theory, sustainability reporting reflects firms' efforts to align with stakeholder expectations and manage reputational risks (Afnan et al., 2024; Deegan, 2019). The descriptive statistics reveal extremely high dispersion in sustainability disclosure (standard deviation = 3,795.776; kurtosis = 18.354), suggesting uneven adoption and reporting intensity across firms. This heterogeneity likely explains why sustainability disclosure significantly affects market sensitivity to earnings instability and growth dynamics.

Interestingly, the positive interaction terms (EV×SD and AG×SD) indicate that sustainability disclosure does not uniformly dampen volatility; instead, it alters the strength and direction of market reactions. This supports recent evidence suggesting that ESG disclosure can reshape investor attention and influence abnormal stock-price volatility (Wu, Zhu, & Tao, 2024; Xu et al., 2023). In contexts where sustainability disclosure enhances transparency, investors may react more efficiently to fundamental information but may also respond more sensitively to risk signals embedded in earnings instability and aggressive growth.

Overall, the discussion confirms the central argument advanced in the introduction: stock price volatility in Indonesian manufacturing firms is not solely driven by financial fundamentals but is conditional on the quality and extent of non-financial transparency. The substantial dispersion observed in EV, DP, and SD underscores the importance of contextual heterogeneity in emerging capital markets. By

integrating financial indicators with sustainability disclosure, this study demonstrates that volatility formation reflects both valuation uncertainty and legitimacy considerations, thereby enriching the capital market literature in emerging markets.

## 5. Conclusions

### *5.1 Conclusion*

This study examines whether firm fundamentals earnings volatility, Dividend Policy (DPR), and asset growth explain stock price volatility among Indonesian manufacturing firms over the 2020–2024 period, while also testing the moderating role of sustainability disclosure. The results demonstrate that stock price volatility is primarily driven by risk-relevant fundamentals, particularly earnings volatility and asset growth, whereas dividend policy does not significantly explain volatility dynamics in the sampled firms. Importantly, sustainability disclosure functions as a contextual mechanism that shapes market sensitivity to firm fundamentals. Specifically, sustainability disclosure significantly moderates the relationships between earnings volatility and stock price volatility, as well as between asset growth and stock price volatility, whereas no moderating effect is identified in the dividend policy pathway. Overall, the findings confirm that investor reactions to financial signals are conditional on firms' non-financial transparency, highlighting that stock price volatility reflects not only fundamental performance signals but also the credibility and richness of the disclosure environment of the firm. The study contributes to the capital market literature by integrating financial and sustainability dimensions through the combined lens of signaling theory and legitimacy theory, demonstrating that sustainability disclosure reshapes how investors interpret earnings instability and growth-related risk in manufacturing firms

### *5.2 Research Limitations*

Despite these contributions, this study has several limitations. First, the analysis is limited to manufacturing firms listed on the Indonesia Stock Exchange (IDX) during 2020–2024, which may restrict the generalizability of the findings to other sectors or under different economic conditions. The manufacturing sector is capital-intensive and sensitive to cost fluctuations; therefore, the relationships identified in this study may differ in the service or financial industries. The final sample consists of 35 firms (175 firm-year observations) selected through purposive sampling based on data completeness and reporting availability. The screening process excluded firms with incomplete annual or sustainability reports, potentially introducing a sample selection bias. Firms that consistently publish sustainability disclosures and complete financial data are typically larger and more transparent, which may influence the magnitude and significance of the estimated relationships and reduce the overall representativeness.

Second, sustainability disclosure is measured using an index based on the extent of the disclosed items, which captures reporting quantity rather than disclosure quality, credibility, or stakeholder perception. Consequently, the index may not fully reflect the substantive sustainability performance. Furthermore, potential endogeneity concerns remain, as firms with different risk profiles may strategically adjust their sustainability reporting or financial policies in response to market conditions. Although panel data techniques help control for unobserved heterogeneity, the results should not be interpreted as strictly causal relationships. Future research should expand sectoral coverage, increase sample size, refine disclosure quality measures, and apply more advanced econometric approaches to address potential endogeneity more rigorously.

### *5.3 Suggestions and Directions for Future Research*

Future research can extend this study in several directions. First, subsequent studies could broaden the sample by including firms from other sectors (e.g., mining, energy, and financial services) or by expanding the observation period to capture different economic phases and volatility regimes. Second, future studies may incorporate additional control variables and risk-related factors, such as leverage, liquidity, firm size, ownership structure, market-to-book ratio, and macroeconomic indicators, to provide a more comprehensive explanation of stock price volatility. Third, researchers are encouraged to refine the measurement of sustainability disclosure by using alternative proxies, such as ESG ratings, sustainability assurance, or quality-based disclosure indices, to better capture credibility and

informativeness. Finally, future studies may apply more advanced econometric techniques, including dynamic panel models (GMM), instrumental variable approaches, or quasi-experimental designs, such as difference-in-differences, to strengthen causal inference and address endogeneity more effectively. These extensions deepen our understanding of how sustainability transparency interacts with firm fundamentals to shape volatility in emerging capital markets.

## Author Contributions

This study was conducted collaboratively by the authors, each of whom contributed to different stages of the research process. DPH conceptualized the study, including identifying the research problem and designing the research framework. DPH conducted the data collection and prepared the initial draft of the manuscript. DK contributed to the development of the research methodology and performed formal data analysis. In addition, DK reviewed and edited the manuscript to enhance its academic quality, supervised the overall research process, and approved the final manuscript for publication.

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