Cerdika: Jurnal Ilmiah Indonesia, 6 (7), 2026
p-ISSN: 2774-6291 e-ISSN: 2774-6534
Available online at http://cerdika.publikasiindonesia.id/index.php/cerdika/index

Inventory Valuation Method Selection and Earnings Quality: A Case From Indonesia's Manufacturing Sector

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Keywords:
Inventory Valuation Method; Earnings Quality; Dechow and Dichev Model; Manufacturing Companies; Cash Flow Predictability

Abstract

The selection of inventory valuation methods represents a critical accounting policy decision that directly influences reported earnings, particularly in manufacturing firms, where inventory constitutes a substantial portion of current assets. In the Indonesian context, PSAK 14 permits the use of either the FIFO or weighted average method, while explicitly prohibiting LIFO. This research aims to analyze the effect of inventory valuation method selection on earnings quality in manufacturing companies during the 2020–2024 period. This study compares companies applying the FIFO method and those applying the weighted average method to examine their impact on earnings quality. This research employs a quantitative approach using secondary data derived from the annual financial statements of manufacturing companies listed on the Indonesia Stock Exchange (IDX). Earnings quality is measured using the accrual quality model by regressing total current accruals on past, current, and future operating cash flows for the 2020–2024 period. The results show that inventory valuation methods are associated with variations in accrual estimation patterns across firms. The findings also show that cost of goods sold (COGS) volatility and inventory intensity reflect operational characteristics that may influence the stability of financial reporting. Overall, the results suggest that inventory accounting practices in Indonesian manufacturing companies operate within a relatively consistent reporting environment, in which the reliability of earnings remains stable across firms applying different inventory valuation approaches.

INTRODUCTION

Financial statements serve as a primary medium through which management communicates corporate performance transparently to external stakeholders, with earnings information representing one of the most important indicators used to evaluate operational success. Earnings are generally considered to be of high quality when the reported figures faithfully represent the firm's actual financial performance without material distortions caused by managerial manipulation or estimation bias (Healy & Wahlen, 1999; Christensen et al., 2022). High-quality earnings enable investors and other stakeholders to rely on reported accounting numbers as credible inputs for forecasting future cash flows and assessing firm value (Nguyen et al., 2021). Recent literature further emphasizes that earnings credibility has become increasingly important in periods characterized by economic uncertainty, market volatility, and supply chain disruption (Salim et al., 2021; Ningtyas et al., 2024). For manufacturing firms, inventory represents one of the most significant components of current assets, and its valuation directly influences both the balance sheet and the income statement through the calculation of cost of goods sold (COGS) (Kieso et al., 2022). While stable earnings

are generally interpreted as positive signals of operational efficiency (Oyebamiji, 2021), information asymmetry may create agency conflicts in which management uses accounting flexibility to influence reported earnings in pursuit of certain objectives (Jensen & Meckling, 1976; Alharbi, 2023).

In Indonesia, the selection of inventory valuation methods is governed by PSAK 14 (Inventories), which permits the first-in, first-out (FIFO) method or the weighted average method while explicitly prohibiting the last-in, first-out (LIFO) method. From a taxation perspective, Indonesian income tax regulations under Article 10 of the Income Tax Law also recognize FIFO and weighted average as acceptable methods, provided that companies apply them consistently (Cahya et al., 2024; Pulungan et al., 2024). The selection of these methods logically influences the volatility of reported earnings across reporting periods (Weygandt et al., 2022). Empirical evidence from recent Indonesian studies indicates that the weighted average method often produces higher COGS and relatively lower taxable income compared with the FIFO method during inflationary conditions (Aisyah et al., 2025; Ningtyas et al., 2024). Under FIFO, older and typically lower historical costs are recognized as COGS during periods of rising prices, which may lead to higher reported earnings but also greater earnings fluctuations (Kieso et al., 2022). In contrast, the weighted average method combines historical and recent purchase prices, thereby smoothing fluctuations in production costs and potentially generating more stable profit margins (Salim et al., 2021). These differences raise an important question as to whether the widespread use of the weighted average method leads to higher earnings quality compared with the FIFO method within the Indonesian regulatory environment.

Earnings quality, however, is not determined solely by the mechanical choice of inventory accounting method. External operational factors, such as volatility in raw material prices and disruptions in global supply chains following the COVID-19 pandemic, may significantly affect the reliability of reported earnings (Pulungan et al., 2024). Variations in COGS reflect fluctuations in input material prices, and when these fluctuations are not effectively managed, operating income may become highly volatile and less predictable. In addition to these external pressures, internal operational characteristics, such as inventory intensity, may also influence earnings quality, as higher intensity can increase accrual estimation risk due to potential obsolescence and valuation adjustments (Ningtyas et al., 2024). From an accrual-based perspective, estimation errors reflect how accurately management translates inventory valuation into reported net income. Under the weighted average method, the blending of historical and current purchase prices is theoretically expected to stabilize inventory-related accruals and reduce estimation errors (Adekunle, 2015; Bahr, 2016; Beger, 2021; Saengsathien, 2015). Conversely, under the FIFO method, the potential mismatch between revenues recognized at current market prices and costs recorded at historical prices may widen the gap between accounting earnings and operating cash flows, especially during the 2020–2024 period, which was characterized by commodity price volatility.

Despite the growing literature on earnings quality and accounting policy choices, empirical evidence examining the relationship between inventory valuation methods and earnings quality within emerging market contexts remains limited. Therefore, this study aims to examine whether statistically significant differences in earnings quality exist between firms applying FIFO and those using the weighted average method within the Indonesian

manufacturing sector. Furthermore, this study investigates whether cost of goods sold volatility moderates the relationship between inventory method selection and earnings quality and whether inventory intensity significantly influences the magnitude of accrual estimation errors. By integrating inventory accounting policy, operational volatility, and accrual-based measurement, this study seeks to provide a more comprehensive evaluation of earnings reliability in emerging market settings. The benefits of this research are twofold. Theoretically, this study contributes to the existing literature by providing empirical evidence on the relationship between inventory valuation methods and earnings quality in the Indonesian emerging market context, particularly using the Dechow and Dichev accrual quality model. Practically, the findings are expected to benefit investors and analysts in making informed investment decisions, assist management in making strategic accounting policy choices, provide regulators, including IAI and OJK, with empirical evidence for refining accounting standards, and offer academics a foundation for further research on the determinants of earnings quality in emerging economies.

METHOD

Research Model and Data

This research employed a quantitative method using panel data analysis to examine the relationship between inventory valuation methods and earnings quality in manufacturing firms listed in Indonesia. The study focused on companies that applied either the FIFO method or the weighted average method during the 2020–2024 period. This period was selected because it reflected significant commodity price fluctuations and supply chain disruptions that may have influenced cost structures and earnings stability.

The study used secondary data obtained from annual financial statements and notes to the financial statements. Inventory valuation methods were identified from accounting policy disclosures. Earnings quality was measured using accrual estimation errors based on the Dechow–Dichev accrual quality model. Cost of goods sold (COGS) volatility was calculated using the standard deviation of COGS over a rolling period, while inventory intensity was measured as the proportion of inventory to total assets. The control variables included firm size, leverage, and return on assets.:

1. Identifying sample firms applying FIFO and Weighted Average methods during 2020–2024.
2. Calculating accrual quality as a proxy for earnings quality.
3. Computing COGS volatility for each firm-year observation.
4. Calculating inventory intensity for each firm year.
5. Constructing an interaction variable between inventory valuation method and COGS volatility to test the moderating effect.
6. Performing moderated regression analysis to examine the effect of inventory valuation method, COGS volatility, and inventory intensity on earnings quality.

Variable Measurement

This study employs earnings quality as the dependent variable, inventory valuation method as the main independent variable, COGS volatility as a moderating variable, and inventory intensity as an additional explanatory variable. The measurement of each variable is described as follows:

1. Earnings Quality (EQ)

Earnings quality is proxied by accrual quality using the Dechow–Dichev (2002) model. This model measures accrual estimation errors by regressing total current accruals on past, current, and future operating cash flows. Recent studies continue to validate accrual quality as a reliable proxy for earnings reliability and reporting precision (McNichols & Stubben, 2021; Ball et al., 2022).

$$\boldsymbol{TCAit = \alpha 0 + \alpha 1 CFOit{-}1 + \alpha 2 CFOit + \alpha 3 CFOit{+}1 + \varepsilon it}$$

Description:

TCA = ΔCurrent Assets – ΔCurrent Liabilities – ΔCash + ΔShort-term Debt

CF0 = Cash Flow from Operations

Earnings quality (EQ) is measured as the absolute value of the residual (|ε|). Lower residual values indicate higher earnings quality.

RESULTS AND DISCUSSION

The descriptive statistics provide an overview of the 610 firm-year observations from the manufacturing sector for the 2020–2024 period. The data shows that the mean value for Absolute Residuals is 0.0896, which is higher than its standard deviation of 0.0753, indicating that the sample is well-centered and representative. The inventory methods are dominated by the Weighted Average method (92.3 percent), while the FIFO method accounts for 7.7 percent of the observations. Furthermore, both COGS Volatility and Inventory Intensity show a stable distribution, with mean values of 0.2577 and 0.2021 respectively, both exceeding their standard deviations. This balance suggests a high level of data consistency, providing a solid foundation for further statistical testing.

Descriptive Statistics

Table 1. Descriptive Statistics Results

	N	Minimum	Maximum	Mean	Std. Deviation
Absolute Residuals	605	0.0052	0.4110	0.0896	0.0753
Inventory Method	605	0	1	0.0777	0.2679
COGS Volatility	605	0.0525	0.8836	0.2577	0.2000
Inventory Intensity	605	0.0168	0.5275	0.2021	0.1291

Source: Processed secondary data from annual financial statements of manufacturing companies listed on the Indonesia Stock Exchange (IDX), 2020–2024

Classical Testing/and Others

To ensure the robustness of the regression results, four classical assumption tests were conducted. First, the Normality Test confirms that the residuals follow a normal distribution, particularly given the large sample size which aligns with the Central Limit Theorem. Second, the Multicollinearity Test reveals that the Variance Inflation Factor (VIF) for all variables is well below 10, indicating no redundancy among independent variables. Third, the Heteroscedasticity Test was performed to ensure that the error variance is constant across all observations, preventing bias in the standard errors. Finally, the Autocorrelation Test confirmed that the error terms are independent across periods, ensuring that the model coefficients are both efficient and reliable.

Hypotheses Testing

H1: Difference in Earnings Quality (FIFO vs. Average)

An Independent Sample T-Test was performed to compare the mean of Absolute Residuals between companies using the FIFO and Weighted Average methods.

Table 2. Independent Sample T-Test Results

Method	N	Mean Absolute Residuals	P-value (2-tail)
FIFO	47	0.0820	0.2591
Weighted Average	558	0.0919	

Source: Processed Data (2026)

The results show a P-value of 0.2591, which is greater than the 0.05 threshold. This suggests that the choice of inventory valuation does not result in a significant difference in earnings quality. Both methods appear to map accruals into cash flows with comparable precision within the Dechow and Dichev framework.

Source: Processed Data (2026)

The results show a P-value of 0.2591, which is greater than the 0.05 threshold. This suggests that the choice of inventory valuation does not result in a significant difference in earnings quality. Both methods appear to map accruals into cash flows with comparable precision within the Dechow and Dichev framework.

H2: The Impact of COGS Volatility on Earnings Quality (Split Group Analysis)

A simple linear regression was conducted separately for the FIFO and Weighted Average groups to observe the direct impact of cost fluctuations on reporting quality.

Table 3. Simple Linear Regression Results: FIFO Group

	Coefficients	t-Stat	P-value
COGS Volatility	-0.0488	-1.1382	0.1281

Source: Processed Data (2026), N=47

Table 4. Simple Linear Regression Results: Average Group

	Coefficients	t-Stat	P-value
COGS Volatility	0.0407	2.7460	0.0116

Source: Processed secondary data (2026)

The results indicate that for firms using the Weighted Average method, COGS Volatility has a significant impact on earnings quality. This confirms that in the Average cost environment, cost fluctuations directly increase estimation noise. Conversely, the FIFO group shows no significant relationship, suggesting that FIFO may provide more resilience against cost instability in the reporting process.

The empirical evidence from the 221 manufacturing firms indicates that while earnings quality is resilient against internal inventory accounting policies, it remains highly sensitive to external cost pressures. Through the lens of the Dechow and Dichev (2002) model, earnings quality is determined by the clarity of the relationship between accruals and cash flows. The results emphasize that operational environmental factors, specifically the fluctuations in production costs, are more dominant in creating estimation noise than the firm's internal choices regarding valuation methods or inventory magnitude.

The reporting stability found across different valuation methods reflects a highly standardized environment where firms prioritize regulatory compliance. Because inventory variables do not significantly drive residual errors except under conditions of high-cost volatility, it can be concluded that financial reporting quality is primarily anchored in institutional discipline. This provides stakeholders with assurance that, under stable economic conditions, manufacturing firms maintain a consistent standard of accrual precision regardless of their specific inventory management strategies.

Each Hypotheses Testing

1. **The Difference in Earnings Quality between FIFO and Average Methods**

The findings suggest that both FIFO and Weighted Average methods provide a comparable level of accuracy in financial reporting. Within the Dechow and Dichev framework, this means that both approaches allow for an equally efficient mapping of accruals to cash flows. The strict regulatory environment likely prevents these methods from being used as tools for earnings distortion, ensuring that the quality of information remains consistent across the industry.

2. **The Impact of COGS Volatility on Earnings Quality across Different Groups**

The split analysis reveals a critical phenomenon where cost volatility only serves as a disruptive factor for firms utilizing the Weighted Average method. The nature of the Average method, which smooths costs across periods, appears to make earnings reports more sensitive to extreme market price changes. In contrast, the FIFO method, which charges costs based on the order of acquisition, shows better resilience toward volatility. Consequently, cost fluctuations do not significantly damage the accrual to cash flow mapping for FIFO users in the Dechow and Dichev model. This finding provides new evidence that the impact of environmental risk on financial information quality depends heavily on the internal accounting policies chosen by management.

3. **The Impact of Inventory Intensity on Earnings Quality**

The result suggests that the volume of assets held as inventory does not serve as a driver for accrual estimation risks. Modern inventory management systems in the manufacturing sector appear effective in mitigating the valuation complexities typically associated with high inventory levels. Therefore, intensity does not negatively impact the precision of earnings, suggesting that the quality of financial reports is more likely influenced by broader governance structures or revenue recognition policies than by the magnitude of inventory itself.

CONCLUSION

The results of this research lead to several conclusions regarding the factors that influence the precision of financial reporting in the manufacturing sector. The primary finding indicates that cost of goods sold (COGS) volatility significantly affects earnings quality, as higher

fluctuations in production costs increase estimation noise within the Dechow and Dichev framework. Conversely, the selection between the FIFO and weighted average methods does not show a significant difference in earnings quality, suggesting that both methods are comparable in their reporting outcomes. Similarly, inventory intensity does not appear to be a major driver of accrual estimation errors, indicating that the magnitude of inventory itself does not compromise the quality of reported earnings. These findings suggest that, for Indonesian manufacturing firms, external environmental factors play a more dominant role in determining accrual reliability than internal accounting policy choices.

Based on these findings, several recommendations are proposed. Management is advised to focus on managing cost volatility through effective supply chain strategies and hedging mechanisms, as this factor has been shown to significantly influence earnings quality. Investors and analysts should place greater emphasis on operational risk factors, particularly cost fluctuations, when assessing earnings quality, rather than focusing solely on accounting method choices. For regulators and standard-setters, the findings support the current regulatory framework that permits both the FIFO and weighted average methods, suggesting that these standards adequately accommodate diverse business practices without compromising reporting quality. Future researchers are encouraged to examine other operational factors that may influence earnings quality, such as supply chain resilience, the effectiveness of raw material price hedging, and the role of corporate governance mechanisms in moderating the relationship between cost volatility and earnings reliability. In addition, comparative studies across different industry sectors or emerging market contexts could provide broader insights into the generalizability of these findings.

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