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Comparative Analysis of Inventory Recording Systems Using the Perpetual Method in MSMEs in Medan City

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Abstrak. *Penelitian ini mengkaji perbandingan tiga metode pencatatan persediaan dalam sistem perpetual, yaitu FIFO (First In First Out), LIFO (Last In First Out), dan metode Rata-Rata (Average), untuk memahami pengaruhnya terhadap harga pokok penjualan (HPP), nilai persediaan akhir, dan laba bersih. Metode FIFO mengasumsikan bahwa barang yang pertama kali diperoleh akan dijual atau digunakan terlebih dahulu, sedangkan metode LIFO mengasumsikan bahwa barang yang terakhir diperoleh akan dijual atau digunakan terlebih dahulu. Sementara itu, metode Rata-Rata menghitung harga pokok penjualan berdasarkan rata-rata harga perolehan persediaan. Penelitian ini menggunakan pendekatan kuantitatif dengan metode deskriptif komparatif serta simulasi transaksi untuk mengevaluasi hasil pencatatan dari ketiga metode tersebut selama periode tertentu. Hasil penelitian menunjukkan bahwa metode FIFO menghasilkan harga pokok penjualan yang lebih rendah dan nilai persediaan yang lebih tinggi, sedangkan metode LIFO menghasilkan harga pokok penjualan yang lebih tinggi dan nilai persediaan yang lebih rendah. Metode Rata-Rata memberikan hasil yang lebih stabil di antara kedua metode tersebut. Temuan ini menunjukkan pentingnya pemilihan metode pencatatan yang tepat karena dapat memengaruhi kinerja keuangan dan pengelolaan persediaan pada perusahaan dagang.*

Kata kunci: *FIFO; LIFO; Rata-Rata; Pencatatan Persediaan; Sistem Perpetual.*

Abstract. *This research examines the comparison of three inventory recording methods in a perpetual system, namely FIFO (First In First Out), LIFO (Last In First Out), and the Average method, to understand their impact on the cost of goods sold (COGS), ending inventory value, and net profit. The FIFO method assumes that the items acquired first will be sold or used first, while the LIFO method assumes that the items acquired last will be sold or used first. The Average Method calculates the cost of goods sold based on the average purchase price of inventory. This study applies a quantitative approach with a descriptive comparative method and transaction simulation to evaluate the recording results of the three methods over a specific period. The research findings indicate that the FIFO method results in lower cost of goods sold and higher inventory value, while the LIFO method results in higher COGS and lower inventory value. The Average method provides more stable results among the two. These findings indicate the importance of selecting the appropriate recording method to influence the financial performance and inventory management of trading companies.*

Keywords: *FIFO; LIFO; Average; Inventory Recording; Perpetual System.*

Introduction

In the business world, especially in companies operating in the trading sector, inventory management is one of the fundamental elements that must be optimally regulated to ensure the continuity and efficiency of the company's operational activities and to maximize profits. The inventory recording system aims to manage and supervise the inventory held by the company to determine the existing quantity, estimate the inventory value, and avoid unwanted shortages or excesses of goods. In its implementation, there are various methods that can be used in recording merchandise inventory, one of which is the perpetual system with FIFO (First In First Out), LIFO (Last In First Out), and Average Cost approaches. These three methods have their own characteristics and provide different impacts on the presentation of the company's financial statements. The FIFO method refers to the assumption that the first items purchased are the first to be sold or used, while the LIFO method is based on the assumption that the last items purchased are the first to be sold or used. On the other hand, the average method calculates all beginning and ending inventory as one.

Thus, the cost of goods sold and the value of ending inventory will be equivalent to the average of all the acquisition prices of the goods in a company's warehouse. Each method has its advantages and disadvantages that need to be mastered by the company in order to determine the method that best suits its needs and desired market conditions. (Maulana *et al.*, 2024) Inventory becomes a vital element that supports business continuity, as it often serves as the sole source of cash inflow. In trading activities, inventory is the main component being sold, so almost all of the company's operational activities are focused on efforts to convert that inventory into cash while also earning profit from the difference between the selling price and the cost of goods sold. In the balance sheet of a trading company, inventory is included in current assets with a significant investment value, which indicates the importance of inventory for business continuity. Poor inventory management is often caused by the indifference and lack of awareness from business owners, who focus solely on operational continuity without considering the potential risks when inventory continues to accumulate and ultimately remains unsold. As a result, the business may be forced to stop because it cannot cover the losses from unsold inventory. (Panigoro *et al.*, 2024) In the accounting system, inventory plays an important role in controlling and managing the company's wealth, particularly related to merchandise inventory. With the implementation of an effective system, inventory can be protected from potential recording errors and physical loss of goods. Inventory is one of the main components that plays a significant role in determining the company's profit. This is because the value of inventory is closely related to the calculation of Cost of Goods Sold (COGS), which ultimately directly affects net profit. Therefore, inventory valuation needs to be conducted with the appropriate approach and applied consistently from year to year in order to produce reliable and comparable financial statements.

The value of inventory listed in the financial statements is greatly determined by the inventory valuation method used, such as FIFO (First In, First Out), LIFO (Last In, First Out), or the Average Method. The determination of the method must align with the company's accounting policies and refer to the applicable standards and regulations. If the selection of the method is effective and aligns with the market, the company's profit will increase. In conducting this research, we aim to compare the three inventory recording methods by assessing aspects such as their impact on the ending inventory value, gross profit, and taxes that the company is required to pay. By understanding the differences in characteristics and impacts of each method, the company can make more optimal decisions in managing inventory and preparing financial reports that align with the actual situation and long-term strategic goals. This research aims to analyze the differences in effectiveness levels and the implications arising from the application of three inventory recording methods in the perpetual system, namely FIFO, LIFO, and the average method, on the cost of goods sold, ending inventory value, and net profit of

MSME actors in the Medan Amplas District. The findings of this research are expected to provide a basis for consideration for business actors in determining the inventory recording method that is most suitable for the operational characteristics and market dynamics they face.

Literature Review

Inventory

Inventory or stock is an important component of working capital that continuously experiences dynamic fluctuations and turnover. Investment in the form of inventory has a significant impact on the company's profitability (Widyasari *et al.*, 2021). According to Tauhid & Saddam (2021), inventory is one form of asset that includes items owned by the company to be sold in normal operational activities, including items in the production process and raw materials that will be used in subsequent production processes.

The role of inventory is vital in achieving the company's goals, as most operational activities are directly related to inventory management. Based on the Financial Accounting Standards Statement (PSAK) No. 14 paragraph 8, inventory is defined as assets intended for sale in normal business activities, in the processing stage, or in the form of raw materials and supplies to be used in the production of goods or the provision of services. However, if there is an excess of inventory due to slow turnover, this can lead to various risks such as wasted working capital, increased storage and maintenance costs, lost opportunity costs, and the risk of damage to goods. Generally, goods acquired or produced in an accounting period are not entirely sold in the same period (Sugiarto, 2024).

A Stock Recording System with the Perpetual Method

Perpetual is an adjective that refers to something that occurs continuously, without interruption, and tends to lack a time limit. In certain contexts, this term can also describe a method or system that operates continuously and is constantly updated in real-time (Ramanda, 2023). The perpetual system is a method that continuously monitors changes in the inventory account. In other words, the company records all purchase and sale transactions directly into the Inventory account at the time the transactions occur. The main characteristics of the perpetual inventory recording system are as follows:

1) Transactions for the purchase of merchandise for resale or raw materials for production purposes are recorded by debiting the Inventory account, not the Purchases account.
2) Freight-in costs are recorded by debiting the Inventory account and are not included in the Purchase account. Meanwhile, purchase returns, purchase discounts, and discounts received are recorded as deductions from the value of Inventory, not through separate accounts.
3) The cost of goods sold is recorded each time a sales transaction occurs by debiting the Cost of Goods Sold (COGS) account and crediting the Inventory account.
4) The company maintains subsidiary ledgers to record the details of inventory individually as a form of internal control. The subsidiary ledger reflects the quantity and cost of each type of available goods. This perpetual inventory recording system provides up-to-date balance information for both the Inventory account and the Cost of Goods Sold account, enabling more accurate and real-time financial reporting (Sormin *et al.*, 2022).

According to Norlailah *et al.* (2024), the perpetual inventory recording system is a method where every change in the quantity or value of inventory is recorded directly and in real-time. Nur *et al.* (2022) added that this system is very effective when applied in trading companies as a tool for managing inventory. In its implementation, the inventory subsidiary ledger plays an important role in maintaining optimal stock levels, allowing for timely reordering and preventing excessive purchasing of goods. In the context of the perpetual recording system, Andari *et al.* (2022) compared the FIFO and Average methods at UD Agung Pratama. The research results indicate that the application of the FIFO method tends to yield higher net income compared to the Average

method. These findings indicate that the choice of inventory valuation method in a perpetual system can significantly impact the company's financial statements.

FIFO Method (First In First Out)
The FIFO method assumes that the first items purchased will be the first to be sold. In an inflationary situation, the application of this method results in a higher ending inventory value and a lower Cost of Goods Sold (COGS), which in turn increases net profit. Research by Salim (2021) indicates that the application of the FIFO method results in higher profits compared to the Average method, especially when the prices of goods increase.

LIFO Method (Last In First Out)
The LIFO (Last In First Out) method is based on the assumption that the last items purchased will be the first to be sold. In inflationary conditions, this method results in a higher Cost of Goods Sold (COGS) and a lower ending inventory value, thereby impacting the decrease in net profit. Ali *et al.* (2024) show that compared to the FIFO and Average methods, LIFO results in lower net income, but this method is considered to more realistically reflect current costs.

Average Method (Weighted Average)
The average method is an approach in inventory valuation that determines the cost per unit based on the average purchase price of similar items over a period (Nur *et al.*, 2022). This method does not consider the order of the inflow and outflow of goods. According to Khoirol Azka (2023), for the perpetual recording method, the average cost flow assumption is known as the moving average method. Kusumawati (2024) integrated the Average method into retail business inventory information systems and found that this method improves inventory management efficiency and cost recording accuracy.

Research Methodology

Type of Research
This research uses a qualitative approach with a descriptive comparative method. The quantitative approach was chosen because this research involves numerical data in the form of purchase and sale transactions of merchandise, which are then mathematically analyzed to calculate the Cost of Goods Sold (COGS), ending inventory value, and gross profit. The comparative descriptive method was selected because this research aims to describe and compare the calculation results obtained from three inventory recording methods in the perpetual system, namely FIFO, LIFO, and Average.

Population and Sample
The population in this study consists of photocopy and stationery SMEs operating in the Medan City area. From that population, the researcher determined the sample using purposive sampling techniques, specifically selecting photocopy and stationery businesses in Harjosari I Village, Medan Amplas, which already have an inventory recording system and are willing to provide the relevant data. The analysis was conducted by comparing the effectiveness and efficiency of inventory recording using the perpetual method with the practices that have been carried out by the MSME operators.

Data Collection Techniques:
1) Transaction Simulation
   Data is arranged in the form of transaction simulations over one accounting period.
2) Direct Observation
   Conducting direct observations of inventory recording practices in MSMEs.
3) Interview
   Conducted with business operators to obtain data on actual recording practices.
4) Documentation
   Involves inventory record documents held by each MSME as a data source.

Data Analysis Techniques:
The comparison of inventory recording results using the FIFO, LIFO, and Average methods will be calculated and compared from the perspective of:
1) Cost of Goods Sold (COGS)
2) Value of Ending Inventory
3) Gross Profit

Data will be presented in the form of tables and numerical calculations, then analyzed to determine the most efficient and profitable method.

Results and Discussion

Results

To understand the case regarding the inventory of merchandise using perpetual data in the LIFO, FIFO, and Average methods, and to gain further insight, the author has conducted interviews in this research with the results of three studies provided as follows:

1) Case Study 1:
Stationery Amanah is a business that sells various office stationery supplies such as pencils, pens, and notebooks. In carrying out its operational activities, Amanah conducted various purchase and sale transactions of merchandise during April 2025. The company uses the LIFO (Last In, First Out) inventory valuation method in recording the Cost of Goods Sold (COGS) and the ending inventory value. Here are the transaction data that occurred during April 2025:

Table 1. Office stationery Amanah (Pencil, Pen & Book)

Date	Description	Quantity	Acquisition Cost per Unit
01-Apr	Beginning Inventory	84	10.000
03-Apr	Sales	16	-
05-Apr-25	Purchase	132	10.500
10-Apr-25	Sales	40	-
17-Apr-25	Sales	50	-
22-Apr-25	Sales	60	-

Based on the transaction data of Stationery Amanah during April 2025, a record was made of the purchase and sales activities for merchandise consisting of pencils, pens, and books. To determine the Cost of Goods Sold (COGS) and the ending inventory value, the LIFO (Last-In, First-Out) method is applied, which assumes that the most recently purchased items are sold first. The following table presents the details of the purchase calculations, COGS, and inventory balance based on the LIFO method.

Table 2. LIFO Perpetual Inventory Calculation

Date	Purchase			Cost Of Good Sold			Inventory		
	UNIT	Acquisition Cost	Total	UNIT	Acquisitio	Total	UNIT	HP	TOTAL
01 Apr 25							84	Rp 10.000	Rp 840.000
03 Apr 25				16	Rp 10.000	Rp 160.000	68	Rp 10.000	Rp 680.000
05 Apr 25	132	Rp 10.500	Rp 1.386.000				68	Rp 10.000	Rp 680.000
							132	Rp 10.500	Rp 1.386.000
10 Apr 25				40	Rp 10.500	Rp 420.000	68	Rp 10.000	Rp 680.000
							92	Rp 10.500	Rp 966.000
17 Apr 25				50	Rp 10.500	Rp 525.000	68	Rp 10.000	Rp 680.000
							42	Rp 10.500	Rp 441.000
22 Apr 25				42	Rp 10.500	Rp 441.000	50	Rp 10.000	Rp 500.000
				18	Rp 10.000	Rp 180.000			

Ending inventory	50	Rp 10.000	Rp 500.000
Net Sales	166	Rp 15.000	Rp 2.490.000
cost of good sold			Rp 1.726.000
Gross Profit			Rp 764.000

2) Case Study 2:
Stationery Ina Com is a business that sells various office stationery supplies, such as pencils, pens, and notebooks. In carrying out its operational activities, Stationery Ina Com conducted various purchase and sales transactions of merchandise during April 2025. The company uses the Average inventory valuation method to record the Cost of Goods Sold (COGS) and the ending inventory value. The transaction data that occurred during April 2025 is presented below:

Table 3. Office stationery Ina Com (Pencil, Pen & Book)

Date	Description	Quantity	Acquisition Cost per Unit (Rp)
01-Apr-25	Beginning Inventory	85	10,000

04-Apr-25	Sales	35	-
06-Apr-25	Purchase	144	10,500
12-Apr-25	Sales	140	-
14-Apr-25	Purchase	120	11,000

Based on the transaction data of Stationery Ina Com for April 2025, a record was maintained of the purchase and sales activities for merchandise consisting of pencils, pens, and books. To determine the Cost of Goods Sold (COGS) and the ending inventory value, the Average method is applied. The following table presents the details of the purchase calculations, COGS, and inventory balance based on the Average method.

Table 4. Average Method

Date	Purchase			Cost of good sold			Investory		
	UNIT	Acquisition Case	TOTAL	UNIT	Acquisition Cost	TOTAL	UNIT	Acquisition Cost	TOTAL
01-Apr-25							85	Rp 10.000	Rp 850.000
04-Apr-25				35	Rp 10.000	Rp 350.000	50	Rp 10.000	Rp 500.000
06-Apr-25	144	Rp 10.500	Rp 1.512.000				194	Rp 10.371	Rp 2.012.000
12-Apr-25				140	Rp 10.371	Rp 1.451.958	54	Rp 10.371	Rp 560.041
14-Apr-25	120	Rp 11.000	Rp 1.320.000				174	Rp 10.805	Rp 1.880.041
20-Apr-25				100	Rp 10.805	Rp 1.080.483	74	Rp 10.805	Rp 799.557

Endinbg Investory	74	Rp 10.805	Rp 799.557
Net Sales	275	Rp 15.000	Rp 4.125.000
CostOf Good			Rp 2.882.441
Gross Profit			Rp 1.242.559

3) Case Study 3:
Stationery Narik Berkah is a business that sells various office stationery supplies, such as pencils, pens, and notebooks. In conducting its operational activities, Stationery Narik Berkah carried out various purchase and sales transactions of merchandise during April 2025. The company uses the FIFO (First-In, First-Out) inventory valuation method to record the Cost of Goods Sold (COGS) and the ending inventory value. The transaction data that occurred during April 2025 is presented below:

Table 5. Office stationery Narik Berkah (Pencil, Pen & Book)

Date	Description	Quantity Sold	Price (Rp)	COGS (Rp)	Remaining Inventory
03-Apr	Sales	30	10,000	300,000	60 units @ 10,000
10-Apr	Sales	60 + 40	10,000 / 10,500	600k + 420k	236 units @ 10,500
17-Apr	Sales	80	10,500	840,000	156 units @ 10,500

Based on the transaction data of Stationery Narik Berkah for April 2025, a record was maintained of the purchase and sales activities for merchandise consisting of pencils, pens, and books. To determine the Cost of Goods Sold (COGS) and the ending inventory value, the FIFO (First-In, First-Out) method is applied, which assumes that the earliest items purchased are sold first. The following table presents the details of the purchase calculations, COGS, and inventory balance based on the FIFO method.

Table 6. Method FIFO (First-In, First-Out)

Date	Purchase			Cost of good sold			Investory		
	UNIT	Acquisition Case	TOTAL	UNIT	Acquisition Cost	TOTAL	UNIT	Acquisition Cost	TOTAL
01-Apr-25							90	Rp 10.000	Rp 900.000
03-Apr-25				30	Rp 10.000	Rp 300.000	60	Rp 10.000	Rp 600.000
05-Apr-25	276	Rp 10.500	Rp 2.898.000				60	Rp 10.000	Rp 600.000
							276	Rp 10.500	Rp 2.898.000
10-Apr-25				60	Rp 10.000	Rp 600.000	236	Rp 10.500	Rp 2.478.000
				40	Rp 10.500	Rp 420.000			
17-Apr-25				80	Rp 10.500	Rp 840.000	156	Rp 10.500	Rp 1.638.000
22-Apr-25	60	Rp 11.000	Rp 660.000				156	Rp 10.500	Rp 1.638.000
							60	Rp 11.000	Rp 660.000
27-Apr-25				60	Rp 10.500	Rp 630.000	96	Rp 10.500	Rp 1.008.000
							60	Rp 11.000	Rp 660.000

Endinbg Investory	96	Rp 10.500	Rp 1.008.000
Net Sales	60	Rp 11.000	Rp 660.000
CostOf Goo	270	Rp 15.000	Rp 4.050.000
Gross Profit			Rp 2.790.000
LABA KOTOR			Rp 1.260.000

Table 7. Comparison of Advantages and Disadvantages

Method	Advantages	Disadvantages
FIFO	The value of the ending inventory is closer to the current market price because the newest items are still in the warehouse. Net profit tends to be higher if the price of goods increases. Suitable for perishable or easily damaged goods (such as food, medicines). Recognized by PSAK and IFRS.	HPP is lower when prices rise, so profits appear higher → this can lead to higher taxes. Not suitable for tax-saving purposes during inflation. High profit values may not reflect the current cost reality.
LIFO	HPP reflects the latest prices (current costs), suitable in inflationary conditions. Net profit is lower when prices rise, thus reducing the tax burden.	No longer allowed in PSAK and IFRS, because it does not reflect the fair value of inventory. The ending inventory value becomes too low when prices rise → less relevant on the balance sheet.
AVERAGE	COGS and inventory value are more stable, not too affected by extreme price fluctuations. Easy to implement in a computerized system. Suitable if the company does not have significant price changes between purchases.	Does not accurately reflect the current market price. If prices change sharply, this method can produce data that does not reflect the actual cost reality. It can reduce accuracy in cost-based planning or decision-making.

Table 8. Inventory Valuation Methods

Method	Applicable At	COGS	Profit	Tax	Compliance (PSAK/IFRS)
FIFO	When prices are rising	Lower	Higher	Higher	Permitted
LIFO	When seeking tax savings	Higher	Lower	Lower	Not Permitted (PSAK)
AVERAGE	When prices are stable	Stable	Stable	Stable	Permitted

Discussion

In a perpetual inventory system, the choice of valuation methods—specifically FIFO, LIFO, and Average—has a significant impact on final inventory value and the Cost of Goods Sold (COGS). The FIFO (First-In, First-Out) method assumes that the earliest items purchased are the first ones sold. In inflationary economic conditions where prices are rising, this method results in a lower COGS because older, less expensive goods are sold first, leading to higher reported net income and an ending inventory value that reflects more recent, higher purchase prices. Research by Permana & Yulianingsih (2024) and Pamulang & Windasari (2020) supports that FIFO yields a relatively lower COGS and higher ending inventory compared to the Average method, thereby potentially increasing both company profit and total assets.

Conversely, the LIFO (Last-In, First-Out) method assumes that the most recently acquired items are sold first. During inflationary periods, this results in a higher COGS because more expensive items are sold first, which lowers the reported net income and can reduce tax liabilities. However, it is important to note that LIFO is not permitted under international accounting standards (IFRS) or local Indonesian standards (PSAK). Meanwhile, the Average method determines COGS by calculating the weighted average of all available inventory, regardless of the order of receipt. This method produces a more stable COGS and ending inventory value, as it is less sensitive to price fluctuations, though it may be less responsive to rapid market changes. Research by Widyasari *et al.* (2021) and Ningtyas & Wafirotin (2024) highlights that the Average method often falls between FIFO and LIFO, providing a balanced approach to financial

reporting. A comparative study of three stationery SMEs—Narik Berkah (FIFO), Amanah (LIFO), and Ina Com (Average)—reveals significant differences in financial performance. Narik Berkah achieved the highest gross profit at Rp1,260,000, followed by Ina Com at Rp1,242,559, and Amanah at Rp764,000. Analysis confirms that in an environment of rising prices, FIFO is the most advantageous method, as it utilizes older, lower-cost inventory to generate revenue, thereby expanding profit margins. As noted by Khoirol Azka (2023) and Christian & Supatmi (2013), while FIFO is effective in optimizing stock turnover and reflecting current replacement costs, its primary weakness lies in the potential distortion of the matching principle between costs and revenues. Ultimately, the choice of inventory recording method significantly influences a company's financial statements, particularly regarding COGS, ending inventory, and net profit. FIFO proves effective for optimizing asset value and inventory efficiency, LIFO provides a more conservative profit outlook, and the Average method offers stability amidst price volatility. Therefore, businesses must carefully consider their specific economic environment, product characteristics, and financial reporting objectives to select the method that best aligns with their operational strategy and long-term financial goals.

Conclusion

Based on the results of a comparative analysis of perpetual inventory recording methods—namely FIFO, LIFO, and Average—it can be concluded that each method possesses distinct advantages suitable for specific conditions. The FIFO method yields a higher ending inventory value and greater gross profit during periods of rising prices, making it ideal for companies aiming to present a more favorable financial performance. In contrast, the LIFO method results in a higher cost of goods sold and lower profits in an inflationary environment, which can provide advantages in terms of short-term tax efficiency. Meanwhile, the Average method offers more stable and balanced results, making it suitable for companies that prioritize consistency and stability in financial reporting. Therefore, the choice of inventory recording method should align with the financial reporting objectives and the market conditions faced by the company. Based on the conclusion, it is recommended that trading companies select an inventory recording method tailored to their needs and business strategy. FIFO is suitable for demonstrating higher profits, LIFO is advantageous for tax efficiency (with regulatory considerations), and Average is ideal for stability. Periodic evaluation of the chosen methods is highly recommended, and further research could expand the analysis to include other financial impacts.

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