

Chapter 9

Inventories



Inventory

Inventory is a product held in reserve for consumption by an entity's customers.

Generally, three types of inventories exist:

- **Raw materials inventories** – Material to be converted into finished goods through a manufacturing process.
- **Work-in-Process (WIP) inventories** – Manufactured goods that are partially completed.
- **Finished goods** – Completed items awaiting sale or shipment to customers.



Difference Between Manufacturing and Merchandising

Generally, manufacturing firms will have all three types of the inventory listed in the previous slide, whereas merchandising firms (i.e., retail firms) will only have finished goods inventory. That is, goods to be sold directly to the consumer.



Advantages of Holding A Large Quantity of Inventory

Organizations maintain inventories to reduce “stock-out” costs and their related risks. Such costs include:

- Customers who satisfy their demands elsewhere.
- Delayed sales due to product unavailability.
- Increased costs resulting from material shortages as well as related disrupted production schedules (e.g., excess levels of WIP to “smooth” production, material acquired at a less than favorable price due to poor planning).



Disadvantages of Holding A Large Quantity of Inventory

Holding inventory has its own costs, which organizations must consider. These include:

- Storage costs (e.g., refrigeration of frozen product)
- Spoilage costs
- Obsolescence
- Theft
- Alternative economic use of the cash invested in inventory, including the earning of interest.



The Inventory Decision

Given these advantages and disadvantages, an entity will seek to develop optimal inventory management processes. These involve trading off the “costs” and “benefits” of holding inventory. The rapid development of information technology and production methods has enabled management to better control its investment in inventories.



Financial Statements for Merchandising Company

The income statement for a merchandising company would be as follows:

Net Sales

- Cost of Goods Sold
- Gross Profit
- Operating Expenses
- Net Income



Financial Statements for Merchandising Company

GAAP for merchandise inventories is based upon the purchase sequence that occurs during acquisition.

GAAP describes the overall process through the following formula:

$$\begin{aligned} & \text{Beginning Inventory} \\ & + \text{Purchases} \\ & = \text{Cost of Goods Available for Sale} \\ & - \text{Cost of Goods Sold} \\ & = \text{Ending Inventory} \end{aligned}$$



Determining Cost of Goods Sold

Beginning inventory and purchases are known from existing records (e.g., prior year's inventory valuation and current-year purchase records).

The cost of ending inventory is computed (by counting the goods on hand and multiplying these quantities by the appropriate unit price).

Cost of goods sold is "squeezed out" as the only missing item.



Recording Sales Under a Perpetual Inventory System

With a perpetual inventory system, continually updated records are maintained for inventory items. Such tracking is readily enabled through advances in technology. As a result, two journal entries are made when a sale occurs. Assume Rhody is an appliance retailer and sold \$50,000 of appliances on account. It acquired the appliances for \$32,000. What are the necessary journal entries to record the sale?



Perpetual Inventory Journal Entries

Time of Sale (Both Entries):

Accounts Receivable	50,000	
Sales		50,000
Cost of Goods Sold	32,000	
Merchandise Inv.		32,000



Recording Sales Under a Periodic Inventory System

In a periodic inventory system, when an item is sold, the only journal entry recorded is to reflect the sale of the merchandise. Cost of goods sold is recorded only after the ending inventory has been counted and valued at the end of the period. Again, assume Rhody is an appliance retailer and sold \$50,000 of appliances that it acquired for \$32,000. What is the journal entry to record the sale?



Periodic Inventory Journal Entries

Time of Sale:

Accounts Receivable	50,000	
Sales		50,000

End of the Period:

Cost of Goods Sold	32,000	
Merchandise Inv.		32,000



Which Inventory Method Do Companies Use?

Perpetual inventory systems offer management “real time” information as well as enhanced inventory control (e.g., reduced shrinkage, theft) and planning capabilities (e.g., current quantities available by individual product). The key difference between periodic and perpetual inventory is the point at which the costs of goods sold is computed. In summary, GAAP requires that for external purposes we use periodic; however, internally, companies use a perpetual system, since it provides tremendous efficiencies.



Inventory Costing Methods

Since inventory items have been purchased at various times and prices during the period, a “flow assumption” (i.e., which items have been sold and which remain in ending inventory) must be made to compute ending inventory. There are a number of inventory costing methods:

- First-in, First-out (FIFO) method
- Last-in, First-out (LIFO) method
- Average Cost Method



Inventory Costing Methods

There is no accounting requirement that the costing method is consistent with the physical movement of the goods.

Although these are referred to as “inventory costing methods,” the terms **FIFO**, **LIFO** and **Average Cost** are best understood as methods for calculating cost of goods sold.



First-in, First-out (FIFO) Method

First-in, First-out (FIFO) method assumes that the earliest goods purchased are the first to be sold.

Thus, cost of goods sold is obtained by taking the unit cost of the oldest goods purchased and working forward until the cost of all units sold have been determined. As a result, ending inventory is the most recently purchased goods.



Example: Inventory Methods

Let's assume Rhody starts a new business in June and acquires 1,250 units for sale on three dates during the month. In addition we will assume that Rhody sells 1,000 units during the month. A recap of the inventory activity for June in units and the units sold would be as follows:

Units in beginning inventory	-0-
Units purchased	<u>1,250</u>
Units available for sale	1,250
Units sold	<u>1,000</u>
Units in ending inventory	250



Example: Inventory Methods - FIFO

Assume that we continue with our example and that we purchased the inventory on three separate dates in June at the following cost:

June 2	500 x \$100	\$50,000
June 6	400 x \$125	\$50,000
June 25	350 x \$130	\$45,500

What is the amount of Rhody's cost of goods sold and ending inventory under the FIFO method of valuing inventory if we sold 1,000 units?



Example: Inventory Methods - FIFO

Now to calculate cost of goods sold under FIFO, the first units acquired are the first units sold.

June 2	500 x \$100	\$ 50,000
June 6	400 x \$125	\$ 50,000
June 25	100 x \$130	<u>\$ 13,000</u>
Cost of Goods Sold		\$113,000

Thus the Ending Inventory is:

250 units x \$130	\$ 32,500
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Last-in, First-out (LIFO) Method

Last-in, First-out (LIFO) method assumes that the last goods purchased are the first to be sold.

Thus, cost of goods sold is obtained by taking the unit cost of the most recently purchased goods and working backward until the cost of all units sold have been determined. As a result, ending inventory is the oldest purchased goods.



Example: Inventory Methods - LIFO

Assume that we continue with our example and that we purchased the inventory on three separate dates in June at the following cost:

June 2	500 x \$100	\$50,000
June 6	400 x \$125	\$50,000
June 25	350 x \$130	\$45,500

What is the amount of Rhody's cost of goods sold and ending inventory under the LIFO method of valuing inventory if we sold 1,000 units?



Example: Inventory Methods - LIFO

Now to calculate cost of goods sold under LIFO, the last units acquired are the first units sold.

June 25	350 x \$130	\$ 45,500
June 6	400 x \$125	\$ 50,000
June 2	250 x \$100	<u>\$ 25,000</u>
Cost of Goods Sold		\$120,500

Thus, the Ending Inventory is:

250 units x \$100	\$ 25,000
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Average Cost Method

Average cost method assumes that the goods available for sale are homogeneous and allocates the cost of goods available for sale on the basis of the weighted average unit cost incurred.

The weighted average unit cost is then applied to the units sold to determine the cost of goods sold. In addition, it is applied to the units in ending inventory to determine the value of ending inventory.



Example: Inventory Methods – Weighted Average Cost

Assume that we continue with our example and that we purchased the inventory on three separate dates in June at the following cost:

June 2	500 x \$100	\$50,000
June 6	400 x \$125	\$50,000
June 25	350 x \$130	\$45,500

What is the amount of Rhody's cost of goods sold and ending inventory under the weighted average cost method of valuing inventory if we sold 1,000 units?



Example: Inventory Methods – Weighted Average Cost

Now to calculate cost of goods sold under the weighted average cost method, we total the number of units and the total cost and find an average cost per unit.

June 2	500 x \$100	\$ 50,000
June 6	400 x \$125	50,000
June 25	350 x \$130	<u>45,500</u>
Total	1,250 units	\$145,500 total cost

Average Cost per Unit - \$145,500/1,250 = \$116.40 per unit

Cost of Goods Sold - 1,000 x \$116.40 = \$116,400

Ending Inventory – 250 x \$116.40 = \$29,100



Financial Statements and Tax Effects of Inventory Methods

The reasons companies adopt different inventory cost flow methods are varied, but the reason usually involves one of the three following factors:

- Income statement effects
- Balance sheet effects
- Tax effects



Income Statement Effects

In periods of increasing prices, FIFO reports the highest net income, LIFO the lowest net income, and average cost falls in the middle.

In periods of decreasing prices, the converse is true: FIFO will report the lowest net income, LIFO the highest, with average cost in the middle.



Balance Sheet Effects

In a period of inflation, the costs allocated to ending inventory using FIFO will approximate current costs. Thus, the market to book value of the inventory should approximate 1.0.

Conversely, during a period of increasing prices, the costs allocated to the ending inventory using LIFO will be significantly understated. Thus, the market to book ratio will be greater than 1.0.



Tax Effects

Both inventory on the balance sheet and net income on the income statement are higher when FIFO is used in a period of inflation.

Many companies have switched to LIFO because LIFO yields the lowest net income and, therefore, the lowest income tax liability in a period of increasing prices.



Lower of Cost or Market for Inventories

The LOCM rule guarantees that inventory book values cannot be greater than their market values (i.e., their market-to-book ratio is at least one). When prices are falling, LOCM requires a prompt “write-down” to market.



Lower of Cost or Market (LOCM)

For a merchandising company, market is the cost of purchasing the same goods at the present time from the usual suppliers in the usual quantities.

Once the inventory has been written down, the value of the inventory is never increased!



Lower of Cost or Market (LOCM)

Assume Rhody values its inventory using the FIFO method and determines its ending inventory to be \$18,000. However, due to economic conditions, the market value of this inventory is \$14,000. What must Rhody do to reflect the impact of this information?



Lower of Cost or Market (LCM)

Rhody needs to reduce its inventory by \$4,000. The journal entry depends on whether this reduction is material or not material. If it is not a material amount, it can be part of cost of goods sold. If it is material, you want to signal the users of the financial statements of this “one-time” event, so it would be separately reported.

Not Material:

Cost of Goods Sold	4,000	
Inventory		4,000

Material:

Loss on Write-down of Inventory	4,000	
Inventory		4,000



LIFO Reserve

The tax law requires that if a company uses LIFO for tax purposes, it must use it for book purposes. This is referred to as the LIFO conformity rule. Related to this, the accounting standards require firms using LIFO to report in the notes of the financial statements the amount by which inventory would be increased (or on occasion decreased) if the firm had instead been using FIFO. This amount is referred to as the LIFO reserve. Reporting the LIFO reserve enables analysts to make adjustments to compare companies that use different cost flow methods.



LIFO Reserve

Ending inventory under FIFO is based on the cost of the most recent units purchased. While the value of the inventory under LIFO is based on the oldest units acquired. Therefore, the value of the ending inventory under FIFO will be higher than under LIFO. So in essence, for a company using the LIFO method of inventory, the LIFO reserve measures the amount that COGS has been greater under LIFO than it would have been under FIFO. Thus, when the LIFO reserve decreases, that means that the COGS using LIFO for that year is greater than it would be if the company used FIFO. The opposite is true if the LIFO reserve increases.



Inventory-Related Profitability Ratios

Gross Profit Ratio is calculated as sales less cost of goods sold divided by sales. This measure provides the starting point for many financial analyses, as it illustrates what remains from a dollar of sales to cover operating expenses with the residual amount being profit (see slide 9-7).

Gross Profit Ratio:

$$\frac{(\text{Sales} - \text{COGS} = \text{Gross Profit})}{\text{Sales}}$$



Inventory Turnover Ratio And Inventory in Days

Another important piece of information is how fast an entity turns over its inventory (how many times we need to replenish it) during the year. From this we can determine how many days of inventory we have available for sale. Recall from the beginning of the notes that holding “excess” inventory has benefits (no stockouts) but comes at a cost (ties up cash). Thus, we would like to have our inventory in days as low as possible.



Inventory Turnover Ratio And Inventory in Days

Inventory Turnover Ratio:

$$\frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

Average Inventory = (Beginning Inv + Ending Inv)/2

Inventory in Days:

$$\frac{365 \text{ days}}{\text{Inventory turnover}}$$

