

Chapter 4: Inventories

The accounting choice related to inventory is affected by operating strategies, tax consequences, and is important for providing information that is useful for predicting financial performance. In this chapter, we discuss the basic issues related to accounting and reporting for inventory. The content and organization of the chapter are as follows.

- Nature and classification of inventories
- Physical goods and costs included in inventory
- Cost flow assumptions
- LIFO, LIFO reserve, LIFO liquidation and First-In-First-Out (FIFO)
- Basis for selection of inventory methods
- LCM and other special valuation methods
- Inventory estimation methods

Nature and classification of inventories

Inventory refers to the assets a company (1) intends to sell in the normal course of business, (2) has in production for future sale (work in process), or (3) uses currently in the production of goods to be sold (raw materials). The investment in inventories is frequently the largest current asset of merchandising (retail) and manufacturing businesses. The description and measurement of inventory require careful attention because inventory usually is one of the most valuable assets listed in the balance sheet for these firms and cost of goods sold is the expense recorded when inventory is sold typically is the largest expense in the income statement. The inventory amount in the balance sheet at the end of an accounting period represents the cost of the inventory still on hand, and cost of goods sold in the income statement represents the cost of the inventory sold during the period. The historical cost principle and matching principle offer guidance for measuring inventory and cost of goods sold, but, it's usually difficult to measure inventory (cost of goods sold) at the exact cost of the actual physical quantities on hand (sold). Fortunately, accountants can use one of several techniques to approximate the desired result and satisfy measurement objectives.

Inventories are:

Items held for sale, or Goods to be used in the production of goods to be sold.

Businesses with inventory include Merchandiser or Manufacturer

Merchandising Inventory

One inventory account which is purchase of goods in form ready for sale is usually reported in the balance sheet. Wholesale and retail companies purchase goods that are primarily in finished form. These companies are intermediaries in the process of moving goods from the manufacturer to the end-user. They often are referred to as merchandising companies and their inventory as merchandise inventory. *The cost of merchandise inventory includes the purchase price plus any other costs necessary to get the goods in condition and location for sale.*

Manufacturing Inventories

Three accounts are reported in the balance sheet

Raw materials

Work in process

Finished goods

Unlike merchandising companies, manufacturing companies actually produce the goods they sell to wholesalers, retailers, or other manufacturers.

Valuation requires determining

The physical goods (goods on hand, goods in transit, consigned goods, special sales agreements).

The costs to include (product vs. period costs).

The cost flow assumption (specific Identification, average cost, FIFO, retail, etc.).

Physical Goods Included in Inventory

Technically, a company should record purchases when it obtains legal title to the goods. In practice, however, a company records acquisitions when it receives the goods because it is difficult to determine the exact time of legal passage of title for every purchase. In addition, no material error likely results from such a practice if consistently applied. Illustration below indicates the general guidelines companies use in evaluating whether the seller or buyer reports an item as inventory. Exceptions to the general guidelines can arise for goods in transit and consigned goods.

General Rule	
Inventory is buyer's when received, except:	
FOB shipping point	— Buyer's at time of delivery to common carrier
Consignment goods	— Seller's, not buyer's
Sales with buybacks	— Seller's, not buyer's
Sales with high rates of returns	— Buyer's, if you can estimate returns
Sales on installments	— Buyer's, if you can estimate collectibility

Costs Included in Inventory

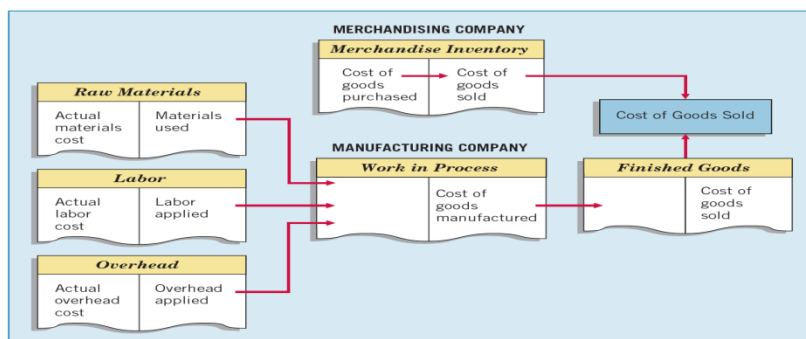
Product Costs - costs directly connected with bringing the goods to the buyer's place of business and converting such goods to a salable condition.

Period Costs – selling, general, and administrative expenses.

Treatment of Purchase Discounts – Gross vs. Net Method

Cost flow assumptions

Illustration below shows the differences in the flow of costs through a merchandising company and a manufacturing company.



In this diagram, we see the typical inventory cost flow. The manufacturing company acquires raw materials, hires direct labor and incurs manufacturing overhead. As raw materials, direct labor and manufacturing overhead are used, they are transferred into work-in-process inventory. When an item in work-in-process inventory has been completed, it is transferred to finished goods inventory. Finally, finished goods are sold to the final customer, and transferred out of finished goods inventory into cost of goods sold.

Companies that sell or produce goods report inventory and cost of goods sold at the end of each accounting period. They use one of two types of systems for maintaining accurate inventory records for these costs: the perpetual system or the periodic system.

Perpetual System: - The accounting features of a perpetual inventory system are as follows.

Purchases of merchandise are debited to Inventory.

Freight-in is debited to Inventory. Purchase returns and allowances and purchase discounts are credited to Inventory.

Cost of goods sold is debited and Inventory is credited for each sale.

Subsidiary records show quantity and cost of each type of inventory on hand.

The perpetual inventory system provides a continuous record of the balances in both the Inventory account and the Cost of Goods Sold account.

Periodic System

Purchases of merchandise are debited to Purchases.

Ending Inventory determined by physical count.

Calculation of Cost of Goods Sold is required

Exercise 1 Fesmire Company had the following transactions during the current year.

Beginning inventory	100 units at \$6	= \$600
Purchases	900 units at \$6	= \$5,400
Sales	600 units at \$12	= \$7,200
Ending inventory	400 units at \$6	= \$2,400

Record these transactions using the Perpetual and Periodic systems.

Illustration: Assume that at the end of the reporting period, the perpetual inventory account reported an inventory balance of \$4,000. However, a physical count indicates inventory of \$3,800 is actually on hand. The entry to record the necessary write-down is as follows.

Inventory Over and Short 200

Inventory

2000

Note: Inventory over and Short adjusts Cost of Goods Sold. In practice, companies sometimes report Inventory Over and Short in the “Other income and expense” section of the income statement.

Note that a company using the periodic inventory system does not report the account Inventory Over and Short. The reason: The periodic method does not have accounting records against which to compare the physical count. As a result, a company buries inventory overages and shortages in cost of goods sold.

Inventory Control

All companies need periodic verification of the inventory records by actual count, weight, or measurement, with the counts compared with the detailed inventory records. Companies should take the physical inventory near the end of their fiscal year, to properly report inventory quantities in their annual accounting reports.

Inventory Cost Flow Methods

How do we account for changes in the cost of inventory and cost of goods sold when we experience changes in the price of the items that we purchased during the period? We will look at four methods to handle this problem. The first is the specific identification method, next is the average cost method, then the first-in first-out or FIFO method, and finally, we will look at the last-in, first-out or LIFO method.

Note that IFRS indicates specific identification is the preferred inventory method, unless it is impracticable to use. Companies use the moving-average method with perpetual inventory records. IFRS does not permit LIFO.

Cost Flow Assumption Adopted does not need to equal Physical Movement of Goods. Method adopted should be one that most clearly reflects periodic income.

LIFO, LIFO reserve, LIFO liquidation and Birr-Value LIFO

The **last-in, first-out (LIFO) method** assumes that the units sold are the most recent units purchased.

Many companies use LIFO for tax and external reporting purposes. However, they maintain a FIFO, average-cost or standard cost system for internal reporting purposes. There are several reasons to do so.

- (1) Companies often base their pricing decisions on other methods.
- (2) Recordkeeping on some other basis is easier
- (3) Profit-sharing and other bonus arrangements often depend on a non-LIFO inventory assumption.
- (4) The use of a pure LIFO system is troublesome for interim periods.

The difference between the inventory method used for internal reporting purposes and LIFO is the Allowance to Reduce Inventory to LIFO account or the **LIFO reserve**. The change in the allowance balance from one period to the next is the **LIFO effect**. The LIFO effect is the adjustment that companies must make to the accounting records in a given year.

Illustration: Acme Boot Company uses the FIFO method for internal reporting purposes and LIFO for external reporting purposes. At January 1, 2011, the Allowance to Reduce Inventory to LIFO balance is \$20,000. At December 31, 2011, the balance should be \$50,000. As a result, Acme Boot realizes a LIFO effect and makes the following entry at year-end.

Journal entry to reduce inventory to LIFO:

Cost of goods sold	30,000
Allowance to reduce inventory to LIFO	30,000

LIFO Liquidations

Remember the importance of matching revenues and expenses in creating an income statement that is useful in predicting future cash flows. If prices change during a period, then LIFO generally will provide a better match of revenues and expenses. Sales reflect the most recent selling prices, and cost of goods sold includes the costs of the most recent purchases.

For the same reason, though, inventory costs in the balance sheet with LIFO generally are out of date because they reflect old purchase transactions. It is not uncommon for a company's LIFO inventory balance to be based on unit costs actually incurred several years earlier.

This distortion sometimes carries over to the income statement as well. When inventory quantities decline during a period, then these out-of-date inventory layers are liquidated and cost of goods sold will partially match noncurrent costs with current selling prices. If costs have been increasing (decreasing), LIFO liquidations produce higher (lower) net income than would have resulted if the liquidated inventory were included in cost of goods sold at current costs. The paper profits (losses) caused by including out of date, low (high) costs in cost of goods sold is referred to as the effect on income of liquidations of LIFO inventory.

To illustrate this problem, consider the example in Illustration below

National Distributors, Inc. uses the LIFO inventory method. The company began 2013 with inventory of 10,000 units that cost \$20 per unit. During 2013, 30,000 units were purchased for \$25 each and 35,000 units were sold.

National's LIFO cost of goods sold for 2013 consists of:

30,000 units @ \$25 per unit	= \$750,000
5,000 units @ \$20 per unit	= \$100,000
<u>35,000</u>	<u>\$850,000</u>

Included in cost of goods sold are 5,000 units from beginning inventory that have now been liquidated. If the company had purchased at least 35,000 units, no liquidation would have occurred. Then cost of goods sold would have been \$875,000 (35,000 units × \$25 per unit) instead of \$850,000. The difference between these two costs of goods sold figures is \$25,000 (\$875,000 – 850,000). This is the before tax income effect of the LIFO liquidation. Assuming a 40% income tax rate, the net effect of the liquidation is to increase net income by \$15,000 [\$25,000 × (1 – .40)]. The lower the costs of the units liquidated, the more severe the effect on income.

A company must disclose in a note any material effect of **LIFO liquidation** on net income. In our illustration, National Distributors, Inc. would disclose that LIFO liquidations increased income by \$15,000 in 2013, assuming that this effect on income is considered material.

Birr-value LIFO (BVL):- Gained such widespread popularity during the 1960s and 1970s that many LIFO applications are now based on this approach. BVL extends the concept of inventory pools by allowing a company to combine a large variety of goods into one pool.

Physical units are not used in calculating ending inventory. Instead, the inventory is viewed as a quantity of value instead of a physical quantity of goods. Instead of layers of units from different purchases, the DVL inventory pool is viewed as comprising layers of dollar value from different years.

Because the physical characteristics of inventory items are not relevant to DVL, an inventory pool is identified in terms of economic similarity rather than physical similarity. Specifically, a pool should consist of those goods that are likely to be subject to the same cost change pressures.

Advantage:

Broader range of goods in pool.

Permits replacement of goods that are similar.

Helps protect LIFO layers from erosion.

Cost Indexes

In either the unit LIFO approach or the pooled LIFO approach, we determine whether a new LIFO layer was added by comparing the ending quantity with the beginning quantity. The focus is on *units* of inventory. Under BVL, we determine whether a new LIFO layer was added by comparing the ending dollar amount with the beginning dollar amount. The focus is on inventory *value*, not units. However, if the price level has changed, we need a way to determine whether an observed increase is a real increase (an increase in the quantity of inventory) or one caused by an increase in prices. So before we compare the beginning and ending inventory amounts, we need to deflate inventory amounts by any increase in prices so that both the beginning and ending amounts are measured in terms of the same price level. We accomplish this by using cost indexes. A cost index for a particular layer year is determined as follows:

$$\text{Cost index in layer year} = \frac{\text{Cost in layer year}}{\text{Cost in base year}}$$

The base year is the year in which the DVL method is adopted and the layer year is any subsequent year in which an inventory layer is created. The cost index for the base year is set at 1.00. Subsequent years' indexes reflect cost changes relative to the base year.

There are several techniques that can be used to determine an index for a BVL pool. An external index like the Consumer Price Index or the Producer Price Index can be used. However, in most cases these indexes would not properly reflect cost changes for any individual BVL pool. Instead, most companies use an internally generated index. These indexes can be calculated using one of several techniques such as the *double-extension method* or the *link-chain method*.

Comparison of LIFO Approaches

Specific-goods LIFO - costing goods on a unit basis is expensive and time consuming.

Specific-goods Pooled LIFO approach

Reduces record keeping and clerical costs.

More difficult to erode the layers.

Using quantities as measurement basis can lead to untimely LIFO liquidations.

Dollar-value LIFO is used by most companies.

Illustration: The following information relates to the Choctaw Company.

Date	Ending Inventory (End-of-Year Prices)	Price Index
December 31, 2007	\$ 70,000	100
December 31, 2008	88,200	105
December 31, 2009	95,120	116

Use the dollar-value LIFO method to compute the ending inventory for 2007 through 2009.

Inventory at End-of-Year			Inventory at Base-Year			\$ Value		
Year	Prices	Index	Prices	Layers	Index	LIFO	LIFO	LIFO
2007	\$ 70,000	1.00	\$ 70,000	\$ 70,000	1.00	\$ 70,000	\$ 70,000	\$ -
2008	88,200	1.05	84,000	70,000	1.00	70,000	84,700	3,500
				14,000	1.05	14,700		
2009	95,120	1.16	82,000	70,000	1.00	70,000	82,600	12,520
				12,000	1.05	12,600		
Balance Sheet			Dec. 31 2007	Dec. 31 2008		Dec. 31 2009		
Inventory			\$ 70,000	\$ 88,200		\$ 95,120		
LIFO Reserve			-	(3,500)		(12,520)		
Journal entry			\$ 70,000	\$ 84,700		\$ 82,600		
Cost of goods sold				3,500		9,020		
Allowance to reduce inventory to LIFO				(3,500)		(9,020)		

Concept review exercises

The Rogers Company began 2013 with an inventory of 10 million units of its principal product. These units cost \$5 each. The following inventory transactions occurred during the first six months of 2013.

Date	Transaction
Feb. 15	Purchased, on account, 5 million units at a cost of \$6.50 each.
Mar. 20	Sold, on account, 8 million units at a selling price of \$12 each.
Apr. 30	Purchased, on account, 5 million units at a cost of \$7 each.

On June 30, 2013, 12 million units were on hand.

Required:

- Prepare journal entries to record the above transactions. The company uses a periodic inventory system.
- Prepare the required adjusting entry on June 30, 2013, applying each of the following inventory methods:
 - Average
 - FIFO
 - LIFO
- Repeat requirement 1&2 assuming that the company uses a perpetual inventory system.

On January 1, 2013, the Johnson Company adopted the dollar-value LIFO method. The inventory value on this date was \$500,000. Inventory data for 2013 through 2016 are as follows:

Date	Ending Inventory at Year-End Costs	Cost Index
12/31/13	\$556,500	1.05
12/31/14	596,200	1.10
12/31/15	615,250	1.15
12/31/16	720,000	1.25

Required:

Calculate Johnson's ending inventory for the years 2013 through 2016.

Basis for selection of inventory methods

LIFO is generally preferred:

If selling prices are increasing faster than costs and

If a company has a fairly constant "base stock."

LIFO is not appropriate:

If prices tend to lag behind costs,

If specific identification traditionally used, and

When unit costs tend to decrease as production increases.

Inventories: Additional Issues

Information on inventories is important to investors. In this topic, we discuss some of the valuation and estimation concepts that companies use to develop relevant inventory information.

LCM and other special valuation methods

IFRS defines *market* as net realizable value; GAAP defines *market* as replacement cost subject to certain constraints. LCM is not an optional approach to valuing inventory; it is required by GAAP.

Inventories are recorded at their cost. However, if inventory declines in value below its original cost, a major departure from the historical cost principle occurs. Whatever the reason for a decline obsolescence, price-level changes, or damaged goods a company should write down the inventory to market to report this loss. A company abandons the historical cost principle when the future utility (revenue producing ability) of the asset drops below its original cost. Companies therefore report inventories at the lower-of-cost-or-market or Net realizable value (NRV) at each reporting period.

Determining Market value

From the preceding discussion, you might interpret the term *market* to mean the amount that could be realized if the inventory were sold. However, generally accepted accounting principles define market for LCM purposes as the inventory's current replacement cost (by purchase or reproduction) except that market should not:

Exceed the net realizable value (that is, estimated selling price in the ordinary course of business less reasonably predictable costs of completion and disposal).

Be less than net realizable value reduced by an allowance for an approximately normal profit margin.

In effect, we have a ceiling and a floor between which market (that is, replacement cost) must fall. **Net realizable value (NRV)** represents the upper limit and **net realizable value less a normal profit margin (NRV-NP)** provides the lower limit. If **replacement cost (RC)** is within the range, it represents market; if it is above the ceiling or below the floor, the ceiling or the floor becomes market. As a result, the designated market value is the number that falls in the middle of the three possibilities: replacement cost, net realizable value, and net realizable value less a normal profit margin. The designated market value is compared with cost, and the lower of the two is used to value inventory.

Net Realizable Value

Estimated selling price in the normal course of business less estimated costs to complete and estimated costs to make a sale.

Inventory value—unfinished		\$1,000
Less: Estimated cost of completion	\$ 50	
Estimated cost to sell	<u>200</u>	<u>250</u>
Net realizable value		\$ 750

Lower-of-Cost-or-Net Realizable Value (LCNRV)

Illustration of LCNRV: Regner Foods computes its inventory at LCNRV.

Food	Cost	Net Realizable Value	Final Inventory Value
Spinach	\$ 80,000	\$120,000	\$ 80,000
Carrots	100,000	110,000	100,000
Cut beans	50,000	40,000	40,000
Peas	90,000	72,000	72,000
Mixed vegetables	95,000	92,000	92,000
			<u>\$384,000</u>
Final Inventory Value:			
Spinach	Cost (\$80,000) is selected because it is lower than net realizable value.		
Carrots	Cost (\$100,000) is selected because it is lower than net realizable value.		
Cut beans	Net realizable value (\$40,000) is selected because it is lower than cost.		
Peas	Net realizable value (\$72,000) is selected because it is lower than cost.		
Mixed vegetables	Net realizable value (\$92,000) is selected because it is lower than cost.		

Methods of applying LCNRV

	Cost	LCNRV	LCNRV by:		
			Individual Items	Major Groups	Total Inventory
Frozen					
Spinach	\$ 80,000	\$120,000	\$ 80,000		
Carrots	100,000	110,000	100,000		
Cut beans	50,000	40,000	40,000		
Total frozen	<u>230,000</u>	<u>270,000</u>		\$230,000	
Canned					
Peas	90,000	72,000	72,000		
Mixed vegetables	95,000	92,000	92,000		
Total canned	<u>185,000</u>	<u>164,000</u>		164,000	
Total	<u>\$415,000</u>	<u>\$434,000</u>	<u>\$384,000</u>	<u>\$394,000</u>	<u>\$415,000</u>

Methods of Applying LCNRV

In most situations, companies price inventory on an item-by-item basis.

Tax rules in some countries require that companies use an individual-item basis.

Individual-item approach gives the lowest valuation for statement of financial position purposes.

Method should be applied consistently from one period to another.

Recording Net Realizable Value Instead of Cost			
	Cost of goods sold (before adj. to NRV)		\$ 108,000
	Ending inventory (cost)		82,000
	Ending inventory (at NRV)		70,000
Loss Method	Loss due to decline to NRV	12,000	
	Inventory		12,000
COGS Method	Cost of goods sold	12,000	
	Inventory		12,000

Statement of Financial Position Presentation

	COGS Method	Loss Method
Current assets:		
Inventory	\$ 70,000	\$ 70,000
Prepays	20,000	20,000
Accounts receivable	350,000	350,000
Cash	<u>100,000</u>	<u>100,000</u>
Total current assets	<u>540,000</u>	<u>540,000</u>

Income Statement Presentation

	COGS Method	Loss Method
Sales	\$ 200,000	\$ 200,000
Cost of goods sold	108,000	120,000
Gross profit	92,000	80,000
Operating expenses:		
Selling	45,000	45,000
General and administrative	20,000	20,000
Total operating expenses	65,000	65,000
Other income and expense:		
Loss due to NRV on inventory	12,000	-
Interest income	5,000	5,000
Total other	(7,000)	5,000
Income from operations	20,000	20,000
Income tax expense	6,000	6,000
Net income	\$ 14,000	\$ 14,000

Inventory estimation methods: Use of an Allowance

Instead of crediting the Inventory account for net realizable value adjustments, companies generally use an allowance account. Under the loss method:

Loss due to decline to NRV	12,000
Allowance to reduce inventory to NRV	12,000

Statement of Financial Position Presentation

	COGS Method	Loss Method
Current assets:		
Inventory	\$ 70,000	\$ 82,000
Allowance to reduce inventory		(12,000)
Inventory at NRV		70,000
Prepays	20,000	20,000
Accounts receivable	350,000	350,000
Cash	100,000	100,000
Total current assets	540,000	540,000

Recovery of Inventory Loss

Amount of **write-down** is reversed.

Reversal **limited** to amount of original write-down.

Continuing the Ricardo example, assume the net realizable value increases to \$74,000 (an increase of \$4,000). Ricardo makes the following entry, using the **loss method**.

Allowance to reduce inventory to NRV	4,000
Recovery of inventory loss	4,000

Allowance account is adjusted in subsequent periods, such that inventory is reported at the LCNRV.

Date	Inventory at Cost	Inventory at Net Realizable Value	Amount Required in Allowance Account	Adjustment of Allowance Account Balance	Effect on Net Income
Dec. 31, 2010	\$188,000	\$176,000	\$12,000	\$12,000 inc.	Decrease
Dec. 31, 2011	194,000	187,000	7,000	5,000 dec.	Increase
Dec. 31, 2012	173,000	174,000	0	7,000 dec.	Increase
Dec. 31, 2013	182,000	180,000	2,000	2,000 inc.	Decrease

Inventory should not be reported at a value above original cost.

Evaluation of LCM Rule

Some Deficiencies:

Decreases in the value of the asset and the charge to expense are recognized in the period in which the loss in utility occurs—not in the period of sale.

Increases in the value of the asset (in excess of original cost) recognized only at the point of sale.

Inconsistency because a company may value inventory at cost in one year and at net realizable value in the next year.

LCNRV values inventory conservatively. Net income for the year in which a company takes the loss is definitely lower. Net income of the subsequent period may be higher than normal if the expected reductions in sales price do not materialize.

Remmers Company manufactures desks. Most of the company's desks are standard models and are sold on the basis of catalog prices. At December 31, 2010, the following finished desks appear in the company's inventory.

Finished Desks	A	B	C	D
FIFO cost inventory at 12/31/10	\$ 470	\$ 450	\$ 830	\$ 960
Est. cost to complete and sell	50	110	260	200
Catalog selling price	500	540	900	1,200

Instructions: At what amount should the desks appear in the company's December 31, 2010, inventory, assuming that the company has adopted a lower-of-FIFO-cost-or-net realizable value approach for valuation of inventories on an individual-item basis?

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FIFO cost inventory at 12/31/10	\$ 470	\$ 450	\$ 830	\$ 960
Est. cost to complete and sell	50	110	260	200
Catalog selling price	500	540	900	1,200
Net realizable value	450	430	640	1,000
Lower-of-cost-or-NRV	450	430	640	960

Valuation Bases

Special Valuation Situations

Departure from LCNRV rule may be justified in situations when

Cost is difficult to determine,

Items are readily marketable at quoted market prices, and

Units of product are interchangeable.

Two common situations in which **NRV is the general rule:**

Agricultural assets

Commodities held by broker-traders.

Agricultural Inventory

Biological asset (classified as a **non-current asset**) is a living animal or plant, such as sheep, cows, fruit trees, or cotton plants.

Biological assets are measured on initial recognition and at the end of each reporting period at fair value less costs to sell (NRV).

Companies record gain or loss due to changes in NRV of biological assets in income when it arises.

Agricultural produce is the harvested product of a biological asset, such as wool from a sheep, milk from a dairy cow, picked fruit from a fruit tree, or cotton from a cotton plant.

Agricultural produce are measured at fair value less costs to sell (NRV) at the point of harvest.

Once harvested, the NRV becomes cost.

Illustration: Bancroft Dairy produces milk for sale to local cheese-makers. Bancroft began operations on January 1, 2011, by purchasing 420 milking cows for €460,000. Bancroft provides the following information related to the milking cows.

Milking cows		
Carrying value, January 1, 2011*		€460,000
Change in fair value due to growth and price changes	€35,000	
Decrease in fair value due to harvest	(1,200)	
Change in carrying value		33,800
Carrying value, January 31, 2011		€493,800
Milk harvested during January**		€ 36,000

*The carrying value is measured at fair value less costs to sell (net realizable value). The fair value of milking cows is determined based on market prices of livestock of similar age, breed, and genetic merit.

**Milk is initially measured at its fair value less costs to sell (net realizable value) at the time of milking. The fair value of milk is determined based on market prices in the local area.

Milking cows		
Carrying value, January 1, 2011*		€460,000
Change in fair value due to growth and price changes	€35,000	
Decrease in fair value due to harvest	(1,200)	
Change in carrying value		33,800
Carrying value, January 31, 2011		€493,800
Milk harvested during January**		€ 36,000

Bancroft makes the following entry to record the change in carrying value of the milking cows.

Biological Asset—Milking Cows 33,800

Unrealized Holding Gain or Loss—Income 33,800

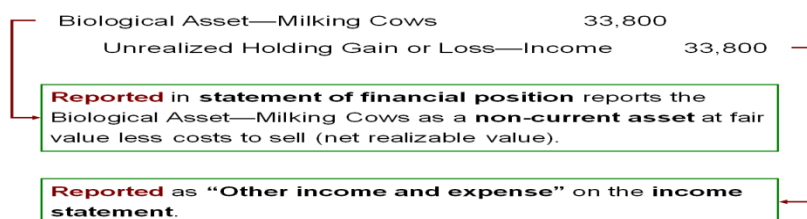


Illustration: Bancroft makes the following summary entry to record the milk harvested for the month of January.

Milk Inventory 36,000

Unrealized Holding Gain or Loss—Income 36,000

Assuming the milk harvested in January was sold to a local cheese-maker for €38,500, Bancroft records the sale as follows.

Cash	38,500	
Sales		38,500
Cost of Goods Sold	36,000	
Milk Inventory		36,000

Commodity Broker-Traders at NRV

Generally measure their inventories at fair value less costs to sell (NRV), with changes in NRV recognized in income in the period of the change.

Buy or sell commodities (such as harvested corn, wheat, precious metals, heating oil).

Primary purpose is to sell the commodities in the near term and generate a profit from fluctuations in price.

Valuation Using Relative Sales Value

Permitted by GAAP under the following conditions:

A controlled market with a quoted price applicable to all quantities, and

No significant costs of disposal (rare metals and agricultural products) or

Too difficult to obtain cost figures (meatpacking).

Valuation Using Relative Sales Value

Used when buying varying units in a single lump-sum purchase.

Larsen Realty Corporation purchased a tract of unimproved land for \$55,000. This land was improved and subdivided into building lots at an additional cost of \$30,000. These building lots were all of the same size but owing to differences in location were offered for sale at different prices as follows. Operating expenses allocated to this project total \$18,200.

Group	No. of Lots	Price per Lot	Lots Unsold at Year-End
1	9	\$ 3,000	5
2	15	4,000	7
3	19	2,000	2

Instructions: Calculate the net income realized on this operation to date.

(Relative Sales Value Method):

Group	No. of Lots	Price per Lot	Selling Price	Relative Sales Price	Total Cost	Cost Allocated	Cost Per Lot
1	9	\$ 3,000	\$ 27,000	$\$27,000/125,000$	\$ 85,000	\$ 18,360	\$ 2,040
2	15	4,000	60,000	$60,000/125,000$	85,000	40,800	2,720
3	19	2,000	38,000	$38,000/125,000$	85,000	25,840	1,360
			\$ 125,000			\$ 85,000	

Group	Lots Sold	Price per Lot	Total Sales	Cost Per Lot	Total Cost of Goods
1	4	\$ 3,000	\$ 12,000	\$ 2,040	\$ 8,160
2	8	4,000	32,000	2,720	21,760
3	17	2,000	34,000	1,360	23,120
			\$ 78,000		\$ 53,040

Calculation of Net Income	
Sales	\$ 78,000
Cost of good sold	53,040
Gross profit	24,960
Expenses	18,200
Net income	\$ 6,760

Purchase Commitments: A Special Problem

Generally seller retains title to the merchandise.

Buyer recognizes no asset or liability.

If material, the buyer should disclose contract details in footnote.

If the contract price is **greater than the market price**, and the **buyer expects that losses will occur** when the purchase is effected, the buyer should recognize a liability and a corresponding loss in the period during which such declines in market prices take place.

Illustration: St. Regis Paper Co. signed timber-cutting contracts to be executed in 2013 at a price of \$10,000,000. Assume further that the market price of the timber cutting rights on December 31, 2012, dropped to \$7,000,000. St. Regis would make the following entry on December 31, 2012.

Unrealized Holding Gain or Loss—Income	3,000,000
Purchase Commitment Liability	3,000,000
Other income and expense in the income statement.	
Current liabilities on the statement of financial position.	

Illustration: When St. Regis cuts the timber at a cost of \$10 million, it would make the following entry.

Purchases (Inventory)	7,000,000
Purchase Commitment Liability	3,000,000
Cash	10,000,000

Assume the government permitted St. Regis to reduce its contract price and therefore its commitment by \$1,000,000.

Purchase Commitment Liability	1,000,000
Unrealized Holding Gain or Loss—Income	1,000,000

Gross Profit Method of Estimating Inventory: Substitute Measure to Approximate Inventory

Relies on Three Assumptions:

Beginning inventory plus purchases equal total goods to be accounted for.

Goods not sold must be on hand.

The sales, reduced to cost, deducted from the sum of the opening inventory plus purchases, equal ending inventory.

Illustration: Cetus Corp. has a beginning inventory of €60,000 and purchases of €200,000, both at cost. Sales at selling price amount to €280,000. The gross profit on selling price is 30 percent. Cetus applies the gross margin method as follows.

Beginning inventory (at cost)		€ 60,000
Purchases (at cost)		<u>200,000</u>
Goods available (at cost)		260,000
Sales (at selling price)	€280,000	
Less: Gross profit (30% of €280,000)	<u>84,000</u>	
Sales (at cost)		<u>196,000</u>
Approximate inventory (at cost)		<u>€ 64,000</u>

Computation of Gross Profit Percentage

Gross Profit on Selling Price	Percentage Markup on Cost
Given: 20% → $\frac{.20}{1.00 - .20} = 25\%$	
Given: 25% → $\frac{.25}{1.00 - .25} = 33\frac{1}{3}\%$	
$\frac{.25}{1.00 + .25} = 20\%$ ← Given: 25%	
$\frac{.50}{1.00 + .50} = 33\frac{1}{3}\%$ ← Given: 50%	

Astaire Company uses the gross profit method to estimate inventory for monthly reporting purposes. Presented below is information for the month of May.

Inventory, May 1	€ 160,000
Purchases (gross)	640,000
Freight-in	30,000
Sales	1,000,000
Sales returns	70,000
Purchase discounts	12,000

Instructions:

- Compute the estimated inventory at May 31, assuming that the gross profit is 25% of **sales**.
- Compute the estimated inventory at May 31, assuming that the gross profit is 25% of **cost**.

(Solution): (a) Compute the estimated inventory assuming gross profit is 25% of sales.

Inventory, May 1 (at cost)	€ 160,000
Purchases (gross) (at cost)	640,000
Purchase discounts	(12,000)
Freight-in	30,000
Goods available (at cost)	818,000
Sales (at selling price)	€ 1,000,000
Sales returns (at selling price)	(70,000)
Net sales (at selling price)	930,000
Less gross profit (25% of €930,000)	232,500
Sales (at cost)	697,500
Approximate inventory, May 31 (at cost)	€ 120,500

(Solution): (b) Compute the estimated inventory assuming gross profit is 25% of cost

Inventory, May 1 (at cost)	€ 160,000
Purchases (gross) (at cost)	640,000
Purchase discounts	(12,000)
Freight-in	30,000
Goods available (at cost)	818,000
Sales (at selling price)	€ 1,000,000
Sales returns (at selling price)	(70,000)
Net sales (at selling price)	930,000
Less gross profit (20% of €930,000)	186,000
Sales (at cost)	744,000
Approximate inventory, May 31 (at cost)	€ 74,000

Evaluation: - Disadvantages:

Provides an estimate of ending inventory.

Uses past percentages in calculation.

A blanket gross profit rate may not be representative.

Normally unacceptable for financial reporting purposes. IFRS requires a physical inventory as additional verification.

Retail Inventory Method

A method used by retailers, to value inventory without a physical count, by converting retail prices to cost.

Requires retailers to keep:

Total cost and retail value of goods purchased.

Total cost and retail value of the goods available for sale.

Sales for the period.

Conventional Method or Cost Method (based on LCMRV)

Example: Fuque Inc. uses the retail inventory method to estimate ending inventory for its monthly financial statements. The following data pertain to a single department for the month of October 2011.

	<u>COST</u>	<u>RETAIL</u>
Beg. inventory, Oct. 1	\$ 52,000	\$ 78,000
Purchases	272,000	423,000
Freight in	16,600	
Purchase returns	5,600	8,000
Additional markups		9,000
Markup cancellations		2,000
Markdowns (net)		3,600
Normal spoilage		10,000
Sales		390,000

Instructions:

Prepare a schedule computing estimate retail inventory using the following methods:

(1) Conventional

(2) Cost

Solution: Conventional method

	<u>COST</u>	<u>RETAIL</u>	<u>Cost to Retail %</u>
Beg. inventory	\$ 52,000	\$ 78,000	
Purchases	272,000	423,000	
Freight in	16,600		
Purchase returns	(5,600)	(8,000)	
Markups, net		7,000	
Current year additions	283,000	422,000	
Goods available for sale	335,000	500,000	= 67.00%
Markdowns, net		(3,600)	
Normal spoilage		(10,000)	
Sales		(390,000)	
Ending inventory at retail		\$ 96,400	
Ending inventory at Cost:			
\$ 96,400 x 67.00%	=	\$ 64,588	

Solution: cost Method

	<u>COST</u>	<u>RETAIL</u>	<u>Retail %</u>
Beg. inventory	\$ 52,000	\$ 78,000	
Purchases	272,000	423,000	
Freight in	16,600		
Purchase returns	(5,600)	(8,000)	
Markdowns, net		(3,600)	
Markups, net		7,000	
Current year additions	283,000	418,400	
Goods available for sale	335,000	496,400	= 67.49%
Normal spoilage		(10,000)	
Sales		(390,000)	
Ending inventory at retail		\$ 96,400	
Ending inventory at Cost:			
\$ 96,400 x 67.49%	=	\$ 65,056	

Special Items

Freight costs

Purchase discounts and allowances

Purchase returns

Transfers-in

Normal spoilage

Employee discounts

Abnormal shortages

Special Items: Illustration

EXTREME SPORT APPAREL		
	Cost	Retail
Beginning inventory	€ 1,000	€ 1,800
Purchases	30,000	60,000
Freight-in	600	—
Purchase returns	(1,500)	(3,000)
Totals	30,100	58,800
Net markups		9,000
Abnormal shortage	(1,200)	(2,000)
Totals	€28,900	65,800
Deduct:		
Net markdowns		1,400
Sales	€36,000	
Sales returns	(900)	35,100
Employee discounts		800
Normal shortage		1,300
		€27,200
Cost-to-retail ratio = $\frac{€28,900}{€65,800} = 43.9\%$		
Ending inventory at LCMRV ($43.9\% \times €27,200$) = €11,940.80		

Evaluation

Widely used for the following reasons:

To permit the computation of net income without a physical count of inventory.

Control measure in determining inventory shortages.

Regulating quantities of merchandise on hand.

Insurance information.

Some companies refine the retail method by computing inventory separately by departments or class of merchandise with similar gross profits.

Presentation of Inventories

Accounting standards require disclosure of:

Accounting policies adopted in measuring inventories, including the cost formula used (weighted-average, FIFO).

Total carrying amount of inventories and the carrying amount in classifications (merchandise, production supplies, raw materials, work in progress, and finished goods).

Carrying amount of inventories carried at fair value less costs to sell.

Amount of inventories recognized as an expense during the period.

Amount of any write-down of inventories recognized as an expense in the period and the amount of any reversal of write-downs recognized as a reduction of expense in the period.

Circumstances or events that led to the reversal of a write-down of inventories.

Carrying amount of inventories pledged as security for liabilities, if any.

Analysis of Inventories

Common ratios used in the management and evaluation of inventory levels are **inventory turnover** and **average days to sell the inventory**.

Inventory Turnover Ratio: Measures the number of times on average a company sells the inventory during the period.

Illustration: In its 2009 annual report **Tate & Lyle plc** (GBR) reported a beginning inventory of £562 million, an ending inventory of £538 million, and cost of goods sold of £2,019 million for the year.

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} = \frac{£2,019}{(£562 + £538)/2} = 3.67 \text{ times}$$

Average Days to Sell Inventory

Measure represents the average number of days' sales for which a company has inventory on hand.

The diagram illustrates the relationship between Inventory Turnover and Average Days to Sell. At the top, a yellow box contains the formula for Inventory Turnover: $\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} = \frac{£2,019}{(£562 + £538)/2} = 3.67 \text{ times}$. Below this, the text 'Average Days to Sell' is written. A red arrow points from 'Average Days to Sell' to a yellow box at the bottom containing the formula: $365 \text{ days} / 3.67 \text{ times} = \text{every } 99.5 \text{ days}$. A blue arrow points from the '3.67 times' result of the turnover calculation to the same bottom box.

$$\text{Average Days to Sell} = 365 \text{ days} / 3.67 \text{ times} = \text{every } 99.5 \text{ days}$$

Relevant Facts

The requirements for accounting for and reporting inventories are more principles-based under IFRS. That is, U.S. GAAP provides more detailed guidelines in inventory accounting.

Who owns the goods—goods in transit, consigned goods, special sales agreements—as well as the costs to include in inventory are essentially accounted for the same under IFRS and U.S. GAAP.

U.S. GAAP permits the use of LIFO for inventory valuation. IFRS prohibits its use. FIFO and average cost are the only two acceptable cost flow assumptions permitted under IFRS. Both sets of standards permit specific identification where appropriate.

In the lower-of-cost-or-market test for inventory valuation, IFRS defines market as net realizable value. U.S. GAAP, on the other hand, defines market as replacement cost subject to the constraints of net realizable value (the ceiling) and net realizable value less a normal markup (the floor). IFRS does not use a ceiling or a floor to determine market.

Under U.S. GAAP, if inventory is written down under the LCM valuation, the new basis is now considered its cost. As a result, the inventory may not be written back up to its original cost in a subsequent period. Under IFRS, the write-down may be reversed in a subsequent period up to the amount of the previous write-down. Both the write-down and any subsequent reversal should be reported on the income statement.

Unlike property, plant, and equipment, IFRS does not permit the option of valuing inventories at fair value. As indicated above, IFRS requires inventory to be written down, but inventory cannot be written up above its original cost.

As indicated, IFRS requires both biological assets and agricultural produce at the point of harvest to be reported to net realizable value. U.S. GAAP does not require companies to account for all biological assets in the same way. Furthermore, these assets generally are not reported at net realizable value. Disclosure requirements also differ between the two sets of standards.