

## CHAPTER 7

### MERCHANDISE INVENTORY

#### BRIEF EXERCISES

##### BE7-1

The inventory purchases made by Hewlett-Packard during 2008 can be calculated as follows:

Beginning inventory	\$ 8.0 billion
+ Purchases	<u>X</u>
– Cost of Goods Sold	<u>69.3</u>
=Ending Inventory	<u>\$ 7.9 billion</u>
Purchases = \$69.2 billion	

##### BE7-2

- From the footnote it is apparent that Johnson & Johnson is a manufacturer. A retailer or a service company would not have accounts called Raw materials and supplies or a Goods in process within the detail of their inventory. These accounts are only used by manufacturing companies.
- From this disclosure it appears that Johnson & Johnson uses the FIFO inventory cost flow assumption. If a company uses LIFO it must disclose the amount of the LIFO reserve imbedded in the valuation of the inventory.

##### BE7-3

If General Electric used the FIFO inventory cost flow assumption instead of LIFO, its inventory balance for 2008 would be  $(\$13.7 + 0.706) = \$14.406$  billion. This disclosure is useful to financial statement users because it can make it easier to compare GE's results with a company that uses a FIFO assumption. It also tells the reader the financial statement and tax liability impact on GE if it were to switch to a FIFO assumption.

##### E7-4

**12/31/06:**

**Ending inventory:**

Cost of Goods Sold	=	Goods available for sale – Ending Inventory
\$11,713	=	\$14,314 – Ending Inventory
Ending Inventory	=	\$2,601

**12/31/07:**

**Goods available for sale:**

Goods available for sale	=	Cost of Goods Sold + Ending Inventory
Goods available for sale	=	\$12,735 + \$2,852
Goods available for Sale	=	\$15,587

**Purchases:**

Purchases	=	Goods available for Sale – Beginning Inventory*
Purchases	=	\$15,587 - \$2,601
Purchases	=	\$12,986

\* Beginning inventory for 2007 is the Ending Inventory for 2006

**12/31/08:**

**Goods available for sale:**

Goods available for sale	=	Beginning Inventory** + Purchases
Goods available for sale	=	\$2,852 + \$13,540
Goods available for sale	=	\$16,392

\*\*Beginning inventory for 2008 is the Ending inventory for 2007

**Ending inventory:**

Ending Inventory	=	Goods available for sale – Cost of goods sold
Ending Inventory	=	\$16,392 - \$13,379
Ending Inventory	=	\$3,013

**E7-5**

With the perpetual method, the balance in the Cost of Goods Sold account is perpetually updated for sales of inventory, as is the balance in the Inventory account for sales and acquisitions of inventory. This implies that the balance in Cost of Goods Sold should correspond to a balance in the Inventory account of \$52,000, and that no entry is necessary at the end of the year to record Cost of Goods Sold.

Ending Inventory	=	Beginning Inventory + Net Purchases – Cost of Goods Sold
\$52,000	=	\$32,000 + (\$85,000 + \$4,300) – Cost of Goods Sold
Cost of Goods Sold	=	\$69,300

However, since the physical count indicates that Telly's has \$2,000 less inventory than is recorded in its Inventory account, the following adjusting entry is necessary at the end of the year.

Inventory Shrinkage (E, –SE) .....	2,000	
Inventory (–A) .....		2,000
<i>Incurred inventory shrinkage.</i>		

**E7-6**

- Error in Ending Inventory in 2007: The \$50 understated error in the Ending inventory means that the Ending Inventory should have been  $\$268 + \$50 = \$318$ . This would change the Cost of goods sold to  $\$1,174 - \$318 = \$856$  which would then increase the Gross profit to  $\$421 (\$1,277 - \$856)$ .
- Error in Ending Inventory in 2008: = The 2007 error in the Ending Inventory changes the Beginning Inventory in 2008 and the Goods Available for sale to  $\$318 + \$857 = \$1,175$ . To calculate the Cost of Goods Sold the Ending Inventory for 2008 is deducted from the revised Goods Available for Sale:  $\$1,175 - (\$239 - \$50) = \$986$ . The gross profit would then be  $\$1,262 - \$986 = \$276$ .

## E7-9

### a. FIFO cost flow assumption:

$$\begin{aligned}\text{Cost of Goods Sold} &= (75 \text{ units} \times \$450) + (50 \text{ units} \times \$500) + (5 \text{ units} \times \$600) \\ &= \$33,750 + \$25,000 + \$3,000 \\ &= \$61,750\end{aligned}$$

$$\begin{aligned}\text{Gross Profit} &= \text{Sales} - \text{Cost of Goods Sold} \\ &= (130 \text{ units} \times \$1,000) - \$61,750 \\ &= \$68,250\end{aligned}$$

$$\begin{aligned}\text{Ending Inventory} &= (60 \text{ units} \times \$600) \\ &= \$36,000\end{aligned}$$

### Averaging cost flow assumption:

$$\begin{aligned}\text{Cost per Unit} &= [(75 \text{ units} \times \$450) + (50 \text{ units} \times \$500) + (65 \text{ units} \times \$600)] \div (75 \\ &\quad \text{units} + 50 \text{ units} + 65 \text{ units}) \\ &\quad (\$33,750 + \$25,000 + \$39,000) \div 190 \text{ units} \\ &= \$514.47 \text{ per unit (rounded)}\end{aligned}$$

$$\begin{aligned}\text{Cost of Goods Sold} &= (130 \text{ units} \times \$514.47) \\ &= \$66,881.10\end{aligned}$$

$$\begin{aligned}\text{Gross Profit} &= \text{Sales} - \text{Cost of Goods Sold} \\ &= (130 \text{ units} \times \$1,000) - \$66,881.10 \\ &= \$63,118.90\end{aligned}$$

$$\begin{aligned}\text{Ending Inventory} &= 60 \text{ units} \times \$514.47 \\ &= \$30,868.20\end{aligned}$$

### LIFO cost flow assumption:

$$\begin{aligned}\text{Cost of Goods Sold} &= (65 \text{ units} \times \$600) + (50 \text{ units} \times \$500) + (15 \text{ units} \times \$450) \\ &= \$39,000 + \$25,000 + \$6,750 \\ &= \$70,750\end{aligned}$$

$$\begin{aligned}\text{Gross Profit} &= \text{Sales} - \text{Cost of Goods Sold} \\ &= (130 \text{ units} \times \$1,000) - \$70,750 \\ &= \$59,250\end{aligned}$$

$$\begin{aligned}\text{Ending Inventory} &= (60 \text{ units} \times \$450) \\ &= \$27,000\end{aligned}$$

## E7-9 Concluded

- b. If the monitors are identical, customers would be indifferent between any two monitors. Hence, Vinnie could simply give a customer the monitor that allows him to either minimize or maximize cost of goods sold, thereby maximizing or minimizing gross profit.

If Vinnie wants to maximize net income, he would first sell to customers the lowest-priced monitors, followed by the second lowest-priced monitors, and so forth. Since the cost of the monitors is increasing, this strategy is identical to the FIFO cost flow assumption. Therefore, the highest gross profit Vinnie could report is \$68,250 (from part [a]). Vinnie may want to maximize net income for several reasons. First, if Vinnie receives any incentive compensation, such as a bonus that is tied to net income, then he can maximize his compensation by maximizing net income. Second, if Vinnie has any existing debt covenants, they may specify a maximum debt/equity ratio. By increasing net income, Vinnie would increase equity, thereby decreasing his debt/equity ratio. In this manner, Vinnie decreases the probability that he will violate the debt covenant. Finally, if Vinnie is in the process of trying to obtain debt, potential creditors may use net income as a factor in determining whether or not to loan money to Vinnie or what interest rate to charge.

If Vinnie wants to minimize net income, he would first sell to customers the highest-priced monitors, followed by the second highest-priced monitors, and so forth. Since the cost of the monitors is increasing, this strategy is identical to the LIFO cost flow assumption. Therefore, the lowest gross profit Vinnie could report is \$59,250 (from part [a]). The most likely reason Vinnie would want to minimize net income is for tax purposes. If he uses the same set of books for tax and financial reporting purposes, then by minimizing book income, Vinnie minimizes taxable income. Minimizing taxable income, in turn, minimizes the present value of cash outflows for taxes.

## E7-10

<b>2010</b>		<b>FIFO</b>	<b>Weighted Average</b>
<b>LIFO</b>			
Cost of goods sold		160	170
	180		
Gross profit (Sales – COGS)	290		280
	270		
Ending inventory		180	170
	160		
<b>2011</b>		<b>FIFO</b>	<b>Weighted Average</b>
<b>LIFO</b>			
Cost of goods sold		245	262.5
	290		
Gross profit (Sales – COGS)	455		437.5
	410		
Ending inventory		290	262.5
	225		

If the business is growing (inventory levels rising) and the cost of inventory is increasing, then if LIFO is chosen, the company will lower its net income which will reduce its tax liability. This increases the cash flow of the company. Using FIFO will increase its reported net income and tax liability but will also increase its current assets. This choice impacts the company's operating and liquidity ratios.

### E7-11

#### a. LIFO cost flow assumption:

<u>Year</u>	<u>Calculation</u>	<u>Amount</u>
2008	5,000 units × \$12	\$ 60,000
2009	(12,000 units × \$16) + (4,000 units × \$12)	240,000
2010	2,000 units × \$18	36,000
2011	10,000 units × \$21	210,000
2012	(2,000 units × \$23) + (3,000 units × \$18) + (1,000 units × \$12)	<u>112,000</u>
Total		<u>\$658,000</u>

#### FIFO cost flow assumption:

<u>Year</u>	<u>Calculation</u>	<u>Amount</u>
2008	5,000 units × \$12	\$ 60,000
2009	(5,000 units × \$12) + (11,000 units × \$16)	236,000
2010	(1,000 units × \$16) + (1,000 units × \$18)	34,000
2011	(4,000 units × \$18) + (6,000 units × \$21)	198,000
2012	(4,000 units × \$21) + (2,000 units × \$23)	<u>130,000</u>
Total		<u>\$658,000</u>

#### Averaging cost flow assumption:

<u>Year</u>	<u>Calculation</u>	<u>Amount</u>
2008	Cost/unit = \$120,000 ÷ 10,000 units = \$12 per unit C O G S = 5,000 units × \$12	\$ 60,000
2009	Cost/unit = [(5,000 × \$12) + (12,000 × \$16)] ÷ 17,000 units = \$14.82 per unit C O G S = 16,000 units × \$14.82	237,120
2010	Cost/unit = [(1,000 × \$14.82) + (5,000 × \$18)] ÷ 6,000 units = \$17.47 per unit C O G S = 2,000 units × \$17.47	34,940
2011	Cost/unit = [(4,000 × \$17.47) + (10,000 × \$21)] ÷ 14,000 units = \$19.99 per unit C O G S = 10,000 units × \$19.99	199,900
2012	Cost/unit = [(4,000 × \$19.99) + (2,000 × \$23)] ÷ 6,000 units = \$20.99 per unit C O G S = 6,000 units × \$20.99	<u>125,940</u>
Total		<u>\$657,900</u>

(rounded)

- b. Over the life of a company, Cost of Goods Sold would be the same regardless of the cost flow assumption employed. Over the life of a business, all the units of inventory will be sold. Consequently, all costs associated with inventory will be expensed. The choice of a cost flow assumption affects only the allocation of inventory costs to particular accounting periods; it does not affect total inventory costs.
- c. Assume that accounting earnings equals tax earnings. Over the life of a business, a company's total earnings are the same regardless of the cost flow assumption employed. Therefore, a company's total tax liability over the company's life is the same, regardless of the cost flow assumption employed, as long as tax rates are unchanged. The choice of a cost flow assumption does, however, affect the allocation of inventory costs to particular years. These different cost allocations give rise to different earnings in particular years. The different earnings amounts under different cost flow assumptions then give rise to different tax liabilities (i.e., cash outflows) in particular years. Due to the time value of money, the timing of cash flows affects the present value of the total tax payments.

In periods of inventory build-up, the LIFO cost-flow assumption will result in lower earnings while FIFO will result in higher earnings. The opposite is true in times of inventory liquidation. Consequently, LIFO results in lower tax payments when a company builds up its inventories and FIFO results in higher tax payments. The timing of the tax payments means that the present value of tax payments under LIFO is less than the present value of tax payments under FIFO. In times of deflation, the opposite situation arises. The present value of tax payments under FIFO is less than the present value of tax payments under LIFO.

**E7-12**

a. Inventories on LIFO basis.....	\$8,781
Add: Adjustment to LIFO basis.....	<u>3,183</u>
Inventories on FIFO basis.....	<u>\$ 11,964</u>

- b. Accumulated tax savings can be computed by multiplying the tax rate by the total decrease in net income due to LIFO adoption.

$$\begin{aligned}
 \text{Accumulated Tax Savings} &= \text{Tax Rate} \times (\text{2008 LIFO Reserve}) \\
 &= .21 \times (\$3,183) \\
 &= \$668
 \end{aligned}$$

- c. The 2008 reported net income under the FIFO cost flow assumption would be \$6,740 (\$3,557 + \$3,183) even if Caterpillar had chosen to change from LIFO to FIFO years earlier.
  - a. The information generated in parts (a), (b), and (c) could be useful to the users from several perspectives. First, users could use the information to compare Caterpillar with other companies within the industry that use FIFO cost flow assumption. Second, the users can readily see the tax savings that the company has generated as a result of its choice of LIFO cost flow assumption. Thirdly, along with other information, users can use this information to assess the quality of earnings of Caterpillar.
  - b. Under IFRS the last-in, first-out (LIFO) inventory cost flow assumption is prohibited. The cost of inventory generally is determined using the first-in, first-out (FIFO) or averaging assumption. Caterpillar would have to abandon its LIFO method and the related benefits.

### P7-3

The correct amount that should be reported for Cost of Goods Sold is calculated using the following formula.

$$\text{Error in Ending Inventory} = \text{Error in Beginning Inventory} + \text{Error in Purchases} - \text{Error in COGS}$$

#### 2006:

$$\$500 = \$0 + \$0 - \text{Error in COGS}$$

Error in COGS = (\$500). Therefore, COGS as reported is understated \$500.

$$\text{Correct COGS} = \$3,547 + \$500 = \$4,047$$

#### 2007:

$$(\$150) = \$500 + \$0 - \text{Error in COGS}$$

Error in COGS = \$650: COGS as reported is overstated \$650.

$$\text{Correct COGS} = \$4,249 - \$650 = \$3,599$$

#### 2008:

$$\$320 = (\$150) + \$0 - \text{Error in COGS}$$

Error in COGS = (\$470). Therefore, COGS as reported is understated \$470.

$$\text{Correct COGS} = \$4,383 + \$470 = \$4,853$$

The restated income statements follow.

	<u>2008</u>	<u>2007</u>	<u>2006</u>
Sales	\$ 20,378	\$ 18,634	\$ 15,691
Cost of goods sold	<u>4,853</u>	<u>3,599</u>	<u>4,047</u>
Gross profit	\$ 15,525	\$ 15,035	\$ 11,644
Expenses	<u>18,067</u>	<u>11,432</u>	<u>9,481</u>
Net income	<u>\$ (2,542)</u>	<u>\$ 3,603</u>	<u>\$ 2,163</u>

### P7-5

a. Cost of Goods Available for Sale = Cost of Goods in Beginning Inventory + Cost of Goods Purchased  
= (500 units x \$70) + (1,000 units x \$75) + (3,000 units x \$80) + (4,000 units x \$82)  
= \$678,000

Number of Units Available for Sale = Number of Units in Beginning Inventory + Number of Units Purchased  
= 500 + 8,000  
= 8,500 units

Units Sold = 6,000 units  
Units remaining in Inventory = 2,500 units

#### FIFO:

Ending Inventory = 2,500 units x \$82  
= \$205,000

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Cost of Goods Available for Sale} - \text{Ending Inventory} \\ &= \$678,000 - \$205,000 \\ &= \$473,000 \end{aligned}$$

**LIFO:**

$$\begin{aligned} \text{Ending Inventory} &= (500 \text{ units} \times \$70) + (1,000 \text{ units} \times \$75) + (1,000 \text{ units} \times \$80) \\ &= \$190,000 \end{aligned}$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Cost of Goods Available for Sale} - \text{Ending Inventory} \\ &= \$678,000 - \$190,000 \\ &= \$488,000 \end{aligned}$$

**Averaging:**

$$\begin{aligned} \text{Cost per Unit} &= \text{Cost of Goods Available for Sale} \div \text{Number of Units Available for Sale} \\ &= \$678,000 \div 8,500 \text{ Units} \\ &= \$79.76 \text{ per Unit} \end{aligned}$$

$$\begin{aligned} \text{Ending Inventory} &= \text{Number of Units in Ending Inventory} \times \text{Cost per Unit} \\ &= 2,500 \text{ units} \times \$79.76 \text{ per unit} \\ &= \$199,400 \end{aligned}$$

$$\begin{aligned} \text{Cost of Goods Sold} &= \text{Cost of Goods Available for Sale} - \text{Ending Inventory} \\ &= \$678,000 - \$199,400 \\ &= \$478,600 \end{aligned}$$

Laundryman's Corporation  
Income Statements  
For the Year Ended December 31, 20XX

	<u>FIFO</u>	<u>Averaging</u>	<u>LIFO</u>
Sales	\$900,000	\$900,000	\$900,000
Cost of goods sold	<u>473,000</u>	<u>478,600</u>	<u>488,000</u>
Gross profit	\$427,000	\$421,400	\$412,000
Other expenses	<u>125,000</u>	<u>125,000</u>	<u>125,000</u>
Income before taxes	\$302,000	\$296,400	\$287,000
Income taxes	<u>90,600</u>	<u>88,920</u>	<u>86,100</u>
Net income	<u>\$211,400</u>	<u>\$207,480</u>	<u>\$200,900</u>

b. By using LIFO rather than FIFO, Laundryman's would save \$4,500 (\$90,600 – \$86,100) in taxes.

c. Ending inventory

	<u>FIFO</u>	<u>Averaging</u>	<u>LIFO</u>
Cost	2,500 units @ \$82	2,500 units @ \$79.76	500 units @ \$70 1,000 units @ \$75 1,000 units @ \$80
Market /unit	\$78	\$78	\$78
Writedown	2,500 x (\$82 - \$78)	2,500 x (\$79.76 - \$78)	1,000 x (\$80 - \$78)

**FIFO method:**

Loss on Inventory Write-down (Lo, –SE).....	10,000	
Inventory (–A) .....		10,000

*Adjusted inventory to LCM.*

**Averaging method:**

Loss on Inventory Write-down (Lo, -SE).....	4,400	
Inventory (-A) .....		4,400

*Adjusted inventory to LCM.*

**LIFO method:**

Loss on Inventory Write-down (Lo, -SE).....	2,000	
Inventory (-A) .....		2,000

*Adjusted inventory to LCM.*

d. Cost of Goods Available for Sale = Cost of Goods in Beginning Inventory + Cost of Goods Purchased  
= (500 units x \$80) + (1,000 units x \$78) + (3,000 units x \$77) + (4,000 units x \$75)  
= \$649,000

Number of Units Available for Sale = Number of Units in Beginning Inventory + Number of Units Purchased  
= 500 + 8,000  
= 8,500 units

Units Sold = 6,000 units  
Units remaining in Inventory = 2,500 units

**FIFO:**

Ending Inventory = (2,500 units x \$75)  
= \$187,500

Cost of Goods Sold = Cost of Goods Available for Sale - Ending Inventory  
= \$649,000 - \$187,500  
= \$461,500

**LIFO:**

Ending Inventory = (500 units x \$80) + (1,000 units x \$78) + (1,000 units x \$77)  
= \$195,000

Cost of Goods Sold = Cost of Goods Available for Sale - Ending Inventory  
= \$649,000 - \$195,000  
= \$454,000

**Averaging:**

Cost per Unit = Cost of Goods Available for Sale ÷ Number of Units Available for Sale  
= \$649,000 ÷ 8,500 units  
= \$76.35 per unit

Ending Inventory = Number of Units in Ending Inventory x Cost per Unit  
= 2,500 units x \$76.35 per unit  
= \$190,875

Cost of Goods Sold = Cost of Goods Available for Sale – Ending Inventory  
= \$649,000 – \$190,875  
= \$458,125

Laundryman’s Corporation  
Income Statements  
For the Year Ended December 31, 20XX

	<u>FIFO</u>	<u>Averaging</u>	<u>LIFO</u>
Sales	\$900,000	\$900,000	\$900,000
Cost of goods sold	<u>461,500</u>	<u>458,125</u>	<u>454,000</u>
Gross profit	\$438,500	\$441,875	\$446,000
Other expenses	<u>125,000</u>	<u>125,000</u>	<u>125,000</u>
Income before taxes	\$313,500	\$316,875	\$321,000
Income taxes	<u>94,050</u>	<u>95,063</u>	<u>96,300</u>
Net Income	<u>\$219,450</u>	<u>\$221,812</u>	<u>\$224,700</u>

Because Cost of Goods Sold is the lowest under LIFO due to deflation, LIFO yields the highest net income in this case. Under FIFO, the oldest costs flow into COGS before the most recent costs. Under LIFO, the most recent costs flow into COGS before the older costs. Under the averaging method, all the costs are averaged to determine COGS. In this case, the cost of the inventory is decreasing, so the LIFO cost flow assumption uses lower, newer costs in computing COGS than the other two methods. Since these lower costs flow into COGS under LIFO, the older, higher costs flow into ending inventory.

**P7-6**

**a. LIFO cost flow assumption:**

(1) 1/3	Purchases (+A) .....	140,000	
	Accounts Payable (+L) .....		140,000
	<i>Purchased inventory on account.</i>		
(2) 1/3	Cash (+A) .....	100,000	
	Sales (R, +SE) .....		100,000
	<i>Made cash sales.</i>		
(3) 1/9	Accounts Receivable (+A) .....	200,000	
	Sales (R, +SE) .....		200,000
	<i>Made sales on account.</i>		
(4) 1/10	Accounts Payable (–L) .....	140,000	
	Cash (–A) .....		137,200
	Purchase Discount (–A) .....		2,800*
	<i>Made payment to supplier.</i>		

\* \$2,800 = \$140,000 × 2% discount

(5)	1/15	Purchases (E, -SE).....	248,500	
		Cash (-A).....		73,500
		Accounts Payable (+L) .....		175,000
		<i>Purchased inventory.</i>		
(6)	1/19	Purchases (+A) .....	182,000	
		Accounts Payable (+L) .....		182,000
		<i>Purchased inventory.</i>		
(7)	1/23	Accounts Payable (-L).....	87,500	
		Cash (-A).....		85,750
		Purchase Discount (-A).....		1,750*
		<i>Made payment to supplier.</i>		
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		* $\$1,750 = (\$175,000 \times \frac{1}{2}) \times 2\%$ discount		
(8)	1/27	Purchases (+A) .....	112,000	
		Cash (-A).....		112,000
		<i>Purchased inventory on account.</i>		
(9)	1/28	Accounts Payable (-L).....	87,500	
		Cash (-A).....		87,500
		<i>Made payment to supplier.</i>		
(10)	1/28	Accounts Payable (-L).....	182,000	
		Cash (-A).....		178,360
		Purchase Discount (-A).....		3,640*
		<i>Made payment to supplier.</i>		
<hr/>				
		* $\$3,640 = \$182,000 \times 2\%$ discount		
(11)	1/29	Cash (+A).....	360,000	
		Sales (R, +SE) .....		360,000
		<i>Made cash sales.</i>		
(12)	1/30	Accounts Receivable (+A) .....	300,000	
		Sales (R, +SE) .....		300,000
		<i>Made sales on account.</i>		
(13)	1/31	Purchases (+A) .....	60,000	
		Cash (-A).....		60,000
		<i>Purchased inventory.</i>		
(14)	1/31	Freight-In (+A).....	30,000	
		Accounts Payable (+L) .....		30,000
		<i>Incurred freight costs on inventory.</i>		

**a. LIFO cost flow assumption**

**Adjusting entry**

1/31	Inventory (ending) .....	393,250*	
	Cost of Goods Sold .....	466,060	
	Purchase Discount .....	8,190	
	Purchases .....		742,500
	Freight-In .....		30,000
	Inventory (beginning) .....		95,000

*Recorded COGS and ending inventory.*

\* Units in Ending Inventory = Units in Beginning Inventory + Units Purchased – Units Sold  
 18,000 = 5,000 + 30,000 – 17,000: Cost of units in inventory using LIFO:  
 $\$393,250 = (5,000 \text{ units} \times \$19.00) + (7,000 \text{ units} \times \$20.60) + (6,000 \text{ units} \times \$25.675)$   
 The unit costs used to calculate the \$393,250 were taken from the following table.

<u>Date</u>	<u>Number of Units</u>	<u>Unit Cost</u>	<u>Unit Freight<sup>a</sup></u>	<u>Unit Discount</u>	<u>Total Unit Cost</u>
Beg. Inv.	5,000	\$19.00	\$0.00	\$ 0.00	\$19.00
1/3	7,000	20.00	1.00	0.40	20.60
1/15	10,000	24.85 <sup>b</sup>	1.00	0.175 <sup>c</sup>	25.675
1/19	7,000	26.00	1.00	0.52	26.48
1/27	4,000	28.00	1.00	0.00	29.00
1/31	2,000	30.00	1.00	0.00	31.00

a \$1.00 = \$30,000 freight bill ÷ 30,000 units purchased

b \$24.85 unit cost = [(3,000 × \$24.50) + (7,000 × \$25.00)] ÷ 10,000 units

c \$0.175 unit discount = Total discount of \$1,750 ÷ 10,000 units

**b. FIFO cost flow assumption:**

All entries throughout January would be identical under the FIFO and LIFO cost flow assumptions using the periodic method. The only difference would be in the adjusting entry to record COGS and ending inventory.

**Adjusting entry**

1/31	Inventory (ending).....	491,735*	
	Cost of Goods Sold .....	367,575	
	Purchase Discount .....	8,190	
	Purchases .....		742,500
	Freight-In.....		30,000
	Inventory (beginning).....		95,000

*Recorded COGS and ending inventory.*

\* The computations for ending inventory are based upon the table used in part (a)  
 $\$491,735 = (2,000 \text{ units} \times \$31.00) + (4,000 \text{ units} \times \$29.00) + (7,000 \text{ units} \times \$26.48)$   
 $+ (5,000 \text{ units} \times \$25.675)$

**P7-7**

a.		<u>Current Assets</u>	÷	<u>Current Liabilities</u>	=	<u>Current Ratio</u>
	FIFO	\$15,820 <sup>a</sup>	÷	\$20,852	=	.76
	LIFO	14,768 <sup>b</sup>	÷	20,852	=	.71
	Decrease					.05

<sup>a</sup> \$15,820 = \$10,768 in cash + \$5,052 in inventory

<sup>b</sup> \$14,768 = \$10,768 in cash + \$4,000 in inventory

b.		<u>FIFO</u>		<u>LIFO</u>
	Sales		\$ 63,747	\$ 63,747
	Cost of goods sold:			
	Beginning inventory	\$ 5,110		\$ 5,110
	Purchases	18,453		18,453
	Cost of goods available	\$ 23,563		\$ 23,563
	Ending inventory	5,052		4,000
	Cost of goods sold		18,511	19,563
	Gross profit		\$ 45,236	\$ 44,184
	Expenses		28,307	28,307
	Income before taxes		\$ 16,929	\$ 15,877
	Income tax		3,980	3,810
	Net income		<u>\$ 12,949</u>	<u>\$ 12,067</u>

Change in gross profit = \$45,236 – \$44,184 = \$1,052

Change in net income = \$12,949 – \$12,067 = \$882

c. Tax dollars saved = \$3,980 – \$3,810 = \$170

d. Using LIFO can have several disadvantages. First, LIFO requires a company to maintain records for older inventory acquisitions. This practice usually results in higher bookkeeping costs. Second, to avoid "eating into" a LIFO layer, which would result in older, lower inventory costs flowing into COGS and raising the company's net income and associated tax liability, managers may purchase inventory at a time or at a cost that is not advantageous to the company. Third, LIFO can adversely affect a company's and/or manager's contracts. A company's debt covenants may stipulate a minimum current ratio, or level of working capital. These both would be lower under LIFO than under FIFO (assuming inflation). Also, using LIFO reduces net income during inflationary periods. If a manager has an incentive contract linked to net income, the manager's compensation would decrease. Finally, the lower net income achieved under LIFO may mislead current and potential investors into believing that the company is performing poorly (although some current research indicates that this last point is not likely).

**P7-8**

a. **Ending Inventory**, 12/31/2011: LIFO layers:  
 1998      4,000 units x \$5 per unit      =    \$    20,000

b.

Ruhe Auto Supplies  
 Income Statement  
 For the Year Ended December 31, 2011

Revenue.....		\$3,000,000
Cost of goods sold:		
Beginning inventory .....	\$ 112,500	
Purchases.....	<u>902,500<sup>a</sup></u>	
Cost of goods available for sale.....	\$1,015,000	
Ending inventory.....	<u>20,000<sup>b</sup></u>	
Cost of goods sold.....		<u>995,000</u>
Gross profit .....		\$2,005,000
Operating expenses.....		<u>800,000</u>
Income before income taxes .....		\$1,205,000
Income taxes .....		<u>361,500</u>
Net income.....		<u>\$ 843,500</u>

a    \$902,500 = 9,500 units purchased during 2011 × \$95 per unit  
 b    \$ 20,000 = 4,000 units from 1998 × \$5 per unit

The company's income tax liability is \$361,500, and its net income is \$843,500.

c.

Revenue.....		\$3,000,000
Cost of goods sold:		
Beginning inventory .....	\$ 112,500	
Purchases.....	<u>1,900,000<sup>a</sup></u>	
Cost of goods available for sale .....	\$2,012,500	
Ending inventory.....	<u>112,500<sup>b</sup></u>	
Cost of goods sold .....		<u>1,900,000</u>
Gross profit .....		\$1,100,000
Operating expenses.....		<u>800,000</u>
Net income before taxes.....		\$ 300,000
Income taxes .....		<u>90,000</u>
Net income.....		<u>\$ 210,000</u>

a    \$1,900,000 = (9,500 units + 10,500 units) × \$95 per unit  
 b    \$ 112,500 = (14,000 units × \$5) + (500 units × \$85)

Purchasing an additional 10,500 units of inventory at \$95 per unit on December 31, 2011 would cost Ruhe Auto Supplies \$997,500. By incurring these costs, the company would save only \$271,500 in taxes (i.e., \$361,500 from part [b]) – \$90,000). So on the face of it, it appears that it would not be a wise decision to acquire these additional units of inventory. However, if Ruhe Auto Supplies was planning to acquire additional inventory early in 2012 anyway, then it might not be a bad decision to acquire the inventory at the end of 2011 to lower the company's taxes.

**P7-9**

a.	Brady's 2011 reported income under LIFO .....	\$ 42,700
	LIFO Layer Liquidation during 2011 (net of income taxes) .....	<u>– 5,200<sup>a</sup></u>
	FIFO Based Net Income After Taxes .....	<u>\$ 37,500</u>

<sup>a</sup> = \$8,000 × (1 - .35) = \$5,200, after tax impact of no LIFO liquidation during 2011.

Brady has gone from reporting higher net income to having lower net income.

- b. Restatement of Brady's 2011 reported income, if it had always been a FIFO user, can be computed as follows:

	Brady's 2011 reported income under LIFO .....	\$ 42,700
	Decrease in LIFO Reserve (net of income taxes) .....	– 845 <sup>a</sup>
	LIFO Layer Liquidation during 2011 (net of income taxes) .....	<u>– 5,200<sup>b</sup></u>
	FIFO Based Net Income After Taxes .....	<u>\$ 36,655</u>

<sup>a</sup> = (\$4,800 – \$3,500) × 1 – .35 = \$845

<sup>b</sup> = \$8,000 × (1 – .35) = \$5,200

According to the analysis given above, Brady's restated reported income is \$36,655 which is lower than Danner's reported net income. The reason Brady's income under FIFO is lower than under LIFO is due to the decline in the LIFO reserve and LIFO layer liquidation.

- c. As of the end of 2011 Brady had a LIFO reserve of \$3,500. A LIFO reserve shows the accumulated benefit derived from the LIFO method. Due to the adoption of LIFO Brady reduced its cumulative pre-tax income by \$3,500. In other words, Brady saved taxes worth \$3,500 × .35 = \$1,225 due to its choice of LIFO.

As of the end of 2010, due to LIFO adoption, Brady's cumulative net income decreased by \$4,800 on a pre-tax basis. The related tax savings were \$4,800 × .35 = \$1,680.

The impact of a LIFO liquidation shows that adoption of LIFO does not necessarily save taxes in all years. LIFO has adverse effects when the layer liquidation occurs.

- d. From an income tax point it is not advisable for Brady to change its cost flow assumption. If it did so, it would have to pay taxes on the \$3,500 of additional income that would be created by eliminating the LIFO reserve. However, if the company wishes to report higher income, the change may be desirable.

**P7-10**

- a. and b.

IBT  
Income Statements  
For the Year Ended December 31,2011

	<u>Part (a)</u>	<u>Part (b)</u>
Sales .....	\$ 67,500	\$ 67,500
Cost of sales .....	<u>17,700<sup>a</sup></u>	<u>27,000<sup>b</sup></u>
Gross profit .....	\$ 49,800	\$ 40,500
Other expenses .....	<u>20,000</u>	<u>20,000</u>
Income (loss) before taxes .....	\$ 29,800	\$ 20,500
Income taxes .....	<u>8,940</u>	<u>6,150</u>
Net income (loss).....	<u>\$ 20,860</u>	<u>\$ 14,350</u>

$$^a \$17,700 = (350 \text{ units} \times \$30) + (200 \text{ units} \times \$15) + (350 \text{ units} \times \$12)$$

$$^b \$27,000 = (900 \text{ units} \times \$30)$$

- c. The primary advantage of purchasing the additional 550 units on December 20 is the effect on income taxes. Under part (a), IBT would have to pay \$8,940 in income taxes. However, under part (b), IBT would have to pay only \$6,150 in income taxes. So the net difference between the income statements of parts (a) and (b) is \$2,790 in taxes saved. Since income taxes represent a cash flow, the strategy of acquiring the additional 550 units would save IBT \$2,790 in cash from income taxes.

This tax savings is not without a cost however. To obtain the savings, IBT had to purchase 550 additional units for \$16,500. If IBT was planning on acquiring at least 550 units some time in the near future, then the cost of the tax savings is not \$16,500, but is rather the return lost on an alternative use of the \$16,500. If IBT was not planning on acquiring additional inventory, then the cost of obtaining the tax savings would be the entire \$16,500 plus the opportunity cost of not investing the \$16,500.

## ISSUES FOR DISCUSSION

### ID7-1

If investors are solely interested in net income, then the partner is probably correct, and companies should select FIFO if they want to raise capital. However, this view is probably not valid. One must remember that net income is simply a measurement; one must not lose sight of what accountants are measuring. Net income is only valuable if it truly represents an increase in the company's net assets. FIFO will result in higher reported income, but the higher income is an illusion. That is, the increased income under FIFO is due to the difference between the inventory's current market value and the older, "understated" inventory costs matched against it. This is why FIFO results in "paper profits." Alternatively, LIFO matches the most recent, higher inventory costs against revenue, which provides a higher quality measure of the company's underlying economic condition. In addition, the reduced income under LIFO implies lower taxes. The lower taxes, in turn, provide cash that the company can plow back into the business to improve operations. Thus, although LIFO results in lower reported income, LIFO provides a higher quality measure of income and results in lower taxes.

### ID7-2

- a. The choice of LIFO or FIFO will affect the amounts a company reports both in its balance sheet for inventory and in its income statement for cost of goods sold (and consequently net income). Thus, in order to evaluate a company's financial position and performance, particularly in comparison with other companies' performances, investors and creditors need to know which cost-flow assumption the company is using. In addition, the choice of LIFO or FIFO can have a large effect on the company's cash flows. If inventory costs are rising, a company will have lower taxable income—and hence lower cash outflows for taxes—if it uses LIFO than if it uses FIFO. For some companies the difference can be several million dollars a year in tax savings.
- b. Under LIFO, the cost of the inventory sold is assumed to be the cost of the inventory purchased most recently. This implies that the cost of the inventory still on hand is assumed to be the cost of inventory purchased long ago. If inventory costs are rising, one would expect the costs assigned to the inventory still on hand to be very low relative to the most recent inventory costs. If a company sells more inventory than it acquires during the year, the company will have to dip into those older inventory costs (i.e., liquidate LIFO layers) when calculating the cost of inventory

sold during the year. Because those older costs are less—in some cases much less—than the most recent inventory costs, a LIFO liquidation will result in Cost of Goods Sold being less than it would have been in the absence of the LIFO liquidation. This means that the company's income will be much greater which, in turn, implies higher tax payments. Thus, investors would be interested in LIFO liquidations because they have implications for the amount of cash the company will have to pay out in taxes.

- c. According to the footnote, Deere's 2009 ending inventory under FIFO would be \$1,367 million more than under LIFO. Therefore, COGS under FIFO would be lower by the same amount and net income before tax higher by the same amount. Based on a 34% tax rate, therefore, Deere would have to pay an additional income tax of \$464.8 million ( $\$1,367 \times .34$ ).
- d. Under IFRS the use of LIFO is prohibited. If IFRS were to be adopted, therefore, Deere would switch to FIFO as its inventory method and would incur the additional tax expenses discussed above.

### **ID7-3**

In times of rising inventory costs, LIFO allows companies to "hide" the value of their inventory. That is, the inventory value reported on the balance sheet is assumed to consist of "old" inventory costs; the most recent costs of inventory are allocated to cost of goods sold. However, the inventory is really worth its current market value. Thus, the difference between the "old" inventory costs and the current market value represents a "hidden reserve" of profits. By manipulating its inventory acquisition, a company can dip into this reserve and increase its reported income.

### **ID7-5**

- a. Valero is using the lower of cost or market exception to the historical cost principle that is applied to inventory. If the market value of inventory is lower than the cost of that inventory, it must be written down to the lower value.
- b. The write-down will lower reported income, current assets and the equity of Valero.
- c. Valero's current ratio will decrease because inventory will be carried at a lower value, which lowers current assets, while there is no change to current liabilities. Valero's inventory turnover ratio will increase because average inventory for the year will be lower.
- d. By reducing the carrying value of inventory Valero is reducing earnings in the current quarter. As this inventory is sold in future periods Valero will report higher earnings than it would have with no write-down. Valero's reporting strategy could be to either lower this quarter's earnings because it produced greater earnings than it anticipated, or Valero could be trying to take a large loss this quarter in order to be able to report better earnings in future quarters.
- e. Under U.S. GAAP, inventory is written down, if appropriate, but never written back up. Therefore, Valero would simply leave the inventory at the written-down carrying cost, even if market prices rebound. Under IFRS, on the other hand, the inventory writedowns can be recovered if market prices move back up. In that case, if Valero used IFRS, the company would book an Inventory Recovery (which would increase profits and equity) to balance out the increase in the carrying value of the asset.

**ID7-6**

- a. If Sherwin Williams reported inventories at the end of 2008 based on a FIFO system, the ending inventory balance would have been \$1,185,480 (\$864,200 + \$321,280).
- b. The following were the tax effects to Sherwin Williams as a result of using LIFO.

<u>2006</u>	<u>2007</u>	<u>2008</u>		
(Decrease) in net income due to LIFO (49,184)			(24,033)	(7,844)
Pretax effect on net income (effect / (1-tax rate))	<u>(35,870)</u>	<u>(11,707)</u>		<u>(73,409)</u>
(Decrease) in tax liability (\$3,863) (\$24,225)				(\$11,837)

- c. A LIFO inventory system operates on the premise that inventory that is sold is the inventory that was most recently purchased and therefore reflects the most current prices for the inventory. By taking this approach, this gives the best indication as to the future earnings potential of the company. This is particularly true during periods of inflation where the cost of inventory could increase dramatically in short periods of time. A LIFO inventory method most closely approximates the earnings power of buying a new unit of inventory today and selling it in the marketplace today. In times of deflation, LIFO still does a better job of matching current costs with current revenues.