Chapter 7

INVENTORIES

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LEARNING OUTCOMES

- describe different inventory valuation methods (cost formulas);
- calculate and compare cost of sales, gross profit, and ending inventory using different inventory valuation methods and using perpetual and periodic inventory systems;
- explain how inflation and deflation of inventory costs affect the financial statements and ratios of companies that use different inventory valuation methods;
- explain LIFO reserve and LIFO liquidation, and their effects on financial statements and ratios;
- convert a company's reported financial statements from LIFO to FIFO for purposes of comparison;
- describe the measurement of inventory at the lower of cost and net realizable value;
- explain issues that analysts should consider when examining a company's inventory disclosures and other sources of information;

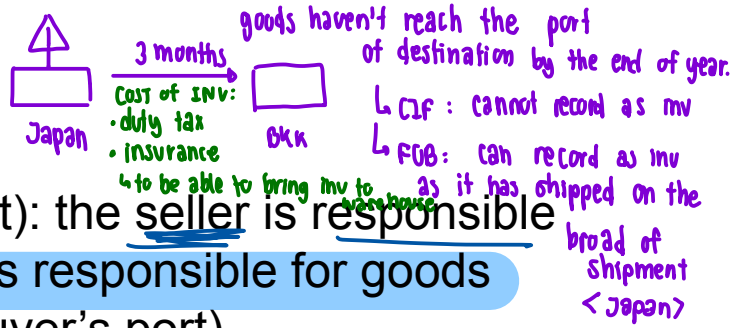
CONTENTS

INVENTORIES

- Raw materials
- Work-in-progress (still in the production line)
- Finished goods

- Consigned goods
  - The party that holds the goods is called the consignee.
  - The party that owns the goods is called the consignor.
    - Consignor has to include consigned goods holding by the consignee as part of its inventory.

e.g. Restaurant's owner will not consign goods (e.g. bakery), which are not their goods but they just distribute them, as their inventory.



- Goods in transit and the terms of sale
  - CIF-port of destination (Cost, Insurance, Freight): the seller is responsible for shipping and transporting costs. The buyer is responsible for goods when the cargo has reached the destination (buyer's port)
  - FOB-port of shipment (Free On Board): The buyer accepts the title of goods at the shipment port.

COSTS INCLUDED IN INVENTORIES

All costs of purchase, costs of conversion, and other costs incurred in bringing the inventories to their present location and condition.

Costs included in Inventories and recognized as expenses when goods are sold:

- Costs of purchase, e.g.
  - purchase price, net of discounts
  - import duties and taxes
  - transport and handling
  - insurance during transport
- Costs of conversion e.g. hire workers → wage included in inventory
- Other costs incurred in bringing the inventories to their present location and condition

Costs excluded from Inventories and recognized as expenses in period incurred:

- Abnormal costs incurred as a result of waste of materials, labor or other production conversion inputs
- Storage costs (unless required as part of the production process) general → already available to use
- All administrative overhead and selling costs

e.g. storage cost for vaccine → necessary cost → can be capitalized as inventory cost

COSTS INCLUDED IN INVENTORIES: EXAMPLE

Assume that during a year, a table manufacturing company preparing its financial statements in accordance with IFRS:

- produced 900,000 finished tables incurring
  - ✓ raw material costs of €9 million,
  - ✓ direct labour conversion costs of €18 million, and
  - ✓ production overhead costs of €1.8 million.
- scrapped 1,000 tables (attributable to abnormal waste) incurring
  - ✗ raw material costs of €10,000 and
  - ✗ labor and overhead conversion costs of €20,000.
- spent
  - ✓ €1 million for freight delivery charges on raw materials and
  - ✗ €500,000 for storing the finished goods as inventory.

necessary cost to get inventory to present location

already ready-for-use

The company does not have any work-in-progress inventory at year end.

- *What costs should be expensed in the period incurred?*
- *What costs should be included in inventory and expensed when the goods are sold?*

COSTS INCLUDED IN INVENTORIES: EXAMPLE

Assume that during a year, a table manufacturing company

- produced 900,000 finished tables incurring
  - raw material costs of €9 million,
  - direct labour conversion costs of €18 million, and
  - production overhead costs of €1.8 million.
- scrapped 1,000 tables (attributable to abnormal waste)
  - raw material costs of €10,000 and
  - labor and overhead conversion costs of €20,000.
- spent
  - €1 million for freight delivery charges on raw materials and
  - €500,000 for storing the finished goods as inventory.

Total costs that should be expensed
€30,000
500,000
€530,000

What costs should be expensed in the period incurred?

COSTS INCLUDED IN INVENTORIES: EXAMPLE

Assume that during a year, a table manufacturing company

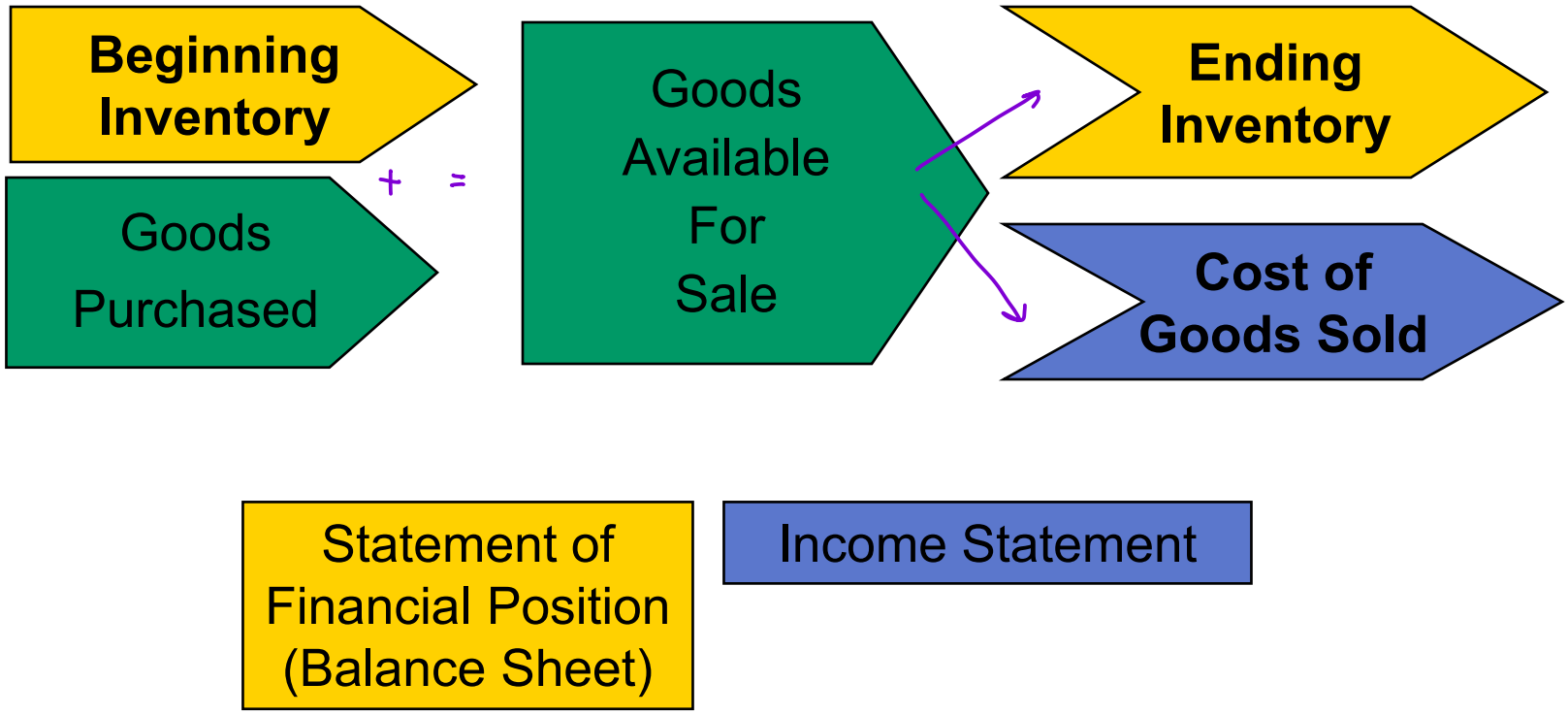
- produced 900,000 finished tables incurring
  - raw material costs of €9 million,
  - direct labour conversion costs of €18 million, and
  - production overhead costs of €1.8 million.
- scrapped 1,000 tables (attributable to abnormal waste) i
  - raw material costs of €10,000 and
  - labor and overhead conversion costs of €20,000.
- spent
  - €1 million for freight delivery charges on raw materials and
  - €500,000 for storing the finished goods as inventory.

Total inventory costs
€9,000,000
18,000,000
1,800,000
1,000,000
€29,800,000

The company does not have any work-in-progress inventory at year end.

What costs should be included in inventory and expensed when the goods are sold?

INVENTORY COST FLOW



SUMMARY TABLE ON INVENTORY VALUATION METHODS

Method	Description
Specific Identification	Actual costs of items specifically identified as sold allocated to COGS.
FIFO (First in-First out)	Assumes that earliest items purchased were sold first. First in to inventory = first out to COGS.
LIFO (Last In-First Out)* e.g. Oil & gas industry	Assumes most recent items purchased were sold first. Last in to inventory = first out to COGS.
Weighted Average Cost	Averages total costs over total units available.

**LIFO not permitted under IFRS*

INVENTORY VALUATION METHODS: SPECIFIC IDENTIFICATION

Sales / Remaining
① 100 kg
② 180 kg → 20 kg ¥124,800
③ 240 kg → 60 kg //

Sales: 520 kg @ ¥240/kg

Purchases | **Goods Available** | **Cost of Goods Sold**

1 100 kg @ ¥110/kg

2 200 kg @ ¥100/kg

3 300 kg @ ¥90/kg

600 kg @ ¥58,000 total

(100 × 110) + (200 × 100) + (300 × 90)

Total = 600 kg @ ¥58,000

100 kg @ ¥110/kg
180 kg @ ¥100/kg
240 kg @ ¥90/kg
520 kg @ ¥50,600

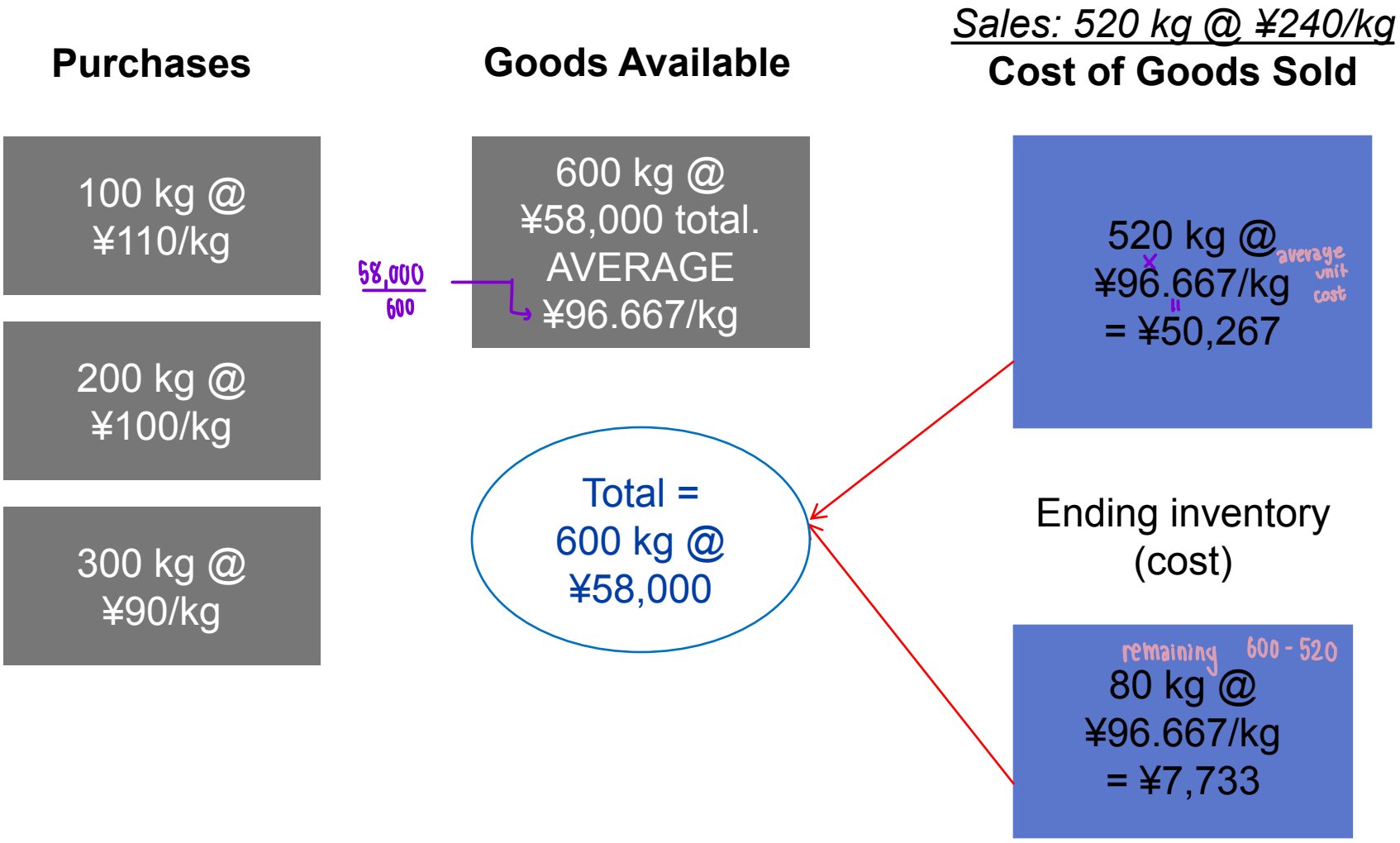
A = L + E
- inventory 50,600
- cogs 50,600 (I/S)

Ending inventory (cost)

Remaining inventory

② 20 kg @ ¥100/kg
③ 60 kg @ ¥90/kg
80 kg @ ¥7,400

INVENTORY VALUATION METHODS: WEIGHTED AVERAGE COST



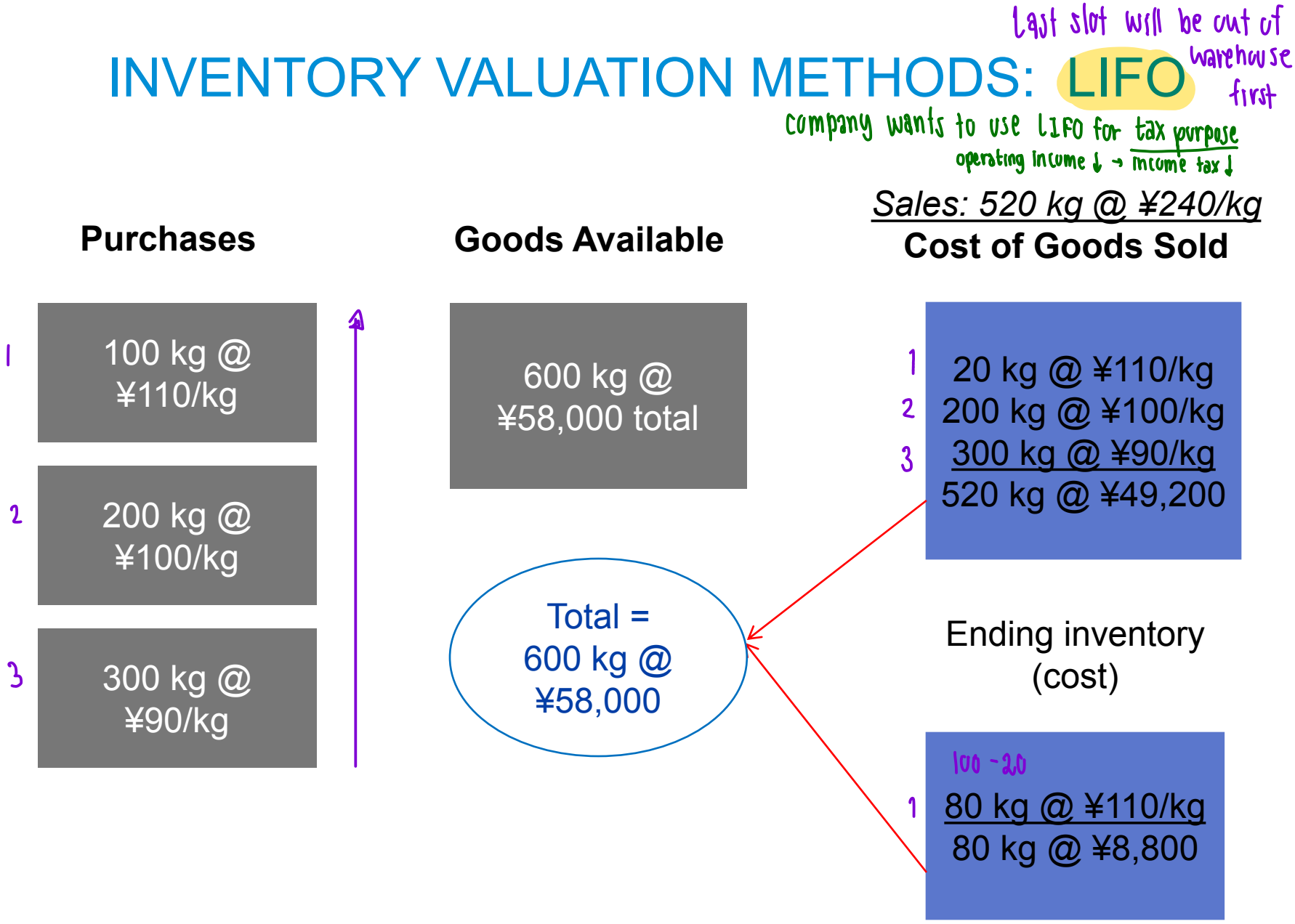
INVENTORY VALUATION METHODS: FIFO

items purchase first will be sold first

INVENTORY VALUATION METHODS: LIFO

Last slot will be out of warehouse first

company wants to use LIFO for tax purpose
operating income ↓ → income tax ↓



INVENTORY VALUATION METHODS: SUMMARY

* Declining cost → not normal (In general, the cost will be higher)

	Inventory Valuation Method			
	Specific ID	Weighted Average Cost	FIFO	LIFO
Cost of sales	50,600	50,267	50,800	49,200
Ending inventory	7,400	7,733	7,200	8,800
Goods available for sale	58,000	58,000	58,000	58,000
Gross profit	74,200	74,533	74,000	75,600

If most recent purchase is less expensive

highest

lowest!

PERIODIC VS PERPETUAL INVENTORY SYSTEMS

count once a year ⇒ which is ending inventory

- Periodic inventory system: inventory values and costs of sales are determined at the end of an accounting period.
  - Purchases are recorded in a purchases account.
  - The total of purchases and beginning inventory is the amount of goods available for sale during the period.
  - The ending inventory amount is subtracted from the goods available for sale to arrive at the cost of sales. The quantity of goods in ending inventory is usually obtained or verified through a physical count of the units in inventory.

↳ then calculate COGS

- Perpetual inventory system: inventory values and cost of sales are *continuously updated* to reflect purchases and sales.

know this

Beginning Inventory + Good purchase = Ending Inventory + COGS ⇒ COGS = Beginning inventory + good purchased − Ending inventory

PERIODIC AND PERPETUAL INVENTORY SYSTEMS: EXAMPLE

not weighted average

Cost of Goods Sold Using *moving* average valuation method: Perpetual Inventory Systems

recalculate average cost per unit when inventory moves (new purchase)

	Purchased		Sold	Remaining (accumulated)	
	Units	Cost	Units	Units	COGS – perpetual
Jan	100	$110		100	
Apr			80	20	=80@$110 = $8,800
					Avg cost =$100.91 per unit
July	200	$100		220	((20*$110)+(200*100))/220
Nov			100	120	=100 @$100.91 = $10,910
				COGS	=$8,800+$10,910=$19,710
				Ending inventory	= 120*100.91 = $12,109

calculate new average

remaining

most recent average cost per unit

PERIODIC AND PERPETUAL INVENTORY SYSTEMS: EXAMPLE

Cost of Goods Sold Using weighted average valuation method: Periodic Inventory Systems

	Purchased		Sold	Remaining		
	Units	Cost	Units	Units		COGS -periodic
Jan	100	$110		100		
Apr			80	20		NA
July	200	$100		220		
Nov			100	120		NA
	300 units				Goods available	= 0+ 100 *$110 + 200*$100 =$31,000
					Avg cost	=(31,000/300) = 103.33
					Ending inventory	= 120*$103.33 = $12,400
					COGS	= $31,000 - $12,400 = $18,600

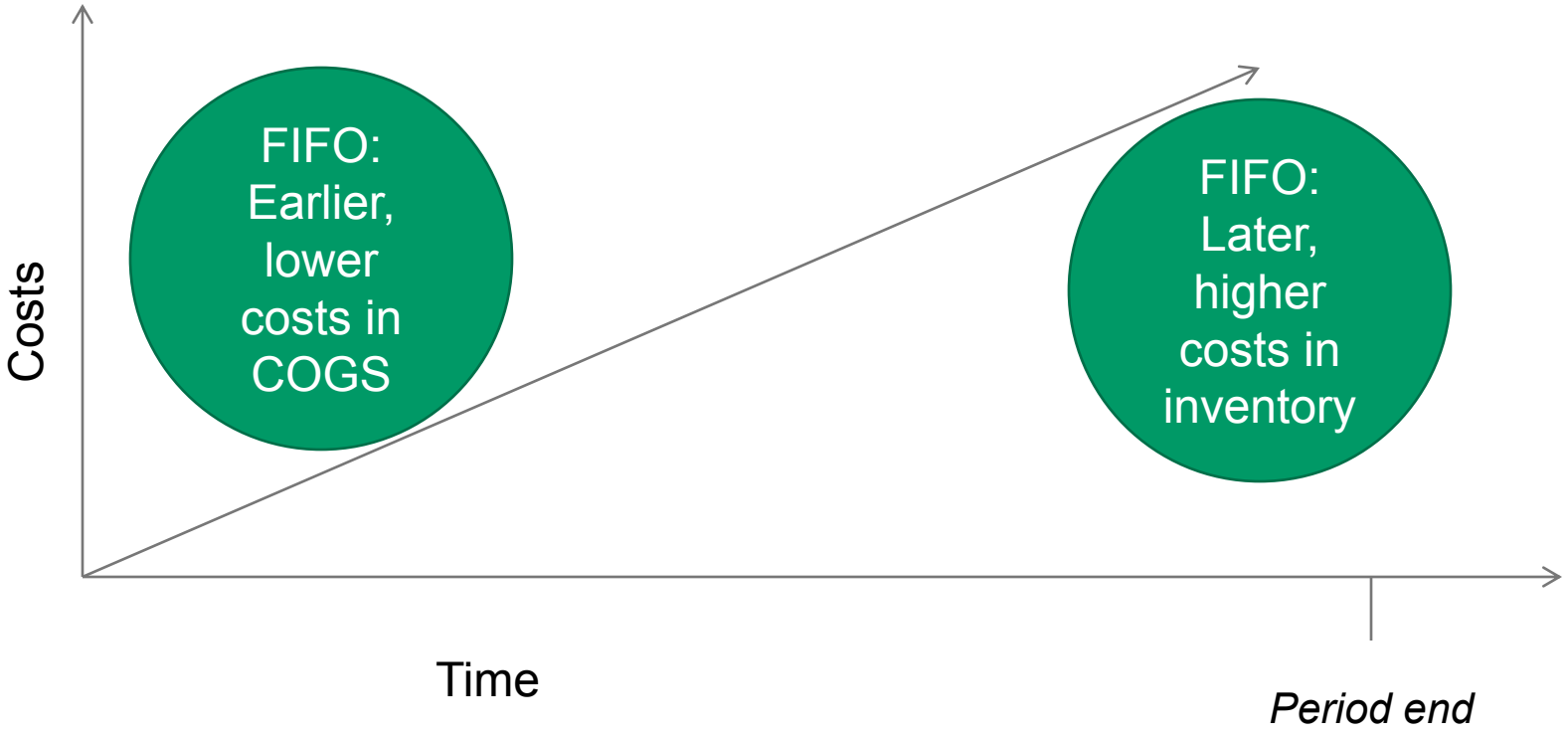
good available ending inv

EFFECTS OF INFLATION OF INVENTORY COSTS ON THE FINANCIAL STATEMENTS

When there's inflation

- COGS ↓ as earlier purchase less cost
- Ending inventory ↑ as recent inventory, with high cost still in the inventory

FIFO



LIFO VS FIFO METHOD- MULTIPLE PERIODS

		Purchase	Unit Price	Sold	Remaining
Year1	March	100	$100		100
	June			80	20
	August	120	$110		140
	November			70	70
Year2	February	60	$120		130
	May			50	80
	July	150	$125		230
	October			140	90

higher

- What is the value of ending inventory at the end of year1, year2 if a company uses FIFO vs LIFO method?
- What amount is the cost of goods sold for the year1, year2 if a company uses FIFO vs LIFO method?

LIFO VS FIFO METHOD- MULTIPLE PERIODS

	Perpetual	LIFO	FIFO	
Year1	Goods available	$23,200	$23,200	
	COGS	$15,700	$15,500	
	Ending Inventory	$7,500	$7,700	
	LIFO-Reserve	$200		
Year2	Goods available	$33,450	$33,650	
	COGS	$23,500	$22,400	
	Ending Inventory	$9,950	$11,250	
	LIFO-Reserve	$1,300		
	Increase in LIFO Reserve	$1,100		($1,300-$200)

sales expensive goods first (most recent purchase)

firm sold earlier purchased good at lower price first

higher ending inventory

reduce cost of inventory from FIFO to LIFO

LIFO reserve
= Ending FIFO- Ending LIFO

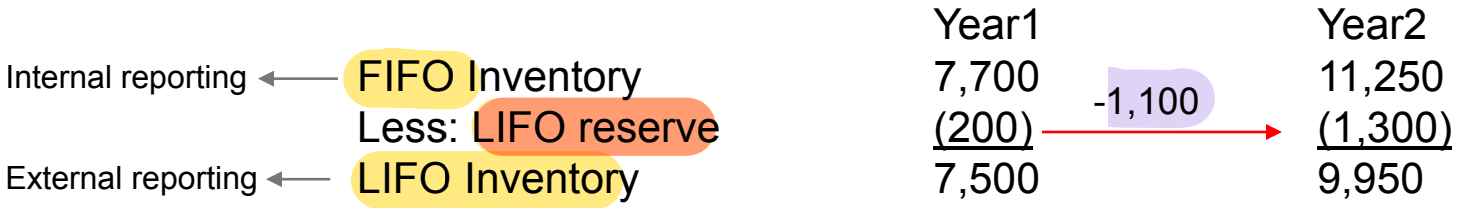
When inventory costs are rising, LIFO yields *higher costs of goods* sold than FIFO, resulting in *lower* income tax expense.

LIFO RESERVE

- LIFO reserve is *the difference between inventory amount as reported using LIFO and the inventory amount that would have been reported using FIFO*.

  FIFO inventory value - LIFO inventory value = LIFO reserve.

- Under US GAAP, companies using the LIFO method must disclose the amount of the LIFO reserve.



Assets	= Liabilities	+ Equity
LIFO Reserve -1,100		COGS -1,100

↳ to reduce the value of inventory ⇒ increase the value of COGS

When there is an increase in LIFO reserve by certain amount, COGS(LIFO) will be higher than COGS(FIFO) by the same amount.

LIFO RESERVE AND FIFO ADJUSTMENT

compared btw FIFO (IFRS) vs. LIFO (US GAAP)

- An analyst can use the disclosure to adjust a company's reported cost of goods sold and ending inventory from LIFO to FIFO.
  - FIFO inventory value = LIFO inventory value + LIFO reserve

know this number

required to disclose for US GAAP

  - FIFO COGS = LIFO COGS – Increase in LIFO reserve
  - FIFO COGS = LIFO COGS + Decrease in FIFO reserve

THE LIFO METHOD

- *Higher cash flows from operating activities* due to lower income taxes may make the company *more valuable* because the value of a firm is based on the present value of its future cash flows.
- Under LIFO, carrying amount of ending inventory is lower than current replacement costs because inventory costs normally increases over time.
  - Costs of goods sold more closely reflects current replacement costs.
- Effects on the financial ratios (when cost is rising)

	LIFO	FIFO
Current ratios = CA/CL	Lower (lower ending inv.)	Higher (higher ending inv)
Debt-to-equity ratios = D/E	Higher (higher cogs → lower equity)	Lower (lower cogs → higher equity)
Profitability ratios (such as profit margin = NI/Sales)	Lower (higher cogs → lower net income)	Higher (lower cogs → higher net income)

LIFO RESERVE EXAMPLE: DISCLOSURE(1)

- Exxon Mobile: Annual Report on form 10-K 2023 (Notes)

Note to financial statement

Inventories

Crude oil, products, and merchandise inventories are carried at the lower of current market value or cost (generally determined under the last-in, first-out method – LIFO). Inventory costs include expenditures and other charges (including depreciation) directly and indirectly incurred in bringing the inventory to its existing condition and location. Selling expenses and general and administrative expenses are reported as period costs and excluded from inventory cost. Inventories of materials and supplies are valued at cost or less.

liquidated inventory using LIFO

LIFO Inventory. In 2022, 2021, and 2020, net income included gains of $367 million, $54 million, and $41 million, respectively, attributable to the combined effects of LIFO inventory accumulations and drawdowns. The aggregate replacement cost of inventories was estimated to exceed their LIFO carrying values by $14.9 billion and $14.0 billion at December 31, 2022 and 2021, respectively.

ending value of inventory & replacement cost

Crude oil, products. and merchandise as of year-end 2022 and 2021 consist of the following:

(millions of dollars)	Dec 31, 2022	Dec 31, 2021
Crude oil	6,909	4,162
Petroleum products	6,291	5,081
Chemical products [1]	3,806	3,354
Gas/other	3,428	1,922
Total	**20,434**	**14,519**

[1] *Chemical products includes basic chemicals (olefins and aromatics), polymers (such as polyolefins, adhesions, specialty elastomers, & butyl), intermediates (e.g. hydrocarbon fluids, plasticizers) and synthetics.*

LIFO RESERVE EXAMPLE: DISCLOSURE(2)

Inventories

Inventories are stated at the lower of cost or market. Cost is principally determined using the last-in, first-out (LIFO) method. The value of inventories on the LIFO basis represented about 65% of total inventories at December 31, 2018 and 2017.

If the FIFO (first-in, first-out) method had been in use, inventories would have been $2,009 million and $1,934 million higher than reported at December 31, 2018 and 2017, respectively.

LIFO reserve

Caterpillar Inc. 2018 Annual Report on form 10-K

Note C.

LIFO RESERVE EXAMPLE: ADJUST INVENTORY

- Caterpillar disclosed: "If the FIFO (first-in, first-out) method had been in use, inventories would have been $2,009 million and $1,967 million higher than reported on December 31, 2018 and 2017, respectively."
- Caterpillar's balance sheet shows inventories of $10,022 million and $10,018 million at December 31, 2018 and 2017, respectively.
- Adjust inventory from LIFO to FIFO by adding the amount of the LIFO reserve to the reported inventory.

31 December ($ millions)	**2018**	**2017**
Total inventories as reported (LIFO)	10,022	10,018
From Note C disclosure (LIFO reserve)	2,009	1,934
Total inventories adjusted (FIFO)	12,031	11,952

LIFO RESERVE EXAMPLE: ADJUST COST OF GOODS SOLD

- Caterpillar disclosed: "If the FIFO (first-in, first-out) method had been in use, inventories would have been $2,009 million and $1,934 million higher than reported at December 31, 2018 and 2017, respectively."
- Caterpillar's income statement shows Cost of Goods Sold of $36,997 million and $31,260 million for the years ending December 31, 2018 and 2017, respectively.
- Adjust Cost of Goods Sold from LIFO to FIFO by deducting the amount of change in LIFO reserve.

31 December ($ millions)	2018	2017
Cost of goods sold as reported (LIFO)	36,997	31,260
(-Increase) decrease in LIFO reserve*	-75	205
Cost of goods sold as adjusted (FIFO)	36,922	31,465

2018: COGS(FIFO) ↓ Net income(FIFO) ↑

2017: COGS(FIFO) ↑ Net income(FIFO) ↓

LIFO RESERVE EXAMPLE: ADJUST NET INCOME

- Caterpillar disclosed: "If the FIFO (first-in, first-out) method had been in use, inventories would have been $2,009 million and $1,934 million higher than reported at December 31, 2018 and 2017, respectively."
- Caterpillar's income statement shows gross profit (total sales less cost of sales) of $17,725 million and $14,202 million for the years ending December 31, 2018 and 2017, respectively.
- Caterpillar's effective tax rates were approximately 24% for 2018 and 28% for 2017.
- Adjust gross profit from LIFO to FIFO by incorporating the adjustment in Cost of Goods Sold (COGS), on an after-tax basis.

31 December ($millions)	**2018**	**2017**
Net income as reported (LIFO)	7,822	4,082
Adjustment to COGS for increase/decrease in LIFO reserve	75	-205
Taxes on adjusted operating profit	-18	57
Net income as adjusted (FIFO)	7,879	3,934

LIFO RESERVE EXAMPLE: ADJUST LIABILITIES AND EQUITY

- Caterpillar disclosed: "If the FIFO (first-in, first-out) method had been in use, inventories would have been $2,009 million and $1,934 million higher than reported at December 31, 2018 and 2017, respectively."
- Caterpillar's December 31, 2018 balance sheet shows total liabilities of $64,429 million, and total equity of $14,080 million.
- Caterpillar's effective tax rates were approximately 24% for 2018 and 28% for 2017.
- Adjust liabilities from LIFO to FIFO by incorporating a tax liability for the amount of accumulated tax savings over the years. Adjust equity by including the cumulative after-tax gross profits.
  - ($75*24%)+($1,934*28%) = $560 million

tax rate tax rate

save tax for now but will create liability in the future if change to FIFO

A = L + E

Increase in LIFO Reserve in 2018 — LIFO reserve in 2017

Total increase in assets - Total increase in liabilities
= 2,009-560 (LIFO reserve 2018 – Deferred tax)
= 1,449
Or after-tax increase in profit (76%*75+72%*1,934)

increase in debt

increase in equity

after-tax rate

31 December ($millions)	**2018**
Liabilities as reported (LIFO)	$64,429
Accumulated deferred taxes	$560
Liabilities as adjusted (FIFO)	$64,989

31 December ($millions)	**2018**
Equity as reported (LIFO)	$14,080
Retained earnings	$1,449
Equity as adjusted (FIFO)	$15,529

COMPARATIVE RATIOS

- Calculate Caterpillar's Inventory Turnover, Gross Profit margin, and Net Profit margin for 2018 under the LIFO and FIFO methods.
- Caterpillar's 2018 revenues were $51,822 million from machinery sales and $2,900 from financial products.

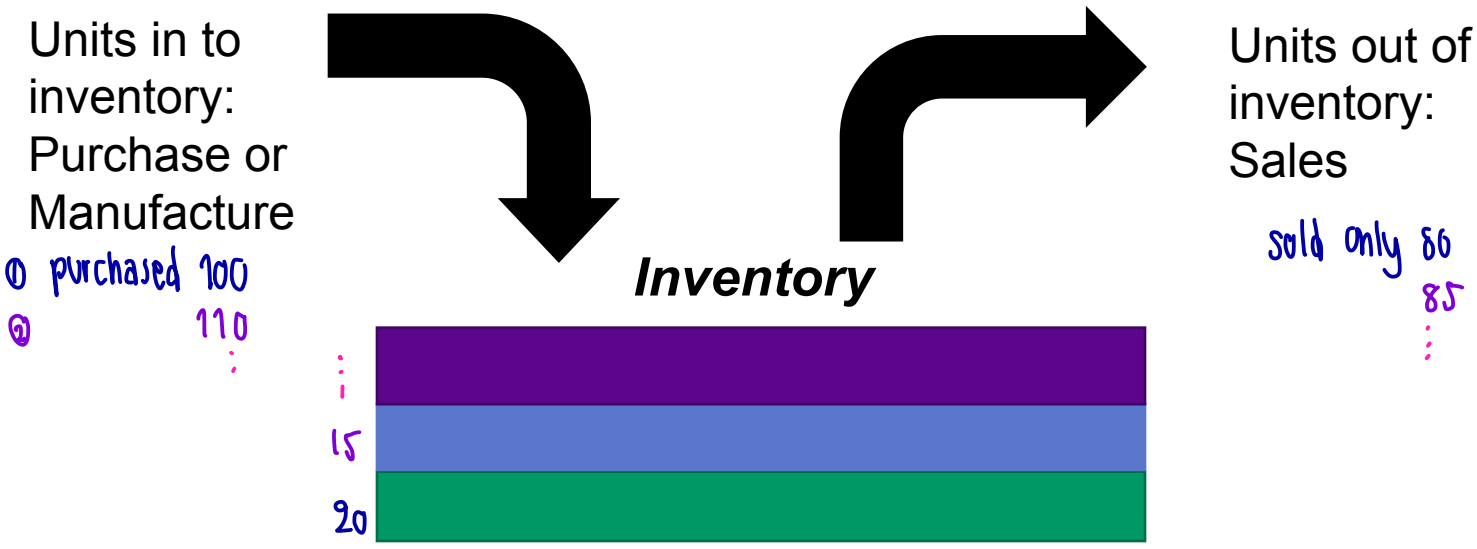
	LIFO	FIFO
Inventory turnover	3.43	3.08
= Cost of goods sold ÷ Average inventory	*= 36,997 ÷ [(11,529 + 10,018) ÷ 2]*	= 36,922 ÷ [(12,031 + 11,952) ÷ 2]
Gross profit margin	28.61%	28.75%
= Gross profit ÷ Total revenue	*= [(51,822 – 36,997) ÷ 51,822]*	*= [(51,822 – 36,922) ÷ 51,822]*
Net profit margin	14.29%	14.40%
= Net income ÷ Total revenue	*= (7,822 ÷ 54,722)*	*= (7,879 ÷ 54,722]*

COMPARATIVE RATIOS

- Calculate Caterpillar's Current Ratio and Total liabilities-to-equity for 2018 under the LIFO and FIFO methods.
- In 2018, Caterpillar reported $38,603 million current assets, $28,218 million current liabilities, 64,429 million total liabilities, and $14,080 million total equity.

	LIFO	FIFO
Current ratio	1.37	1.44
= Current assets ÷ Current liabilities	*= (38,603 ÷ 28,218)*	*= [(38,603 + 2,009) ÷ 28,218]*
Total liabilities-to-equity ratio	4.58	4.19
= Total liabilities ÷ Total shareholders' equity	*= (64,429 ÷ 14,080)*	*= [(64,429 + 560) ÷ (14,080 + 1,449)]*

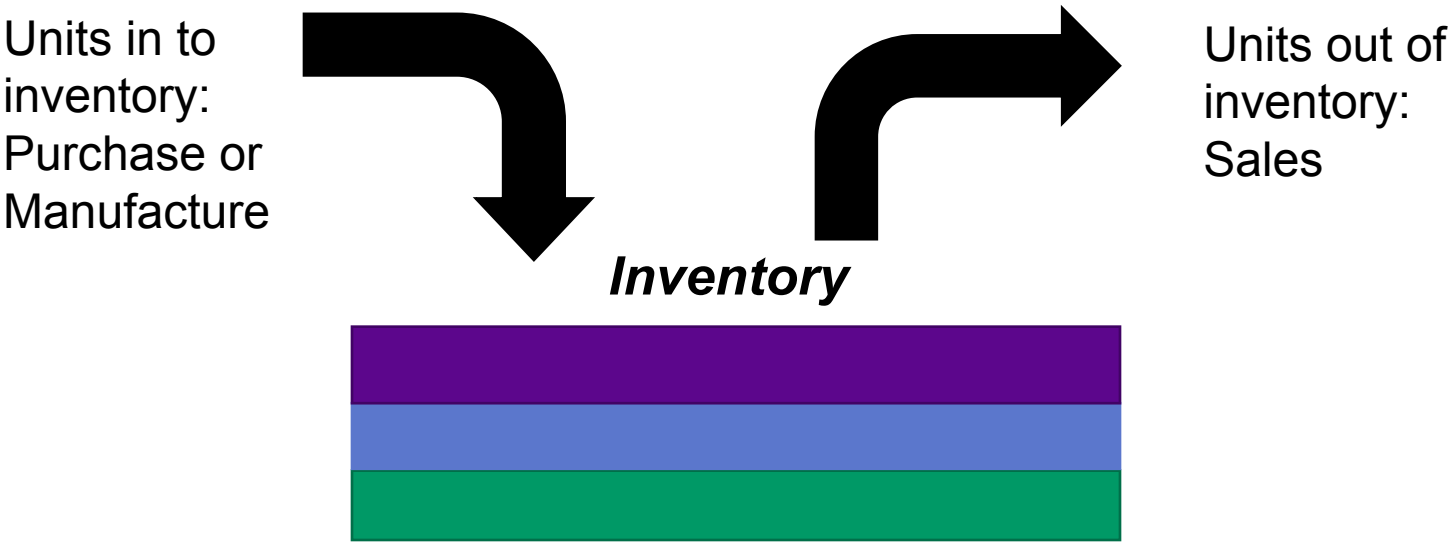
LIFO LIQUIDATION



When the number of inventory units manufactured or purchased in a period exceeds the number of units sold, the LIFO reserve may increase with each increase in quantity creating a new LIFO "layer."

of inv that still in the warehouse

LIFO LIQUIDATION



When the number of units sold in a period exceeds the number of units purchased or manufactured, the costs from older LIFO layers will flow to COGS (some of the older units held in inventory are assumed to have been sold), called *"LIFO liquidation."*

LIFO LIQUIDATION

- If inventory unit costs have been rising from period to period, a LIFO liquidation will produce an inventory-related *increase in gross profits* because the older, lower inventory carrying amounts are used for cost of sales while sales are at current prices.
- Inventory profits caused by a LIFO liquidation are more likely to be one-time events and are not sustainable.

- Reasons for LIFO liquidations
  - labor strikes, economic recession or other causes of declining customer demand which may cause companies to reduce existing inventory levels.
  - Alternatively, management can intentionally inflate their company's reported profits by reducing inventory quantities and liquidating older layers of LIFO inventory (selling some units of beginning inventory).

EXAMPLE: LIFO LAYERS AND LIFO LIQUIDATION

Assume a three-year scenario during which a company's:

- cost of goods increased by $1 per unit each year from $5 to $6 to $7.
- priced its goods to achieve a *50% gross profit per unit* (i.e. 100% markup).

In years 1 and 2, the company buys 10,000 units but sells only 9,000 units. In year 3, the company buys 8,000 units, sells 10,000.

liquidate LIFO inventory

EXAMPLE: LIFO LAYERS AND LIFO LIQUIDATION

	Units	Cost per unit	Total costs
Beginning inventory	0		
Units purchased	10,000	$5	$50,000
Units sold	9,000	$5	$45,000
Ending inventory Year 1	1,000		$5,000
Beginning inventory Year 2	1,000	-	$5,000
Units purchased	10,000	$6	$60,000
Units sold	9,000	$6	$54,000
Ending inventory Year 2	2,000		$11,000

The ending inventory includes a "layer" of old costs at $5 per unit x 1,000 units and another "layer" of costs at $6 per unit x 1,000.

EXAMPLE: LIFO LAYERS AND LIFO LIQUIDATION

	Units	Cost per unit	Total costs
Beginning inventory	0		
Units purchased	10,000	$5	$50,000
Units sold	9,000	$5	$45,000
Ending inventory Year 1	1,000		$5,000
Beginning inventory Year 2	1,000	-	$ 5,000
Units purchased	10,000	$6	$60,000
Units sold	9,000	$6	$54,000
Ending inventory Year 2	2,000		$11,000
Beginning inventory Year 3	2,000		$11,000
Units purchased	8,000	$7	$56,000
Units sold	10,000	$11,000 + $56,000	$67,000
Ending inventory Year 3	0		0

In Year 3, the old layers at $5 from Year 1 and $6 from Year 2 flow to cost of goods sold

EXAMPLE: LIFO LAYERS AND LIFO LIQUIDATION

Year	Revenue per unit	Total revenue	COGS	Gross profit	Gross margin
1	$10	$ 90,000	$ 45,000	$ 45,000	50%
2	$12	$ 108,000	$ 54,000	$ 54,000	50%
3	$14	$ 140,000	$ 67,000	$ 73,000	52%

also included lower cost inventory

gain higher margin

- The company prices its goods to achieve a 50% gross profit per unit (i.e. 100% markup).
- The gross margin in Year 3 is higher because the COGS has the lower per-unit costs from the purchases in earlier years.

INVENTORY METHOD CHANGES

- Under IFRS, a change in inventory method is acceptable only if the change results in the financial statements that provides reliable and more relevant information about the effects of transactions, other events, or conditions on the business entity's financial position, financial performance, or cash flows.
- Require a retrospective approach
  - The change is applied to comparative information for prior periods as far back as is practicable.

e.g. moving average → FIFO since day 1

- Under US GAAP, companies must explain thoroughly why the newly adopted inventory accounting method is superior and preferable to the old method.
  - Change from LIFO to other methods: apply retrospectively
  - Change from other methods to LIFO method: apply prospectively (made no adjustment to prior periods' numbers.)
    - The carrying amount of inventory under the old method becomes the initial LIFO layer in the year of LIFO adoption.

not popular

INVENTORY ADJUSTMENTS

The cost of inventory may not be recovered by spoilage, obsolescence, or declining selling price.

Inventory is measured and carried on the balance sheet at the lower of cost or market.

- IFRS: Lower of cost or net realizable value (LCNRV)
  - NRV = the estimated selling price (expected to get) in the ordinary course of business minus the estimated costs necessary to make the sale and estimated costs to get the inventory in condition for sale. (e.g. commission cost to sell product)
  - If the value of inventory declines below the carrying amount, the loss is recognized as an expense (may be included as part of COGS or reported separately)
  - Subsequent reversals **allowed**

INVENTORY ADJUSTMENTS

Choose the lower one

	Cost	NRV	Inventory (net of allowance) shown on B/S	(loss)or gain recognize on I/S
31/12/2020	520,000	485,000	485,000	-35,000
31/12/2021	615,000	585,000	585,000	+5,000

- 35,000
+ 5000
-30000

	Assets =	Liabilities	+ Equity
Dec 31, 2020	Allowance for valuation-Inventory -35,000		Loss on valuation-inventory -35,000
Dec 31, 2020	Allowance for valuation-Inventory +5,000		Loss on valuation-inventory +5,000

Gain

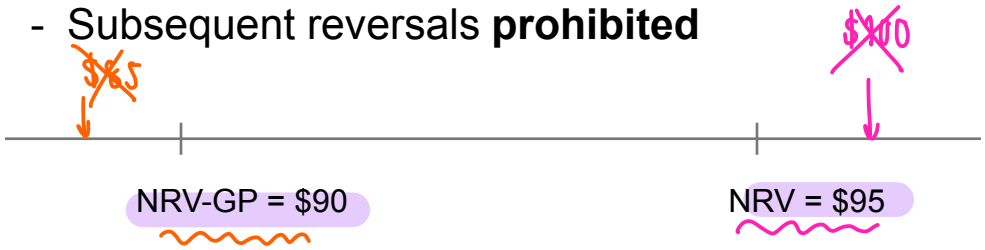
- Allowance for valuation-Inventory is *a contra asset* of Inventory account
- Cost of goods sold = Beginning inventory + Purchase +Loss on valuation – Ending inventory

	Year1		Year2
Inventory (cost)	520,000		615,000
Less: allowance	(35,000)	+5,000 →	(30,000)
Inventory	485,000		585,000

INVENTORY ADJUSTMENTS

Inventory is measured and carried on the balance sheet at the lower of cost or market.

- US GAAP:
  - For fiscal years beginning after December 15, 2016, inventories measured using other than LIFO/retail inventory methods are measured at the lower of cost or net realizable value. (Consistent with IFRS)
  - For inventories measured using LIFO/retail inventory methods, use market value.
    - The market value = *current replacement costs* subject to upper and lower limits.
    - Market value cannot exceed *net realizable value* (selling price minus reasonably estimated costs of completion and disposal)
    - Market value cannot be lower than *net realizable value minus a normal profit margin*.
  - Subsequent reversals **prohibited**



Replacement cost, NRV, NRV-PM
Take "the middle" as the market value
1) replacement cost = $100
The market value is $95.
2) Replacement cost = $85
The market value is $90

INVENTORY ADJUSTMENTS

The Volvo Group reported:

- Total inventories (net of allowance) at year end 2018 and 2017, respectively, as reported on Balance Sheet: SEK 65,783 million and SEK 48,287 million.
- Cost of sales for 2018, as reported on Income Statement: SEK 303,478
- Allowance for inventory obsolescence at year end 2018 and 2017, respectively, as disclosed in note 17: SEK 3,926 million and SEK 3,489 million
- *Compare inventory turnover*
- *Inventory Turnover = Cost of Goods Sold/ Average Inventory*
- *Using numbers reported,* **5.32** = 303,478 ÷ [(65,783 + 48,287) ÷ 2]
- *Assuming all past inventory write downs were reversed, using adjusted numbers* = **4.99** = 303,041 ÷ [(69,709 + 51,776) ÷ 2]

2017 2018
Allowance (3,489) → (3926)
(-437)

A	=	L	+	E
-437				-437

COGS 2018 Δallowance
303,478 - 437
65,783+3,926
48,287 + 3,489

lower if there's no write down

∴ Should compare ratio before any write down → more accurate

- *Inventory turnover is higher based on the numbers as reported* because cost of sales will be higher (assuming inventory write-downs are reported as part of cost of sales) and inventory carrying amounts will be lower with an allowance for inventory obsolescence.
- Inventory write-downs give the appearance of a company having managed its inventory more efficiently, but write-downs of inventory can reflect *poor inventory management*.

INVENTORY ADJUSTMENT-EXAMPLE

For the years ended December 31	2017	2016	2015
Net sales	334,748	301,914	312,515
Cost of sales	(254,581)	(231,602)	(240,653)
Gross income	80,167	70,312	71,862
⋮	⋮	⋮	⋮
Operating income	30,327	20,826	23,318
Interest income and similar credits	164	240	257
Income expenses and similar charges	(1,852)	(1,847)	(2,366)
Other financial income and expenses	(386)	11	(792)
Income after financial items	28,254	19,230	20,418
Income taxes	(6,971)	(6,008)	(5,320)
Income for the period	21,283	13,223	15,099
Attributable to:			
Equity holders of the parent company	20,981	13,147	15,058
Minority interests	302	76	41
Profit	21,283	13,223	15,099

December 31 Partial B/S	2017	2016	2015
Assets			
Total non-current assets	213,455	218,465	203,478
Current assets:			
Inventories already net from allowance	52,701	48,287	44,390
⋮	⋮	⋮	⋮
Cash and cash equivalents	36,092	23,949	21,048
Total current assets	199,039	180,301	170,687
Total assets	412,494	398,916	374,165

Note 17. Inventories

Accounting Policy

Inventories are reported at the lower of cost and net realizable value. The cost is established using the first-in, first-out principle (FIFO) and is based on the standard cost method, including costs for all direct manufacturing expenses and the attributable share of capacity and other related manufacturing-related costs. The standard costs are tested regularly, and adjustments are made based on current conditions. Costs for research and development, selling, administration, and financial expenses are not included. Net realizable value is calculated as the selling price less costs attributable to the sale.

Sources of Estimation Uncertainty

Inventory obsolescence

If the net realizable value is lower than cost, a valuation allowance is established for inventory obsolescence. The total inventory value, net of inventory obsolescence allowance, was: SEK (in millions) 52,701 as of December 2017 and 48,287 as of December 31, 2016.

Increase (decrease) in allowance for inventory obsolescence

December 31 (millions of Krona)	2017	2016	2015
Opening balance	3,683	3,624	3,394
Change in allowance for inventory obsolescence charged to income	304	480	675
Scrapping	(391)	(576)	(435)
Translation differences	(116)	177	(29)
Reclassifications, etc.	8	(23)	20
Allowance for inventory obsolescence as of December 31	3,489	3,683	3,624

Inventories

December 31 (millions of Krona)	2017	2016	2015
Finished products	32,304	31,012	27,496
Production materials, etc.	20,397	17,275	16,894
Total	**52,701**	**48,287**	**44,390**

INVENTORY ADJUSTMENT-EXAMPLE

- What inventory values would the company have reported for 2017, 2016, and 2015 if it had no allowance for inventory obsolescence?

net inventory + allowance

2017 = 52,701 + 3,489 = 56,190

2016 = 48,287 + 3,683 = 51,970

2015 = 44,390 + 3,624 = 48,014

- Assuming that any changes to the allowance for inventory obsolescence are reflected in the cost of sales, what amount would the company's cost of sales be for 2017 and 2016 if it had not recorded inventory write-downs in 2017 and 2016?

Δ allowance in 2017: 3,489 (2017) − 3,683 (2016) = −194 (gain)

Δ allowance in 2016 = 3,683 − 3,624 = +59 (loss on valuation - inventory)

COGS (P/L)

2017 = 254,581 + 194 =

2016 = 231,602 − 59 =

↳ will increase the COGS if firm record it

↳ Δ in allowance

⊕ → COGS will be higher → not record → COGS ↓

⊖ → COGS ↓ → COGS ↑

- What amount would the company's profit (net income) be for 2017 and 2016 if it had not recorded inventory write-downs in 2017 and 2016? the company's effective income tax rate was reported as 25 percent for 2017 and 31 percent for 2016.

COGS ↑ NI ↓ ; NI (2017) = NI (reported) − 75% (194) (after-tax (1−t)) higher COGS

NI (2016) = NI (reported) for the period + 69% (59) lower COGS

SUMMARY

- Total cost of inventories comprises all costs of purchase, costs of conversion, and other costs incurred in bringing the inventories to their present location and condition.
- The choice of inventory valuation method determines how the cost of goods available for sale during the period is allocated between inventory and cost of sales. It affects the financial statements and any financial ratios that are based on them.
- IFRS allow three inventory valuation methods (cost formulas): first-in, first-out (FIFO); weighted average cost; and specific identification.
- U.S. GAAP allow the three methods above plus the last-in, first-out (LIFO) method.
- Companies that use the LIFO method must disclose in their financial notes the amount of the LIFO reserve. This information can be used to adjust reported LIFO inventory and cost of goods sold balances to the FIFO method for comparison purposes.

1

Assume the company uses a periodic inventory system.
Cinnamon Corp. started business in 2017 and uses the **weighted average** cost method. During 2017, it purchased 45,000 units of inventory at €10 each and sold 40,000 units for €20 each. In 2018, it purchased another 50,000 units at €11 each and sold 45,000 units for €22 each. Its 2018 cost of sales (€ thousands) was closest to:

- €450.
- €490.
- €491. ✓
- €495.

✓ **Correct** 1/1 Points

2

Assume the company uses a periodic inventory system.
Zimt AG started business in 2017 and uses the FIFO method. During 2017, it purchased 45,000 units of inventory at €10 each and sold 40,000 units for €20 each. In 2018, it purchased another 50,000 units at €11 each and sold 45,000 units for €22 each. Its 2018 ending inventory balance (€ thousands) was closest to:

- €105.
- €109.
- €110. ✓
- €220.

✓ **Correct** 1/1 Points

3

Question: Cost of goods sold for 2018 under the **FIFO method** is closest to:
if a company using the LIFO method reports the following in £:

	2018	2017
Cost of goods sold (COGS)	50,800	48,500
Ending inventories	10,550	10,000
LIFO reserve	4,320	2,600

- £48,530.
- £49,080. ✓
- £52,520.
- £55,120

✓ Correct 1/1 Points

4

During periods of rising inventory unit costs, a company using the FIFO method rather than the LIFO method will report a lower:

- current ratio.
- inventory turnover. ✓
- gross profit margin.
- none is correct.

✓ Correct 1/1 Points

5

LIFO reserve is most likely to increase when inventory unit:

- costs are increasing ✓
- levels are decreasing.
- costs are decreasing.
- costs are stable.

✓ Correct 1/1 Points

6

Eric's Used Book Store prepares its financial statements in accordance with IFRS. Inventory was purchased for £1 million and later marked down to £550,000. One of the books, however, was later discovered to be a rare collectible item, and the inventory is now worth an estimated £3 million. The inventory is most likely reported on the balance sheet at:

- £2,450,000
- £3,000,000.
- £1,000,000. ✓
- £550,000.

✓ Correct 1/1 Points

7

Eric's Used Book Store prepares its financial statements in accordance with IFRS. Inventory was purchased for £1 million and later marked down to £550,000. One of the books, however, was later discovered to be a rare collectible item, and the inventory is now worth an estimated £3 million. The net income is most likely affected by:

- gain on valuation-inventory £450,000 ✓
- gain on valuation-inventory £2,450,000
- gain on valuation-inventory £3,000,000
- gain on valuation-inventory £1,000,000

✓ Correct 1/1 Points

8

A write down of the value of inventory to its net realizable value will have a positive effect on the:

- income statement.
- inventory turnover ratio. ✓
- profit margin ratio.
- balance sheet.

✓ Correct 1/1 Points

9

Compared with a company that uses the FIFO method, during a period of rising unit inventory costs, a company using the LIFO method will most likely appear more:

- solvent.
- liquid.
- efficient. ✓
- profitable.

✗ Incorrect 0/1 Points

10

Carey Company adheres to US GAAP, whereas Jonathan Company adheres to IFRS. It is least likely that:

- Carey has reversed an inventory write-down. ✓
- Jonathan has reversed an inventory write-down.
- Jonathan and Carey both use the FIFO inventory accounting method.
- Jonathan and Carey both use the weighted average inventory accounting method.