Accounting for Inventory

Objectives

- Understand
  - Cost-flow assumptions are necessary to determine ending inventory and cost of goods sold (COGS)
  - LIFO and FIFO are two cost-flow assumptions
  - How the COGS and ending inventory numbers differ under LIFO and FIFO?
  - How to convert LIFO COGS and ending inventory to FIFO COGS and ending inventory (understand the LIFO reserve)
  - How inventory assumptions affect taxes

Accounting for Inventory

Inventory accounting has two fundamental components:

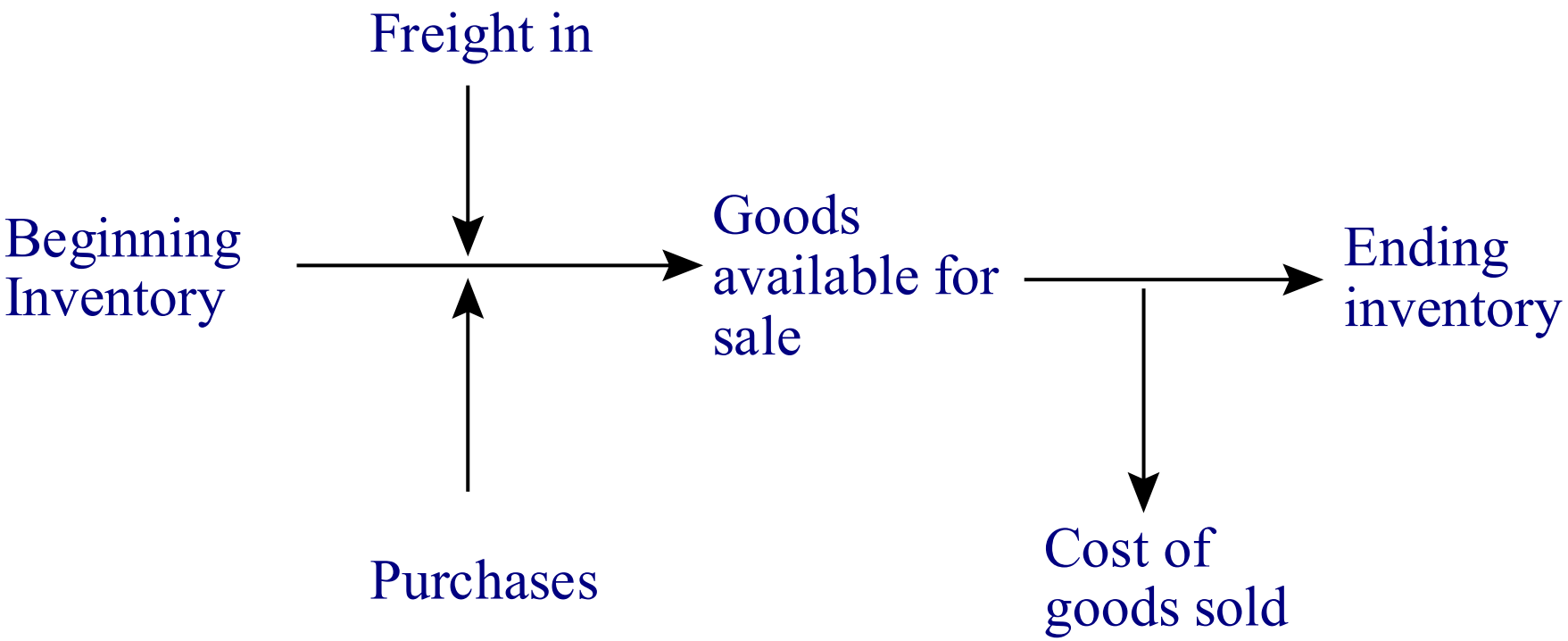
1) Product Costing Decision (This component is discussed in managerial accounting)

What costs flow into each product's inventory account?

2) Cost Flow & Valuation Decisions

Once costs are in the inventory account (i.e., on the Balance sheet), when are costs transferred to the Income Statement?

Accounting for Inventory



The "ins" of inventory accounting

The "outs" of inventory accounting

Accounting for Inventory

	Year 1	Year 2
Beg. Units	0	4
+ Units produced	7	5
= Units available	7	9
- Units sold	3	4
= End. Units	4	5
First-year production		
Second-year production		

Accounting for Inventory

Circuit City, Inc. (Retail operations)	vs.	CarMax Auto Superstore

Accounting for Inventory

A Comparison of LIFO and FIFO

	Income Statement	Balance Sheet
LIFO		
FIFO		

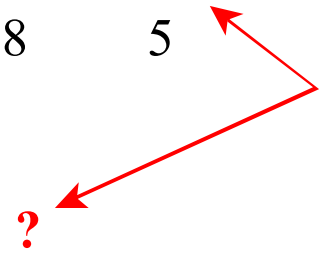
Accounting for Inventory

Cost of goods sold and ending inventory: LIFO vs. FIFO

Product 1

	Year 1	Year 2
Units at start of year	0	4@$8
Units produced	7@$8	5@$10
Units available for sale	7@$8	9
Units sold	3@$8	4
Units at end of year	4@$8	5

In year 2....



LIFO cogs
LIFO ei
LIFO cogs + ei

FIFO cogs
FIFO ei
FIFO cogs + ei

Accounting for Inventory

BSE Entries

•Inputs for product 1 purchased for cash, year 2

• 4 units sold for $20 each in cash. LIFO cost used for matching

• 4 units sold for $20 each in cash, but FIFO used for matching

Accounting for Inventory

LIFO vs. FIFO over time

- Different "cost layers" of inventory

LIFO	FIFO
1@$10	5@10
4@$8	

Cumulative difference: EInvFIFO-EInvLIFO = "LIFO Reserve"pretax

- Under increasing input prices,

	$EInv_{LIFO}$	$\leq$	$EInv_{FIFO}$
Year 2:	$42		$50

Are FIFO firms' inventories more valuable?

Accounting for Inventory

LIFO vs. FIFO over time

Under increasing input prices and continuous buildup of cost layers,

	Gross profitLIFO	≤	Gross profitFIFO
Year 2:	$40		$48

Are FIFO firms more profitable?

Accounting for Inventory

LIFO vs. FIFO over time

- Inventory turnover: units sold per average units in inventory

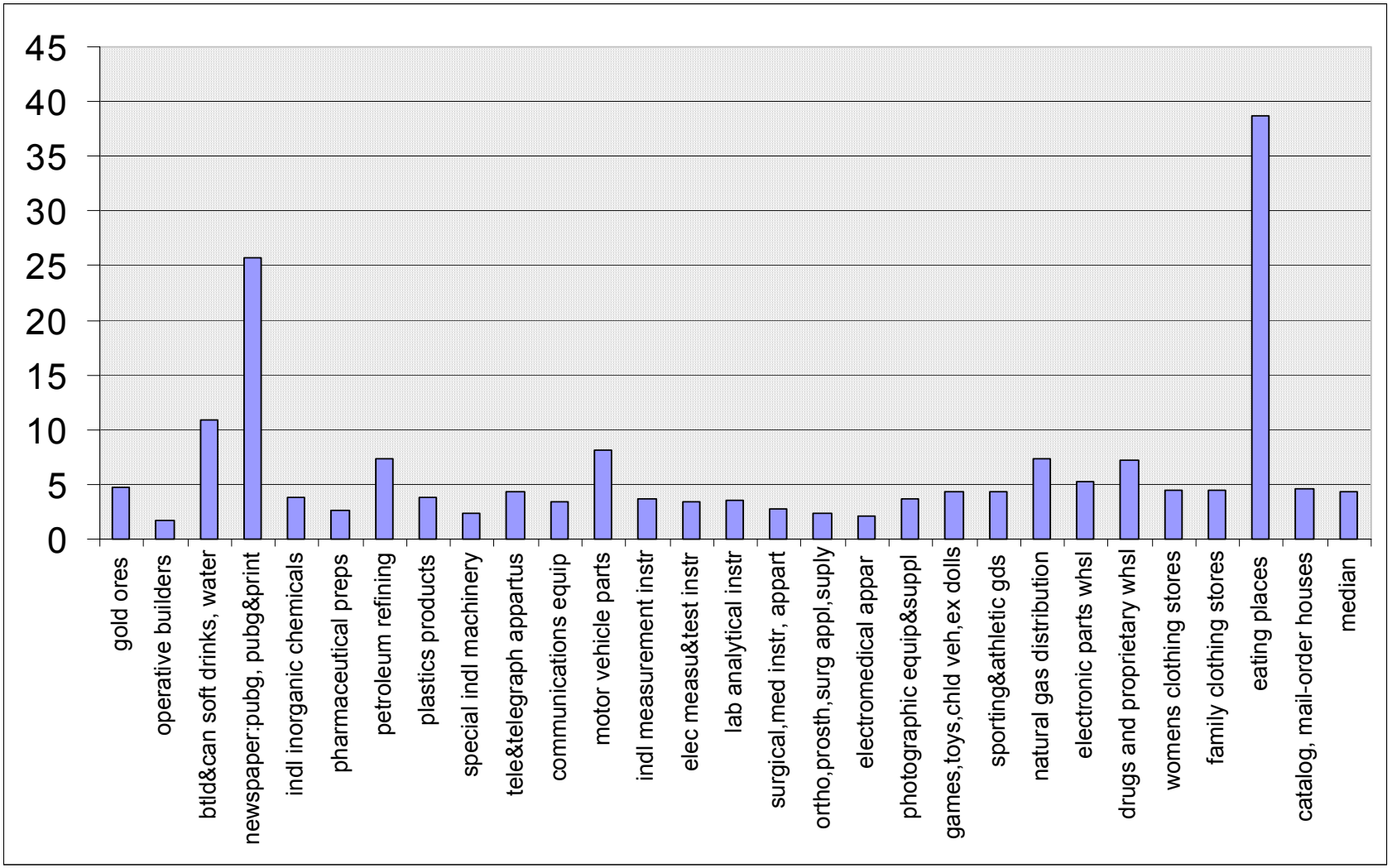
Based on physical units : 4/[(4+5)/2)] = 0.89
Based on FIFO $: 32/[(32+50)/2] = 0.78
Based on LIFO $: 40/[(32+42)/2] = 1.08

- Under increasing input prices and continuous buildup of cost layers,

	ITO_{LIFO}	$\geq$	ITO_{FIFO}
Year 2:	1.08		0.78

Are LIFO firms more efficient?

Inventory Turnover by Industry



Circuit City v. Best Buy

	2002 Gross profit %	2002 ROE	2002 I--Turn
Best Buy	21%	26%	6.9×
Circuit City	25%	8%	4.2×

Accounting for Inventory

$$EInv_{FIFO} = BInv_{FIFO} + Inputs - COGS_{FIFO}$$

$$EInv_{LIFO} = BInv_{LIFO} + Inputs - COGS_{LIFO}$$

The amount of input does not depend upon the choice of LIFO/FIFO.

$$EInv_{FIFO} - EInv_{LIFO} = BInv_{FIFO} - BInv_{LIFO} + COGS_{LIFO} - COGS_{FIFO}$$

Change in LIFO Reserve = $COGS_{LIFO}$-$COGS_{FIFO}$

The change in LIFO Reserve tells us the difference in cost between LIFO and FIFO.

Accounting for Inventory

Intel ITO 2002	USX ITO 2002	Adj. USX ITO 2002
COGS = 13,446	**COGS = 6,158**	**"FIFO" COGS = 6,258**
Beg Inv = 2,253	**Beg Inv = 870**	**"FIFO" Beg Inv = 1,280**
End Inv = 2,276	**End Inv = 1,030**	**"FIFO" End Inv = 1,340**
ITO = 5.9	**ITO = 6.5**	**"FIFO" ITO = 4.8**

Accounting for Inventory

- Suppose no inventory is acquired at start of year 2 (sales = 4)

- FIFO COGS = 4 x $8 = $32 (as before)
- LIFO COGS = 4 x $8 = $32 (same)

- Liquidating LIFO layers, if multiple layers exist
- Decrease LIFO COGS (possibly less than FIFO)
- Increase profitability
- Decrease LIFO reserve
- Decrease turnover ratio

- Earnings manipulation?

Accounting for inventory: Tax considerations

LIFO conformity rule: if a firm uses LIFO for tax purposes, it must also use LIFO for financial reporting purposes

Choice should minimize the present value of tax payments

Given the tax effects, what types of firms would you expect to choose each inventory method?

Summary

•Matching principle requires a "cost flow" assumption, leading to different accounting methods (e.g. LIFO/FIFO)

• Computation/record-keeping trivial, but implications not: LIFO and FIFO produce temporary differences in accounting numbers.

• No accounting method is innately superior: choice depends upon business environment, incentives of users, possibility of manipulation, etc.

• Disclosures available to make numbers comparable across firms.