Managerial Accounting

COURSE OVERVIEW

Session	Topic	Hilton / Platt
1	The Changing Role of Managerial Accounting	Chapter 1
	Basic Cost Management Concepts	Chapter 2
2	Product / Job Costing	Chapter 3
	Transfer Pricing	Chapter 13
3	Cost-Volume-Profit Analysis	Chapter 7
	Inventory Costing (Absorption vs. Variable Costing)	Chapter 8
4	Decision-Making: Relevant Costs and Benefits	Chapter 14
	Responsibility Center, Performance Measures & Controls	(Chapter 12/13)
5	Activity-Based Costing	Chapter 5
6	Activity Analysis, Cost Behavior, and Cost Estimation	Chapter 6
	Budgets – Financial Planning and Analysis	Chapter 9
7	Standard Costing and Direct Cost Variances	Chapter 10
8	Signaling Effects of Incentives	
	Sustainability and Controlling	

CHAPTER 3
PRODUCT COSTING

PRODUCT COSTING

OUTLINE

PRODUCT & SERVICE COSTING

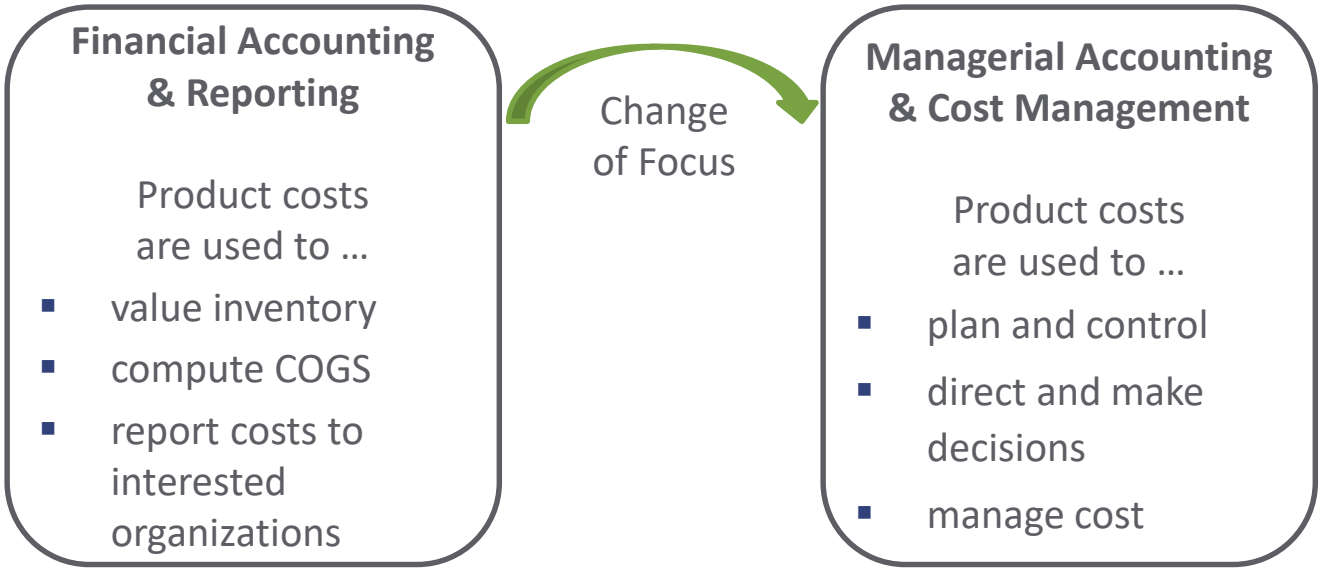
PRODUCT COSTING BY JOB ORDER / BATCH COSTING

APPLIED OVERHEAD

PRODUCT COSTING

PRODUCT & SERVICE COSTING

- A product costing system accumulates the costs incurred in a production process and assigns those costs to the organization's final products



PRODUCT COSTING IN NONMANUFACTURING COMPANIES

- Merchandising companies must know transportation costs in/out
- Professional service firms must know their cost of delivering the services
- Transportation firms must know their full costs to move products, etc.

PRODUCT COSTING

PRODUCT COSTING SYSTEMS: OVERVIEW

JOB-ORDER COSTING

- Products made individually (or in small batches)
- Each product/batch is clearly distinguishable
- Examples:
  - Manufacturing – Custom homebuilding
  - Services – Audits, airline flight, research projects

PROCESS COSTING (NOT COVERED)

- Employed for mass production of like units (chemical or gasoline production, microchips)

PRODUCT COSTING

PRODUCT COSTING SYSTEMS

JOB-ORDER COSTING

- Used for production of large, unique, high-cost items.
- Built to order rather than mass produced.
- Many costs can be directly traced to each job.
- Each distinct batch of production is called a job or job order.

TWO TYPES:

- Job-shop operations - Products manufactured in very low volumes or one at a time (e.g., film production, aircraft manufacture, custom house).
- Batch-production operations - Multiple products in batches of relatively small quantity (e.g., furniture manufacture, pleasure boat production).

PRODUCT COSTING

PRODUCT COSTING SYSTEMS

PROCESS COSTING

- Used for production of small, identical, low cost items.
- Mass produced in automated continuous production process.
- Costs cannot be directly traced to each unit of product.
- Production costs are accumulated for a large number of units of output and then averaged over all of the units.
- Typical process cost applications: Petrochemical refinery, Paint manufacturer, Beer brewery
- **Process Costing will not be covered in class!**

PRODUCT COSTING

E3-23: JOB ORDER OR PROCESS COSTING SYSTEM?

1. Manufacturing of household cleaning solutions
2. Manufacturing of custom hot tubs and spas
3. Architectural firm
4. Manufacturing of ceramic tiles
5. Producer of yogurt
6. Manufacturing of custom backyard tool sheds
7. Manufacturing of paper clips
8. Engineering consulting firm
9. Manufacturing of balloons
10. Manufacturing of custom sailboats

PRODUCT COSTING

JOB COSTING

Service Sector	Merchandising Sector	Manufacturing Sector
• Audit engagements done by Price Waterhouse Coopers • Consulting engagements done by McKinsey & Co. • Advertising-agency campaigns run by Ogilvy and Mather • Individual legal cases argued by Hale & Dorr • Computer-repair jobs done by CompUSA • Movies produced by Universal Studios	• L. L. Bean sending individual items by mail order • Special promotion of new products by Wal-Mart	• Assembly of individual aircrafts at Boeing • Construction of ships at Litton Industries

PRODUCT COSTING

JOB COST RECORD

- A Job Cost Record is used to accumulate the actual direct materials, actual direct labor, and applied manufacturing overhead costs for each job.
- Source Documents
  - Material requisition forms: transfer direct materials
  - Time records: gather the amount of labor
  - Applied (i.e., estimated) manufacturing overhead: a heterogeneous pool of indirect production costs, such as indirect material, indirect labor, utility costs, and depreciation
- Often a source for customer billing when cost plus is a component of pricing

PRODUCT COSTING

JOB COST RECORD

JOB-COST RECORD

Job Number F16 Description 80 deluxe alum. fishing boats
Date Started Nov. 1, 20x1 Date Completed Nov. 22, 20x1
Number of Units Completed 80

Direct Material				
Date	Requisition Number	Quantity	Unit Price	Cost

Direct Labor				
Date	Requisition Number	Quantity	Unit Price	Cost

Manufacturing Overhead				
Date	Requisition Number	Quantity	Unit Price	Cost

Cost Summary	
Cost Item	Amount
Total direct material Total direct labor Total manufacturing overhead	
Total cost	
Unit cost	

Shipping Summary			
Date	Units Shipped	Units Remaining in Inventory	Cost Balance

A Materials requisition form authorizes the use of materials on a job

Time records (time ticket) help accumulate direct labor costs

PRODUCT COSTING

JOB COST RECORD

JOB-COST RECORD

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A Materials requisition form authorizes the use of materials on a job

Time records (time ticket) help accumulate direct labor costs

Applied overhead using a predetermined overhead rate

PRODUCT COSTING

OVERHEAD ALLOCATION: STEPS

- Purpose of predetermined overhead rates: quicker estimation of total job costs

1. Setting a predetermined overhead rate (standard cost)
   - Done at the beginning of the period
2. Total budgeted (estimated) overhead divided by estimated cost-driver units
   - Allocate overheads
   - Actual number of cost-driver units times estimated overhead rate

PRODUCT COSTING

APPLIED MANUFACTURING OVERHEAD

1. Predetermined Overhead Rate (POHR)

$$\text{POHR} = \frac{\text{Budgeted manufacturing overhead cost}}{\text{Budgeted amount of cost driver (or activity base)}}$$

2. Allocating/Applying overhead

$$\text{Overhead applied} = \text{POHR} \times \text{Actual activity}$$

- Based on estimates (determined before the period begins)
- Based on actual, such as direct labor hours (incurred during the period)

PRODUCT COSTING

OVERHEAD APPLICATION: EXAMPLE

- Budgeted manufacturing OH costs: $ 360,000
- Budgeted Cost Driver: 40,000 machine hours
- Actual Machine hours: 3,200

What is POHR?

How much OH do we apply?

PRODUCT COSTING

OVERHEAD APPLICATION: EXAMPLE

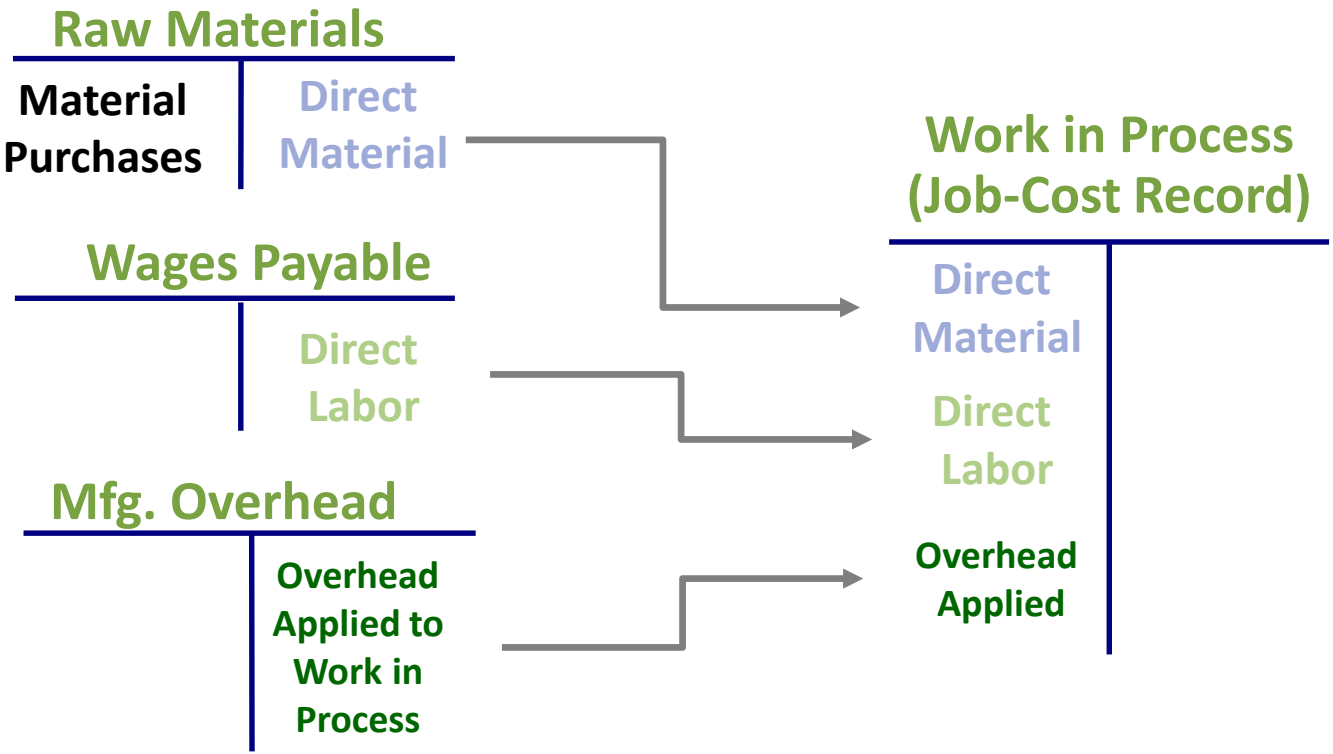
- Budgeted manufacturing OH costs: $ 360,000
- Budgeted Cost Driver: 40,000 machine hours
- Actual Machine hours: 3,200

POHR: $ 360,000/40,000 = $ 9 per machine hour

OH Applied: 3,200 * $ 9 = $28,800

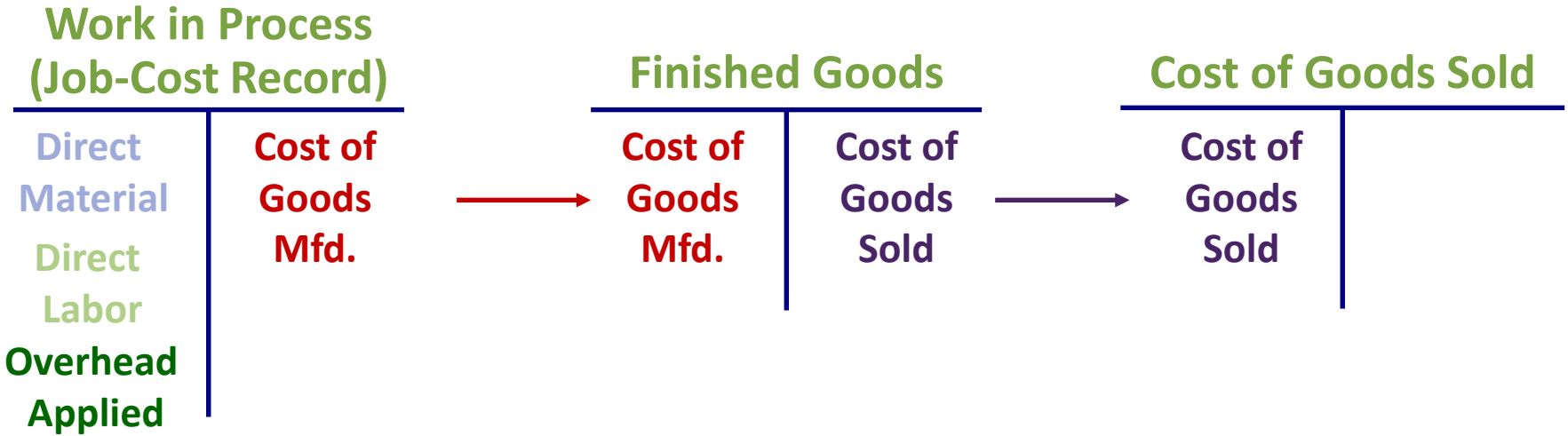
PRODUCT COSTING

JOB-ORDER SYSTEM COST FLOWS



PRODUCT COSTING

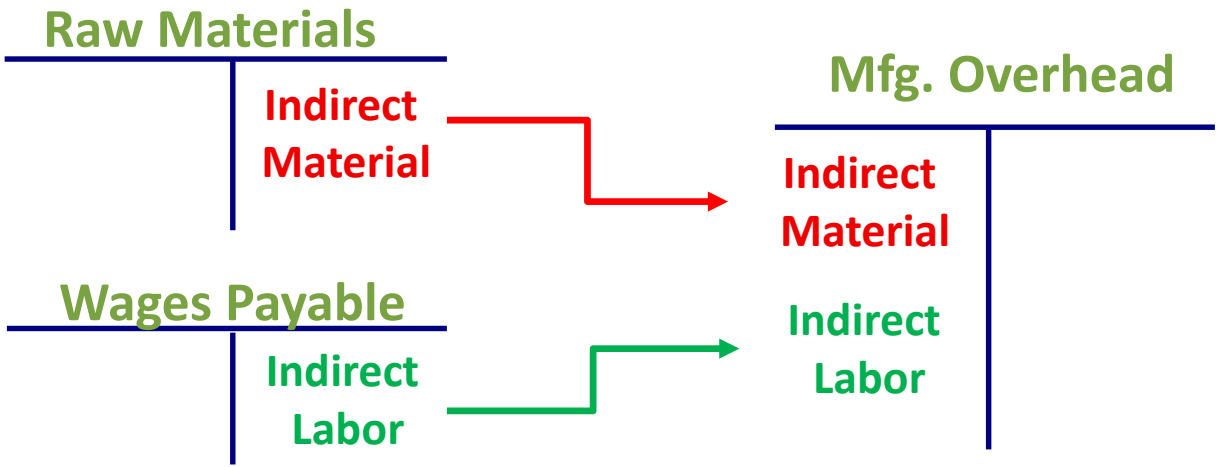
JOB-ORDER SYSTEM COST FLOWS



PRODUCT COSTING

ACTUAL MANUFACTURING OVERHEAD

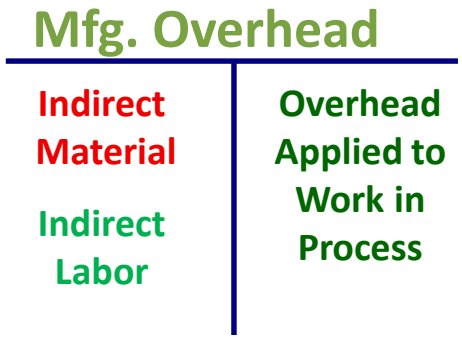
- At the end of the period, all ACTUAL overhead costs have been incurred.



PRODUCT COSTING

ACTUAL VS. APPLIED MANUFACTURING OVERHEAD

- At the end of the period: compare applied overhead with actual overhead



Actual OH > applied OH: underapplied
Actual OH < applied OH: overapplied

PRODUCT COSTING

OVERHEAD APPLICATION: EXAMPLE

- Applied Overhead: $ 28,800
- Actual Overhead: $ 29,050

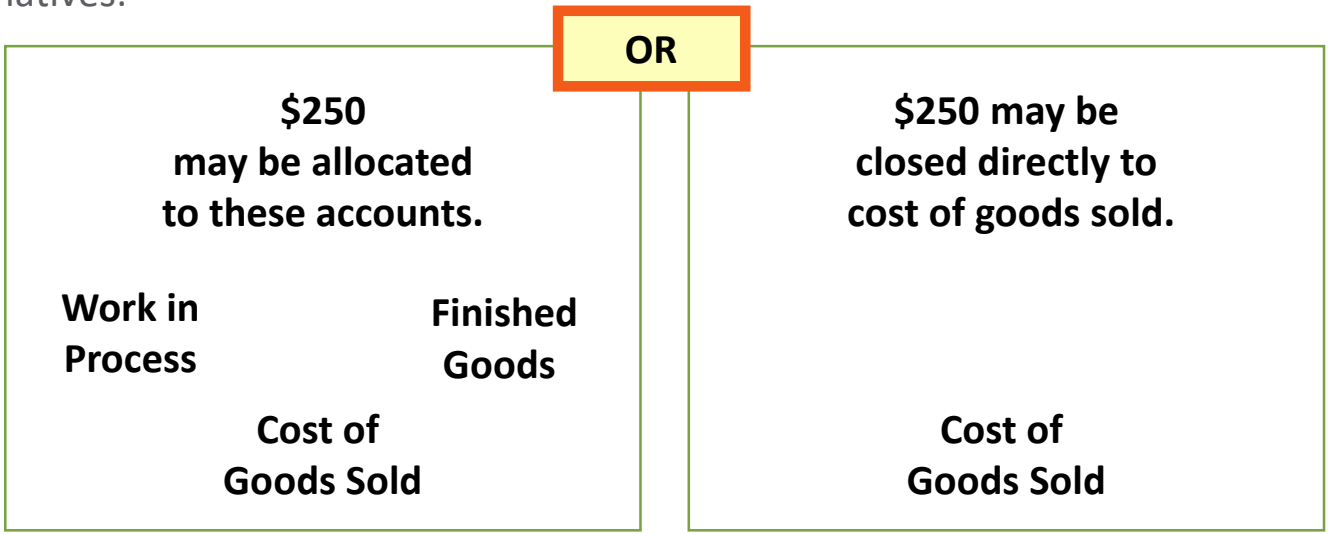
Actual OH exceeds applied OH by $250.
This difference is called underapplied overhead.

PRODUCT COSTING

ACTUAL VS. APPLIED MANUFACTURING OVERHEAD

WHAT DO WE DO ABOUT UNDERAPPLIED OVERHEAD?

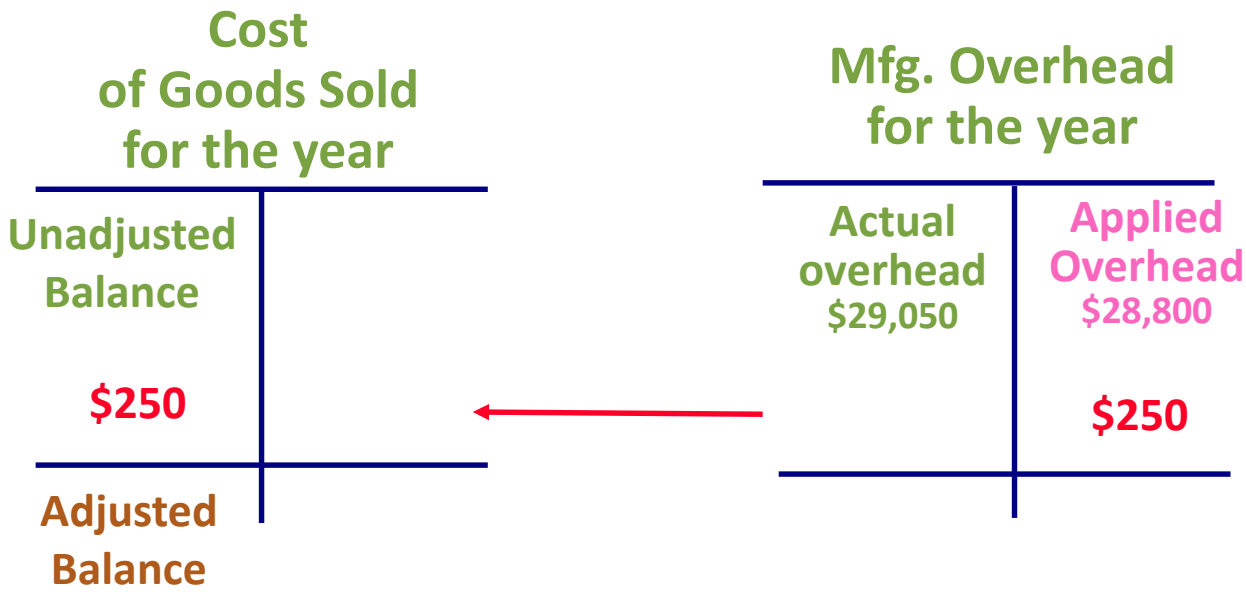
- Recall: Actual OH exceed applied OH by $ 250
- Two Alternatives:



PRODUCT COSTING

ACTUAL VS. APPLIED MANUFACTURING OVERHEAD

- Closed to COGS example (OH underapplied by $ 250)



ACTUAL VS. APPLIED MANUFACTURING OVERHEAD

ACCOUNTING ENTRIES: CLOSED TO COGS

- Overapplied
  - Dr. Manufacturing overhead 250
  - Cr. COGS 250

- Underapplied
  - Dr. COGS 250
  - Cr. Manufacturing overhead 250

PRODUCT COSTING

ACTUAL VS. APPLIED MANUFACTURING OVERHEAD

- Schedule of Cost of Goods Sold

Schedule of Cost of Goods Sold		
Finished goods inventory, beginning		$xxx
Add: Cost of goods manufactured*		xxx
Cost of goods available for sale		$xxx
Deduct: Finished goods inventory, ending		xxx
Cost of goods sold		$xxx
Add: Underapplied overhead		
or Deduct: Overapplied overhead		xxx
Cost of goods sold (adjusted)		$xxx
* From Cost of Goods Manufactured Schedule		

PRODUCT COSTING

OVER- / UNDERAPPLIED OVERHEAD: SUMMARY

If manufacturing overhead is …	Alternative 1: Allocation	Alternative 2: Close to Cost of Goods Sold
UNDERAPPLIED (Applied overhead is smaller than actual overhead)	**INCREASE** ➢ Work in Process ➢ Finished Goods ➢ Cost of Goods Sold	**INCREASE** ➢ Cost of Goods Sold
OVERAPPLIED (Applied overhead is larger than actual overhead)	**DECREASE** ➢ Work in Process ➢ Finished Goods ➢ Cost of Goods Sold	**DECREASE** ➢ Cost of Goods Sold

PRODUCT COSTING

P3-54

- Biloxi Billiards Company uses normal costing. Manufacturing OH is applied based on machine hours.

  Total budgeted manufacturing overhead: $306,000

  Total budgeted machine hours: 51,000 h

- During January, the firm began production jobs.

  M07: 1,200 machine hours T28: 3,000 machine hours B19: 1,800 machine hours

- There is no beginning inventory for WIP. Actual manufacturing OH incurred in January: $38,000.

1. POHR?
2. OH applied in January?
3. Over- or underapplied?
4. Close into COGS

PRODUCT COSTING

E3-33

- Aquarius Hotel Supply Co. for year ended:
  - Budgeted sales revenue $945,000
  - Budgeted mfg. O/H $650,000
  - Budgeted mach. Hours 20,000
  - Budgeted DL hours 25,000
  - Budgeted DL rate per hour $13
  - Actual mfg. O/H $690,000
  - Actual machine hours 22,000
  - Actual DL hours 26,000
  - Actual DL rate per hour $14

$ 350,000 supervisor salaries
$ 200,000 machine depreciation
$ 100,000 factory cleaning

1. Compute POHR using machine hours, DL hours, DL dollars.
2. Compute over/underapplied OH for each cost driver.
3. Generally, what is the cause of over-/underapplied overhead?

PRODUCT COSTING

E3-35

The following information pertains to Paramus Metal Works for the year just ended.

Budgeted direct-labor cost: 77,000 hours (practical capacity) at $17 per hour

Actual direct-labor cost: 79,000 hours at $18 per hour

Budgeted manufacturing overhead:	$993,300
Budgeted selling and administrative expenses:	$417,000

Actual manufacturing overhead:

Depreciation	$225,000
Property taxes	19,000
Indirect labor	79,000
Supervisory salaries	210,000
Utilities	58,000
Insurance	32,000
Rental of space	295,000
Indirect material (see data below	79,000

Indirect material:

Beginning inventory, January 1	46,000
Purchases during the year	95,000
Ending inventory, December 31	62,000

PRODUCT COSTING

E3-35

1. Compute the firm's predetermined overhead rate, which is based on direct-labor hours.

2. Calculate the overapplied or underapplied overhead for the year.

DETERMINING THE ALLOCATION BASE

PLANT-WIDE OVERHEAD RATE

- Direct labor (either hours or dollars) or machine hours generally used as the overhead allocation base

DEPARTMENTAL OVERHEAD RATES

- Different production departments have different cost drivers – labor hours, machine hours, units produced, etc.
- Key is what makes the most sense for that department (see “activity-based costing”)
- Two-stage allocation process – pools and products

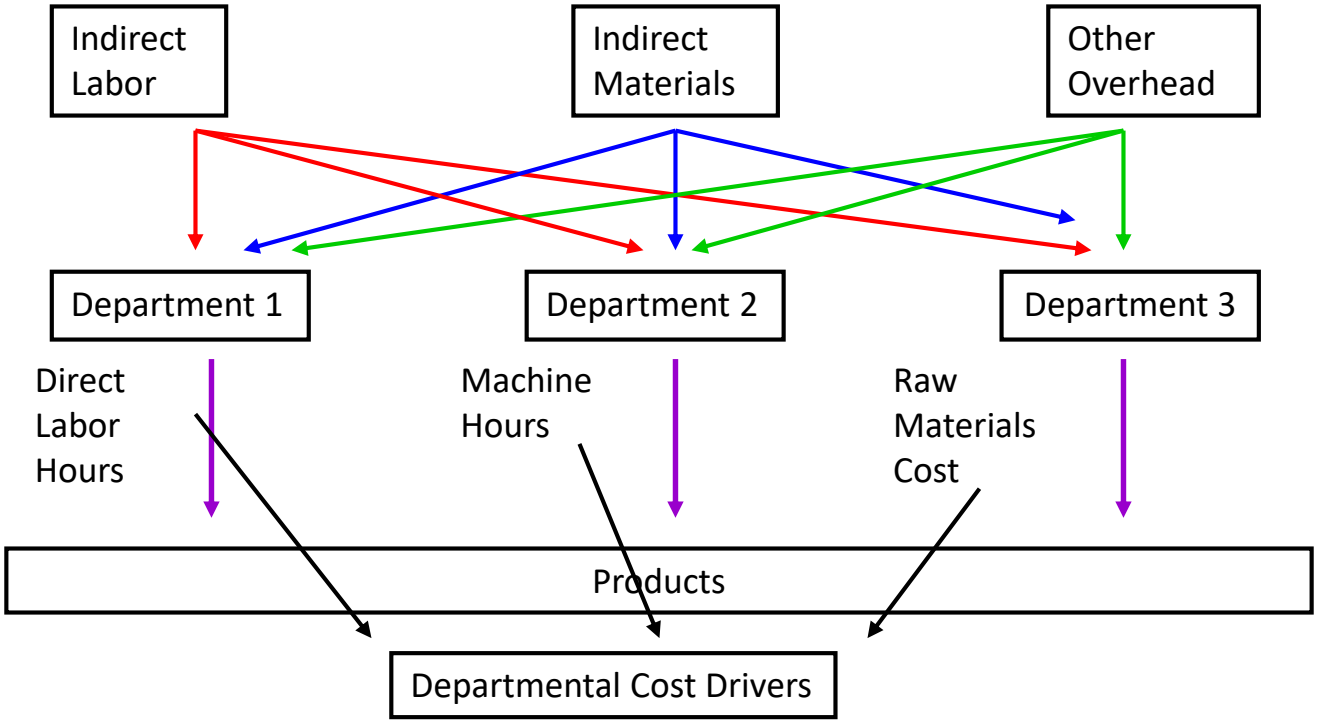
PRODUCT COSTING

TWO-STAGE ALLOCATION PROCESS: OVERHEAD

Stage One:
Costs assigned
to pools

Cost pools

Stage Two:
Costs applied
to products



PRODUCT COSTING

MC-QUESTIONS – EXAMPLE QUESTION

- Aquarius Hotel Supply Co. for year ended:
  - Budgeted mfg. O/H $650,000
  - Budgeted mach. Hours 20,000
  - Actual mfg. O/H $690,000
  - Actual machine hours 22,000
- What is POHR based on machine hours? (1 point)

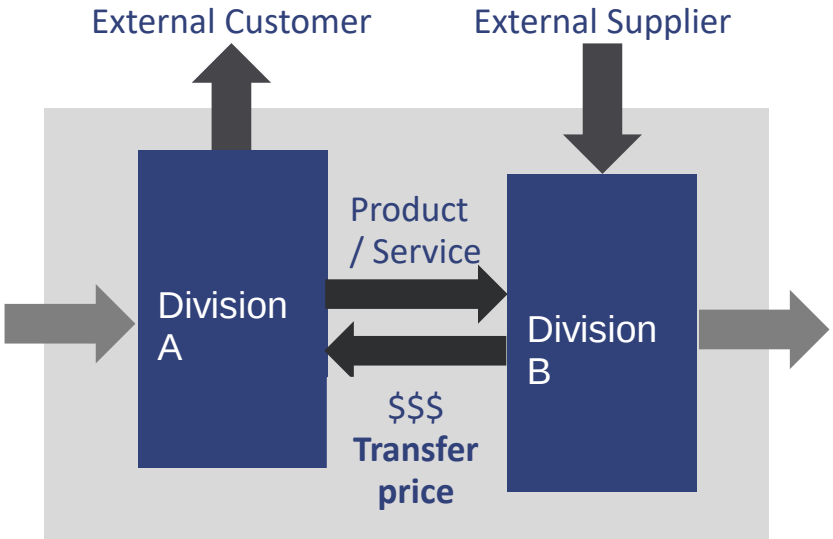
A) 32,5 B) 29,55 C) 31,36 D) 34,5

CHAPTER 13
TRANSFER PRICING

TRANSFER PRICING

GENERAL COMMENT

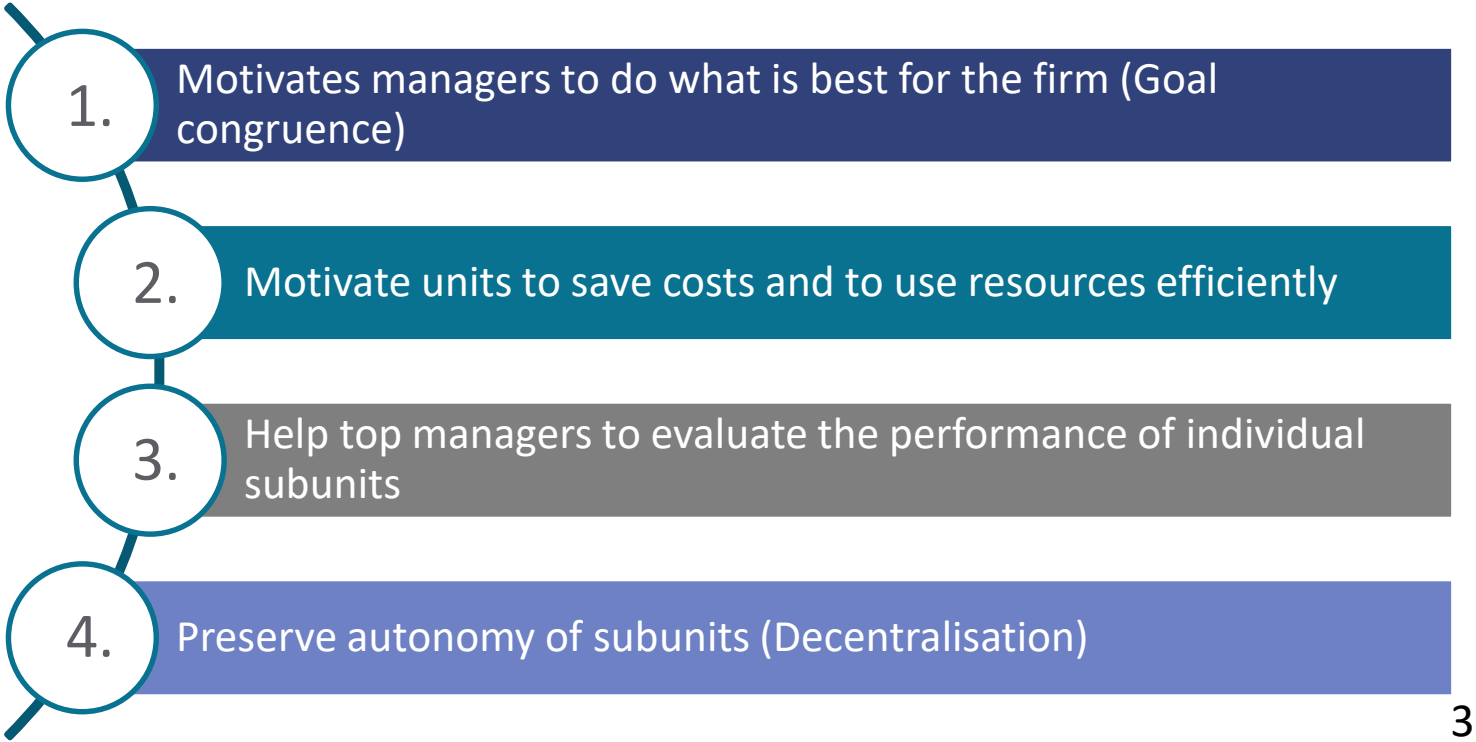
- Transfer price: a price charged between divisions
- In large corporations, divisions of the organization transfer goods and services to each other.



What is the effect of a transfer price, assuming the transfer takes place, on divisional profit and company profit?

TRANSFER PRICING

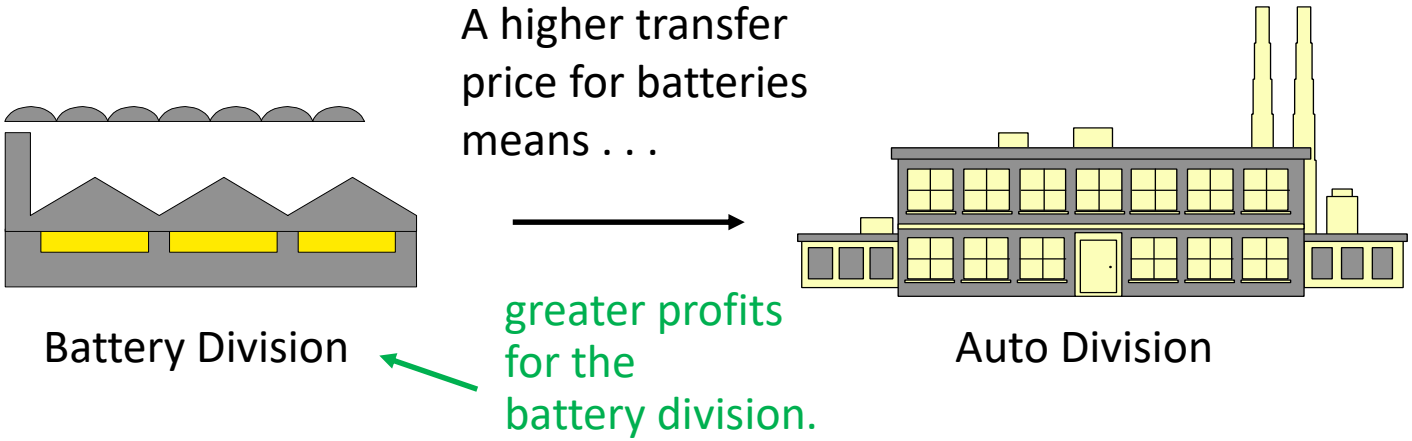
FOUR CRITERIA FOR A GOOD SOLUTION TO TRANSFER-PRICING PROBLEMS



TRANSFER PRICING

PROFIT EFFECT

- A transfer price affects profits of both the selling and the buying divisions.



TRANSFER PRICING

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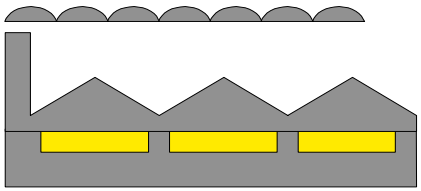
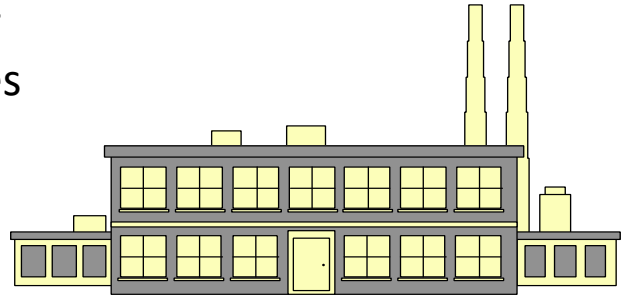


Battery Division

A higher transfer price for batteries means . . .

lower profits for the auto division.

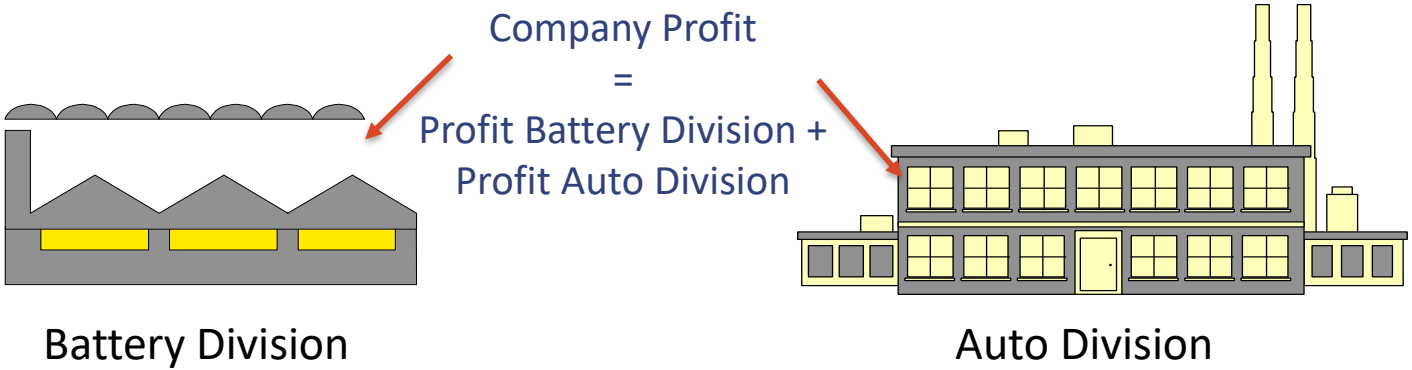


Auto Division

TRANSFER PRICING

PROFIT EFFECT

- There is no effect on the overall company profit, as the lower profit in one division is offset by a higher profit in the other division.



TRANSFER PRICING

IMPORTANCE OF TRANSFER PRICING

- Why is transfer pricing important given that it does not directly impact company profits?

- The transfer price affects whether a transfer takes place.
- The transfer price affects the income of the divisions and therefore affects …
  - the performance evaluations of both managers
  - the operating decisions of both managers
- If division managers maximize profit, they may not transact at some prices.

TRANSFER PRICING

PERFECT TRANSFER PRICES

- A perfect transfer price allows each division to make decisions that maximize divisional profit and company profit.
- A perfect transfer price is the opportunity cost of a unit to the selling division.

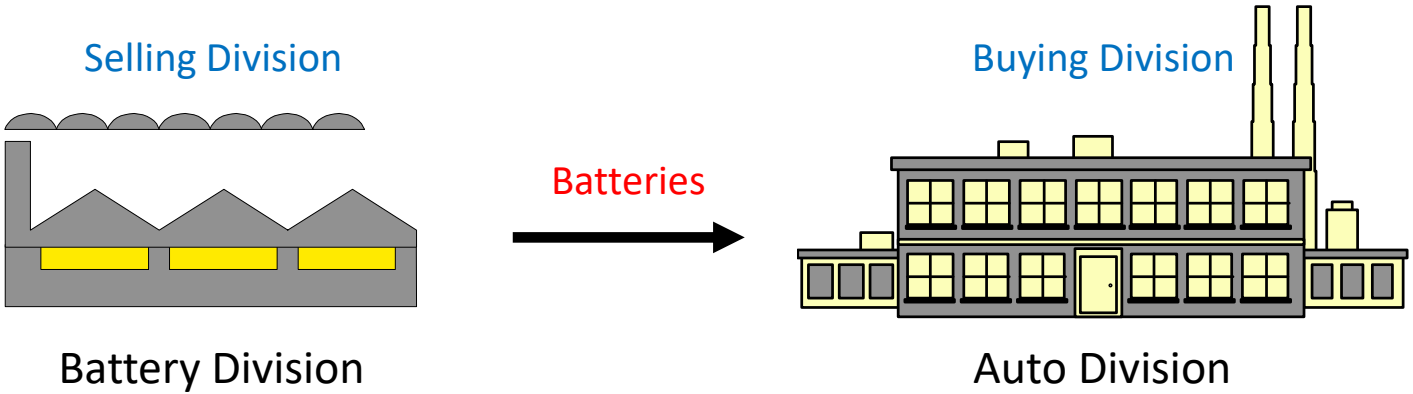
Transfer price	=	Additional outlay cost per unit incurred b/c goods are transferred (= variable cost)	+	Opportunity cost per unit to the selling division b/c of the transfer

TRANSFER PRICING

PRICE DEPENDENCE ON CAPACITY RESTRICTIONS

TRANSFER PRICING UNDER TWO SCENARIOS

- No excess capacity
- Excess capacity

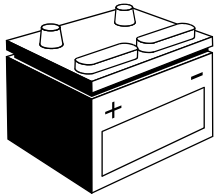


TRANSFER PRICING

SCENARIO I: NO EXCESS CAPACITY

- The Battery Division produces standard 12-volt batteries.

Production capacity	300,000 units
Selling price per battery	$40 (to outsiders)
Variable costs per battery	$18
Fixed costs per battery	$7 (at 300,000 units)



- The Battery division is currently selling 300,000 batteries to outsiders at $40.
- The Auto Division can use 100,000 of these batteries in its X-7 model.

What should the supplying division charge?

TRANSFER PRICING

SCENARIO I: NO EXCESS CAPACITY

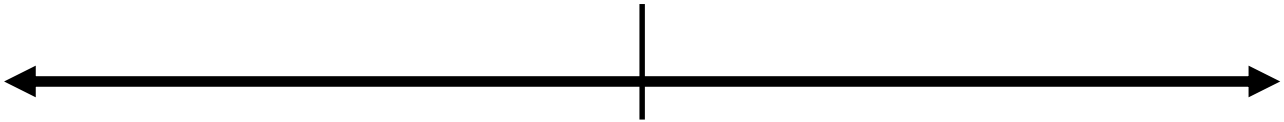
Transfer price	=	Additional outlay cost per unit incurred b/c goods are transferred	+	Opportunity cost per unit to the selling division b/c of the transfer
Transfer price	=	$18 variable cost per battery	+	$22 contribution lost if outside sales given up
Transfer price	=	$40 per battery		

TRANSFER PRICING

SCENARIO I: NO EXCESS CAPACITY

Auto division can purchase 100,000 batteries from an outside supplier for less than $40.

Auto division can purchase 100,000 batteries from an outside supplier for more than $40.



Transfer will not occur.

$40 transfer price

Transfer will occur.

TRANSFER PRICING

SCENARIO I: NO EXCESS CAPACITY

GENERAL RULE

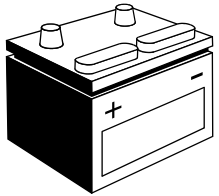
- When the selling division is operating at capacity, the transfer price should be set at the market price.
- (Or at some slight discount to the market price if synergies to transferring goods exist within the firm)

TRANSFER PRICING

SCENARIO II: EXCESS CAPACITY

- The Battery Division produces standard 12-volt batteries.

Production capacity	300,000 units
Selling price per battery	$40 (to outsiders)
Variable costs per battery	$18
Fixed costs per battery	$7 (at 300,000 units)



- The Battery division is currently selling 150,000 batteries to outsiders at $40.
- The Auto Division can use 100,000 batteries in its X-7 model.

What should the selling division charge?

TRANSFER PRICING

SCENARIO II: EXCESS CAPACITY

Transfer price	=	Additional outlay cost per unit incurred b/c goods are transferred	+	Opportunity cost per unit to the organization b/c of the transfer
Transfer price	=	$18 variable cost per battery	+	$0
Transfer price	=	$18 per battery		

TRANSFER PRICING

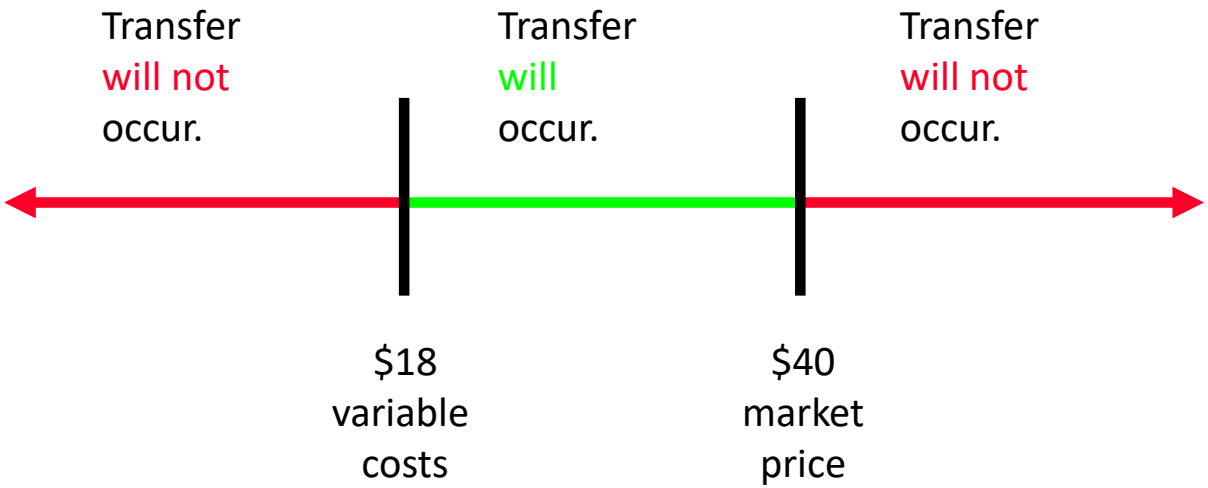
SCENARIO II: EXCESS CAPACITY

GENERAL RULE

- When the selling division is operating below capacity, the minimum transfer price is the variable cost per unit (including transfer costs).

TRANSFER PRICING

SCENARIO II: EXCESS CAPACITY



TRANSFER PRICING

WILL A TRANSFER TAKE PLACE?

Capacity at battery division (sell outside $40, var. cost $18)	Auto division can purchase battery from an external supplier at $…		
	42	35	15
NO Excess			
Excess			

TRANSFER PRICING

WILL A TRANSFER TAKE PLACE?

With no excess capacity the battery devision sets the transfer price to the market price (40$). This is cheaper than the price of batteries the auto divison needs to pay to an external supplier – both accept.

Capacity at battery division (sell outside $40, var. cost $18)	Auto division can purchase battery from an external supplier at $…		
	42	35	15
NO Excess	Yes	No	No
Excess	Yes	Yes	No

With excess capacity the battery devision only needs to charge a transfer prive above var. costs. This is cheaper than the price of batteries the auto divison needs to pay to an external supplier – both accept

TRANSFER PRICING

FOUR APPROACHES FOR CALCULATING TRANSFER PRICES

Market-based

e.g., the price the selling unit charges to outside customers; or the price the buyer would have to pay outsiders

Cost-based

e.g., full manufacturing costs

Negotiated

both business units are free to negotiate the price

Dual-pricing

e.g., buying unit pays market price, selling unit gets costs, difference paid by headquarter

(not covered in class)

TRANSFER PRICING

MARKET-BASED TRANSFER PRICES

- Transferring products or services at market prices generally leads to optimal decisions under the following circumstances:

CONDITIONS FOR OPTIMAL MARKET-BASED TRANSFER PRICES

- There is a (perfectly) competitive external market for the transferred product.
- No additional costs or benefits to the company as a whole from buying or selling in the external market instead of transacting internally.

TRANSFER PRICING

IMPERFECT COMPETITION

- Under imperfect competition for the intermediate good:

TRANSFER PRICING

- below the external market price …
- … and above the selling division's variable cost …
- … induces efficient transfers.

TRANSFER PRICING

COST-BASED TRANSFER PRICES

- Top management chooses a transfer price based on the costs of producing the intermediate product

EXAMPLES

- Variable production costs
- Full costs (VC + allocated fixed overhead)
- One of the above plus some markup

TRANSFER PRICING

COST-BASED TRANSFER PRICES

- Transfer prices will not fluctuate with the opportunity cost per unit for the selling division.
- It is hence important to set transfer prices at standard costs → otherwise, no incentive to produce efficiently for the selling division is provided.
- Often a mark-up is granted to allocate profits between divisions.
- Full costs can lead to inefficient decisions for special orders as fixed costs should be disregarded in these cases.

TRANSFER PRICING

NEGOTIATED TRANSFER PRICES

ADVANTAGES

- Takes into account both cost and market information
- Often start with market prices and then make adjustments for internal savings, etc.

DRAWBACKS

- Can undermine spirit of cooperation
- Impacted by negotiation skills

TRANSFER PRICING

INTERNATIONAL PERSPECTIVE

Since tax rates and import duties are different in different countries, companies have incentives to set transfer prices to …

- Increase revenues in low-tax countries.
- Increase costs in high-tax countries.
- Reduce cost of goods transferred to high-import-duty countries.

TRANSFER PRICING

E13-47

Weathermaster Window Company manufactures windows for the home-building industry. The window frames are produced in the Frame Division. The frames are then transferred to the Glass Division, where the glass and hardware are installed. The company's best-selling product is a three-by-four-foot, doublepaned operable window. The Frame Division can also sell frames directly to custom home builders, who install the glass and hardware. The sales price for a frame is $160. The Glass Division sells its finished windows for $380. The markets for both frames and finished windows exhibit perfect competition.

The standard cost of the window is detailed as follows:

	Frame Division	Glass Division
Direct material	$30	$60*
Direct labor	40	30
Variable overhead	60	60
Total	$130	$150

*Not including the transfer price for the frame.

TRANSFER PRICING

E13-47

1. Assume that there is no excess capacity in the Frame Division.

a. Use the general rule to compute the transfer price for window frames.

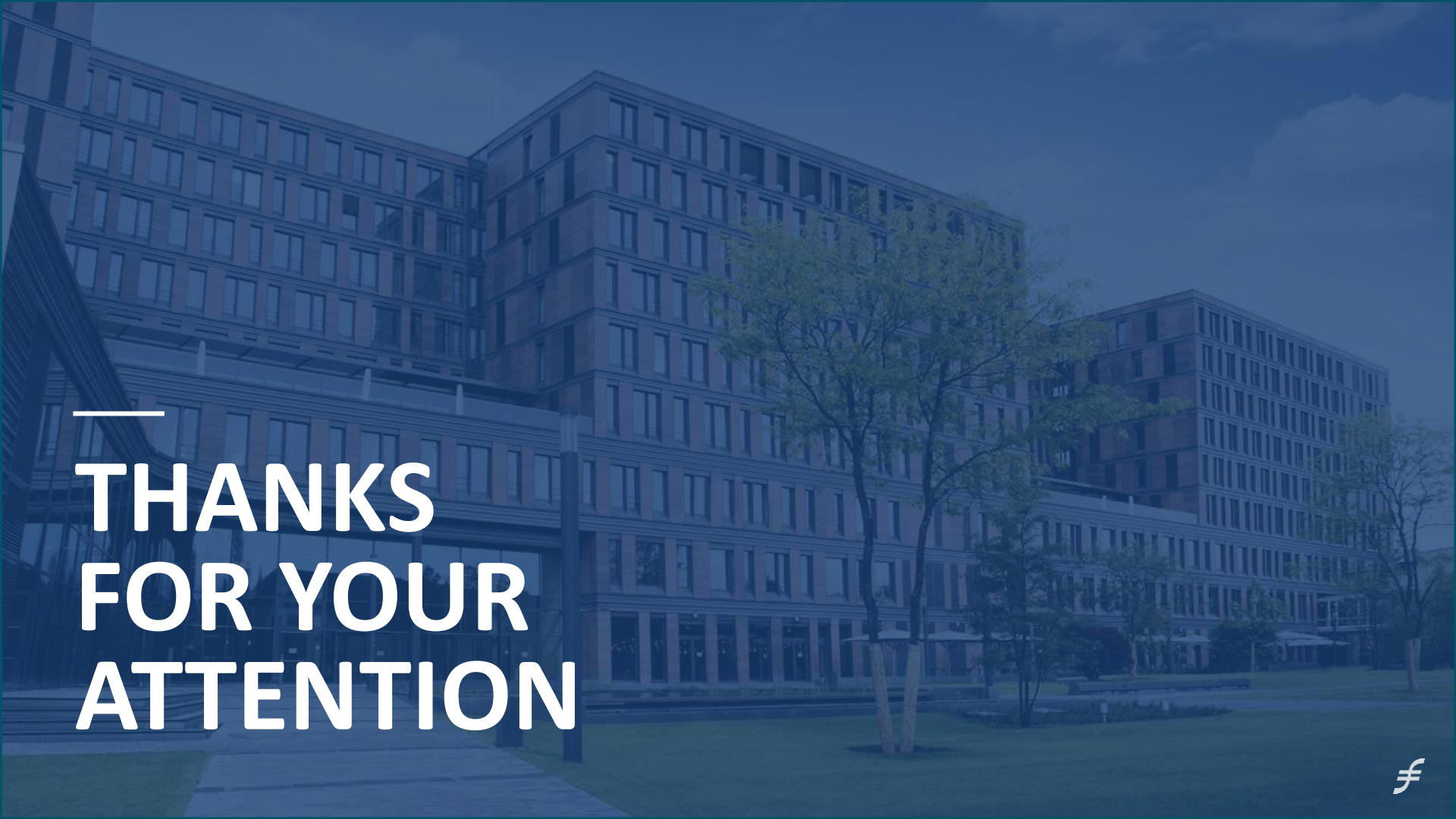
b. Calculate the transfer price if it is based on standard variable cost with a 10 percent markup.

2. Assume that there is excess capacity in the Frame Division.

a. Use the general rule to compute the transfer price for window frames.

b. Explain why your answers to requirements (1 *a*) and (2 *a*) differ.

c. Suppose the predetermined fixed-overhead rate in the Frame Division is 125 percent of direct labor cost. Calculate the transfer price if it is based on standard full cost plus a 10 percent markup.


THANKS
FOR YOUR
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