



مجموعة جامعة
الجميع الذكية
للتعليم القابضة

MIDOCEAN
UNIVERSITY

Accounting for Managers

Prepared by Dr. Sara Ahmed

MGM 341

Lecture 8



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Chapter 8: Relevant Costs for Short-term Decision

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Chapter
08

Learning Objectives

- Describe and identify information relevant to short-term business decisions
- Decide whether to accept a special order
- Decide whether to discontinue a product, department, or store
- Analyze outsourcing (make-or-buy) decisions
- Factor resource constraints into product mix decisions
- Decide whether to sell a product “as is” or process it further

Volume Trade-Off Decisions

Companies are forced to make **volume trade-off decisions** when they do not have enough capacity to produce all of the products and sales volumes demanded by their customers.

- In these situations, companies must trade off, or **sacrifice production of some products in favor of others in an effort to maximize profits.**

When a limited resource of some type restricts the company's ability to satisfy demand, the company is said to have a **constraint**.

The machine or process that is limiting overall output is called the **bottleneck** – it is the constraint.

Determine the most
profitable use of a
constrained resource.

Utilization of a Constrained Resource

- Fixed costs are usually unaffected in these situations, so the product mix that maximizes the company's total contribution margin should ordinarily be selected.
- A company should not necessarily promote those products that have the **highest unit contribution margins**.
- Rather, total contribution margin will be maximized by promoting those products or accepting those orders that provide the **highest contribution margin in relation to the constraining resource**.

Utilization of a Constrained Resource – An Example – Part 1

Ensign Company produces two products and selected data are shown below:

	Product	
	1	2
Selling price per unit	\$ 60	\$ 50
Less variable expenses per unit	36	35
Contribution margin per unit	\$ 24	\$ 15
Current demand per week (units)	2,000	2,200
Contribution margin ratio	40%	30%
Processing time required on machine A1 per unit	1.00 min.	0.50 min.

Utilization of a Constrained Resource – An Example – Part 2

- Machine A1 is the constrained resource and is being used at 100% of its capacity.
- There is excess capacity on all other machines.
- Machine A1 has a capacity of 2,400 minutes per week.

Should Ensign focus its efforts on Product 1 or Product 2?

Concept Check 2

How many units of each product can be processed through Machine A1 in one minute?

Product 1

- a. 1 unit
- b. 1 unit
- c. 2 units
- d. 2 units

Product 2

- 0.5 unit
- 2.0 units
- 1.0 unit
- 0.5 unit

Concept Check 2a

How many units of each product can be processed through Machine A1 in one minute?

Product 1

- a. 1 unit
- b. 1 unit
- c. 2 units
- d. 2 units

Product 2

- 0.5 unit
- 2.0 units
- 1.0 unit
- 0.5 unit

Concept Check 2b

What generates more profit for the company, using one minute of machine A1 to process Product 1 or using one minute of machine A1 to process Product 2?

- a. Product 1
- b. Product 2
- c. They both would generate the same profit.
- d. Cannot be determined.

Concept Check 2c

What generates more profit for the company, using one minute of machine A1 to process Product 1 or using one minute of machine A1 to process Product 2?

- a. Product 1
- b. Product 2
- c. They both would generate the same profit.

With one minute of machine A1, Ensign could make 1 unit of Product 1, with a contribution margin of \$24, or 2 units of Product 2, each with a contribution margin of \$15 per unit.

$$2 \times \$15 = \$30 > \$24$$

Utilization of a Constrained Resource – Part 1

The key is the contribution margin per unit of the constrained resource.

		Product	
		1	2
Contribution margin per unit		\$ 24	\$ 15
Time required to produce one unit	÷	1.00 min.	0.50 min.
Contribution margin per minute		\$ 24	\$ 30

Ensign should emphasize **Product 2** because it generates a contribution margin of \$30 per minute of the constrained resource relative to \$24 per minute for Product 1.

Utilization of a Constrained Resource – Part 2

The key is the contribution margin per unit of the constrained resource.

		Product	
		1	2
Contribution margin per unit		\$ 24	\$ 15
Time required to produce one unit	÷	1.00 min.	÷ 0.50 min.
Contribution margin per minute		\$ 24	\$ 30

Ensign can maximize its contribution margin by first producing **Product 2** to meet customer demand and then using any remaining capacity to produce Product 1. The calculations would be performed as follows.

Utilization of a Constrained Resource – Part 3

Let's see how this plan would work.

Alloting Our Constrained Resource (Machine A1)

Weekly demand for Product 2	2,200	units
Time required per unit	× 0.50	min.
Total time required to make Product 2	<u>1,100</u>	<u>min.</u>

Utilization of a Constrained Resource – Part 4

Let's see how this plan would work.

Alloting Our Constrained Resource (Machine A1)

Weekly demand for Product 2	2,200	units
Time required per unit	× 0.50	min.
Total time required to make Product 2	<u>1,100</u>	min.
Total time available	2,400	min.
Time used to make Product 2	<u>1,100</u>	min.
Time available for Product 1	<u>1,300</u>	min.

Utilization of a Constrained Resource – Part 5

Let's see how this plan would work.

Alloting Our Constrained Resource (Machine A1)

Weekly demand for Product 2	2,200	units
Time required per unit	× 0.50	min.
Total time required to make Product 2	1,100	min.
Total time available	2,400	min.
Time used to make Product 2	1,100	min.
Time available for Product 1	1,300	min.
Time required per unit	÷ 1.00	min.
Production of Product 1	1,300	units

Utilization of a Constrained Resource – Part 6

According to the plan, we will produce 2,200 units of Product 2 and 1,300 of Product 1. Our contribution margin looks like this.

	Product 1	Product 2
Production and sales (units)	1,300	2,200
Contribution margin per unit	\$ 24	\$ 15
Total contribution margin	<u>\$ 31,200</u>	<u>\$ 33,000</u>

The total contribution margin for Ensign is \$64,200.

Determine the value of
obtaining more of the
constrained resource.

Value of a Constrained Resource - Example

Increasing the capacity of a constrained resource should lead to increased production and sales.

How much should Ensign be willing to pay for an additional minute of Machine A1 time?

Value of a Constrained Resource - Solution

The additional machine time would be used to make more units of Product 1, which had a contribution margin per minute of \$24.

Ensign should be willing to pay up to \$24 per minute. This amount equals the contribution margin per minute of machine time that would be earned producing more units of Product 1.

Concept Check 3

Colonial Heritage makes reproduction colonial furniture from select hardwoods.

	<i>Chairs</i>	<i>Tables</i>
Selling price per unit	\$80	\$400
Variable cost per unit	\$30	\$200
Board feet per unit	2	10
Monthly demand	600	100

The company's supplier of hardwood will only be able to supply 2,000 board feet this month. Is this enough hardwood to satisfy demand?

- a. Yes
- b. No

Concept Check 3a

Colonial Heritage makes reproduction colonial furniture from select hardwoods.

	<i>Chairs</i>	<i>Tables</i>
Selling price per unit	\$80	\$400
Variable cost per unit	\$30	\$200
Board feet per unit	2	10
Monthly demand	600	100

The company's supplier can provide only 2,000 board feet this month. Is this enough hardwood to satisfy demand?

a. Yes

b. No

$$(2 \times 600) + (10 \times 100) = 2,200 > 2,000$$

Concept Check 4

	<i>Chairs</i>	<i>Tables</i>
Selling price per unit	\$80	\$400
Variable cost per unit	\$30	\$200
Board feet per unit	2	10
Monthly demand	600	100

The company's supplier of hardwood will only be able to supply 2,000 board feet this month. What plan would maximize profits?

- a. 500 chairs and 100 tables**
- b. 600 chairs and 80 tables**
- c. 500 chairs and 80 tables**
- d. 600 chairs and 100 tables**

Concept Check 4a

Selling price per
Variable cost per
Board feet per
Monthly demand

Chairs Tables

	<i>Chairs</i>	<i>Tables</i>
Selling price	\$ 80	\$ 400
Variable cost	<u>30</u>	<u>200</u>
Contribution margin	\$ 50	\$ 200
Board feet	2	10
CM per board foot	\$ 25	\$ 20
Production of chairs	600	
Board feet required	1,200	
Board feet remaining	800	
Board feet per table	10	
Production of tables	80	

The company's supply
be able to supply 2
What plan would m

- a. 500 chairs and 1
- b. 600 chairs and 8
- c. 500 chairs and 8
- d. 600 chairs and 1

Concept Check 5

As before, Colonial Heritage's supplier of hardwood will only be able to supply 2,000 board feet this month. Assume the company follows the plan we have proposed. Up to how much should Colonial Heritage be willing to pay above the usual price to obtain more hardwood?

- a. \$40 per board foot**
- b. \$25 per board foot**
- c. \$20 per board foot**
- d. Zero**

Concept Check 5a

As before,
2,000 boards
proposed
usual price

- a. \$40
- b. \$25 per board foot
- c. \$20 per board foot
- d. Zero

The additional wood would be used to make tables. In this use, each board foot of additional wood will allow the company to earn an additional \$20 of contribution margin and profit.

supply
have
ove the

Managing Constraints

It is often possible for a manager to increase the capacity of a bottleneck, which is called relaxing (or elevating) the constraint, in numerous ways such as:

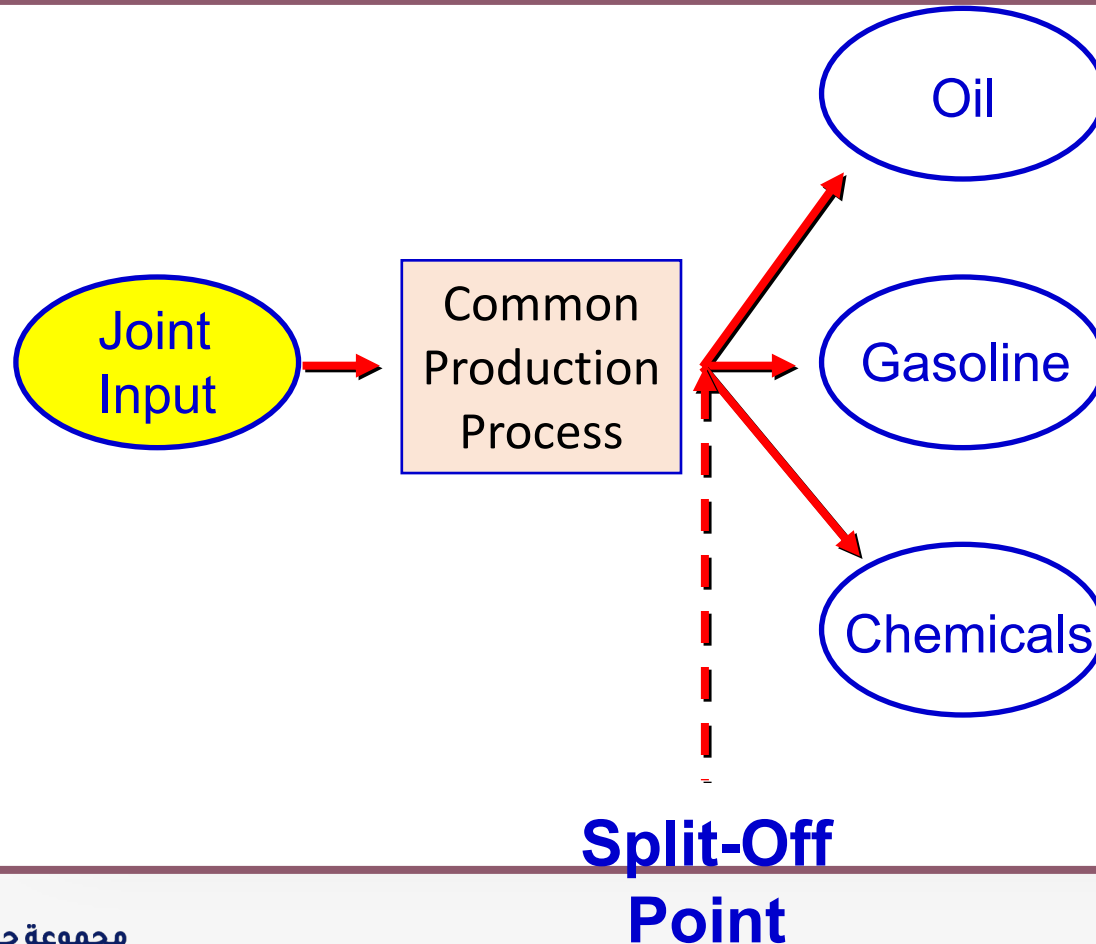
- 1. Working overtime on the bottleneck.**
- 2. Subcontracting some of the processing that would be done at the bottleneck.**
- 3. Investing in additional machines at the bottleneck.**
- 4. Shifting workers from non-bottleneck processes to the bottleneck.**
- 5. Focusing business process improvement efforts on the bottleneck.**
- 6. Reducing defective units processed through the bottleneck.**

Prepare an analysis showing whether joint products should be sold at the split-off point or processed further.

Joint Product Costs

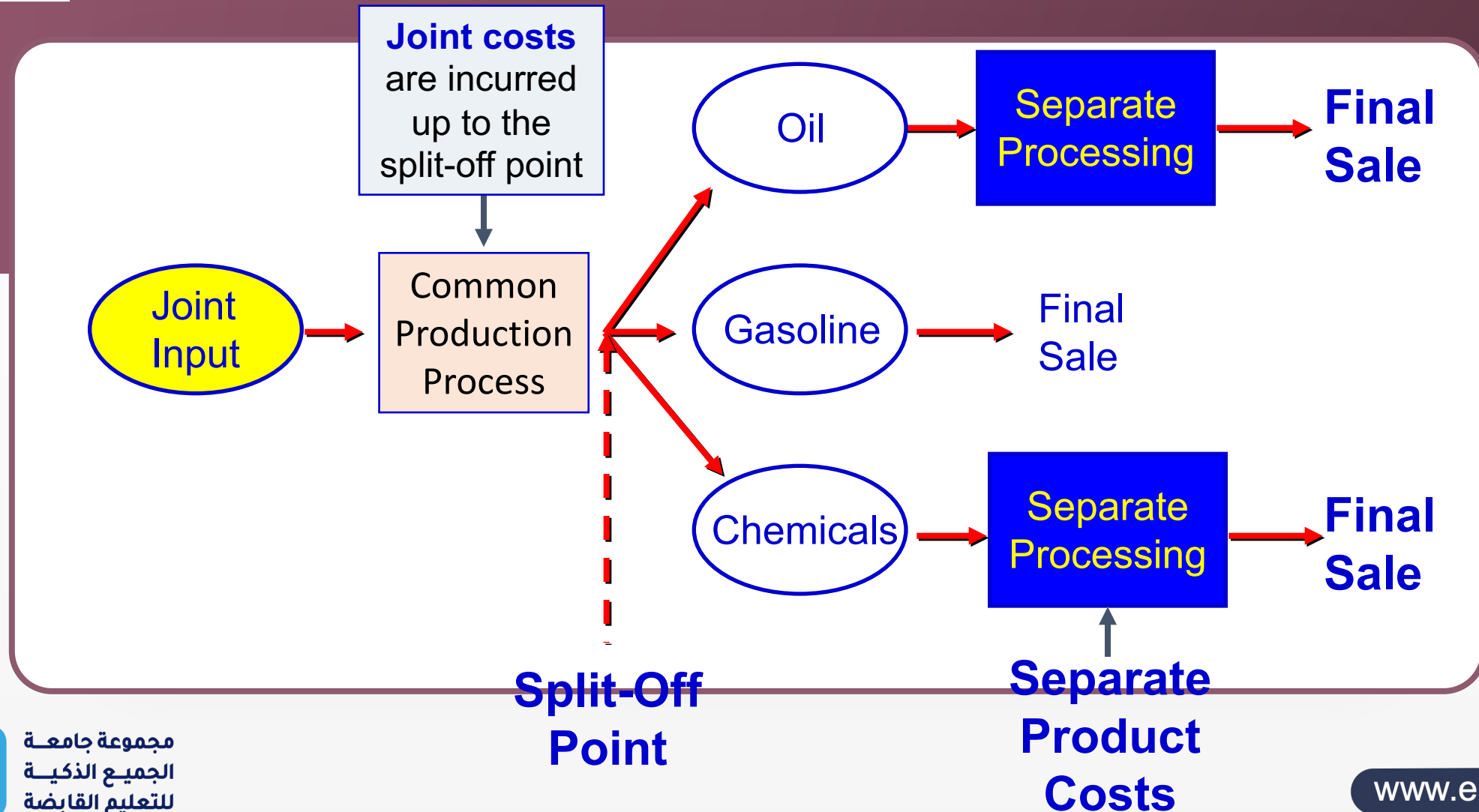
- In some industries, two or more products, known, as **joint products** are produced from a single raw material input.
- The point in the manufacturing process where joint products can be recognized as a separate product is called the **split-off point**.
- A decision as to whether a joint product should be sold at the split-off point or processed further is known as a **sell or process further decision**.

Joint Products



For example, in the petroleum refining industry, a large number of products are extracted from crude oil, including gasoline, jet fuel, home heating oil, lubricants, asphalt, and various organic chemicals.

Joint Products – Additional Processing



Joint costs are traditionally allocated among different products at the split-off point. A typical approach is to allocate joint costs according to the **relative sales value** of the end products.

Although allocation is needed for some purposes such as balance sheet inventory valuation, allocations of this kind are **very dangerous** for decision making.

Sell or Process Further

Joint costs are irrelevant in decisions regarding what to do with a product from the split-off point forward. Therefore, these costs should not be allocated to end products for decision-making purposes.

With respect to sell or process further decisions, it is profitable to continue processing a joint product after the split-off point **so long as the incremental revenue from such processing exceeds the incremental processing costs incurred after the split-off point.**

Sell or Process Further – An Example

- Sawmill, Inc. cuts logs from which unfinished lumber and sawdust are the immediate joint products.
- Unfinished lumber is sold “as is” or processed further into finished lumber.
- Sawdust can also be sold “as is” to gardening wholesalers or processed further into “presto-logs.”

Sell or Process Further – Additional Data

Data about Sawmill's joint products includes:

	Per Log	
	Lumber	Sawdust
Sales value at the split-off point	\$ 140	\$ 40
Sales value after further processing	270	50
Allocated joint product costs	176	24
Cost of further processing	50	20

Sell or Process Further – Part 1

Analysis of Sell or Process Further

	Per Log	
	Lumber	Sawdust
Final sales value after further processing	\$ 270	\$ 50
Sales value at the split-off point	140	40
Incremental revenue from further processing	130	10
Cost of further processing		
Financial advantage (disadvantage) of further processing		

Sell or Process Further – Part 2

Analysis of Sell or Process Further

	Per Log	
	Lumber	Sawdust
Final sales value after further processing	\$ 270	\$ 50
Sales value at the split-off point	140	40
Incremental revenue from further processing	130	10
Cost of further processing	50	20
Financial advantage (disadvantage) of further processing	\$ 80	\$ (10)

The lumber should be processed further and the sawdust should be sold at the split-off point.



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Thank You

