CHAPTER 7

INCREMENTAL ANALYSIS

Managerial Accounting, Fourth Edition
1. Identify the steps in management’s decision-making process.

2. Describe the concept of incremental analysis.

3. Identify the relevant costs in accepting an order at a special price.

4. Identify the relevant costs in a make-or-buy decision.
5. Identify the relevant costs in determining whether to sell or process materials further.

6. Identify the relevant costs to be considered in retaining or replacing equipment.

7. Identify the relevant costs in deciding whether to eliminate an unprofitable segment.
An important purpose of management accounting is to provide managers with relevant information for decision making.

All companies must make product decisions - to cut prices to increase market share, to produce a higher priced product, to change their product mix, etc.

Management frequently uses a decision-making process called incremental analysis.
Incremental Analysis

Management’s Decision-Making Process
- Incremental analysis approach
- How incremental analysis works

Types of Incremental Analysis
- Accept an order at a special price
- Make or buy
- Sell or process further
- Retain or replace equipment
- Eliminate an unprofitable segment

Other Considerations
- Qualitative factors
- Incremental analysis and ABC
Management’s Decision-Making Process

- Decision-making is an important management function that does not always follow a set pattern.

- Decisions vary significantly in scope, urgency, and importance.

- Steps in management’s decision-making process:
  1. Identify the problem and assign responsibility.
  2. Determine and evaluate possible courses of action.
  3. Make a decision.
  4. Review results of the decision.

LO 1: Identify the steps in management’s decision-making process.
Management’s Decision-making Process

- Accounting helps management in making decisions primarily by evaluating possible courses of action (step 2) and reviewing results (step 4).

- Both financial and nonfinancial information are considered in decision-making.

  Financial information includes revenues and costs as well as their effect on profitability.

  Nonfinancial information relates to factors such as the effect of the decision on employee turnover, the environment, or company image.

LO 1: Identify the steps in management’s decision-making process.
Decisions involve a choice among alternative courses of action.

Financial data relevant to a decision are the data that vary in the future among alternatives. Both costs and revenues may vary

or

Only revenues may vary

or

Only costs may vary.

LO 2: Describe the concept of incremental analysis.
Incremental Analysis

- Process used to identify the financial data that change under alternative courses of action
- Identifies the probable effects of decisions on future earnings
- Involves estimates and uncertainty
- Incremental analysis is also called differential analysis because it focuses on differences

LO 2: Describe the concept of incremental analysis.
How Incremental Analysis Works

Uses Three Important Cost Concepts

- **Relevant cost**: In incremental analysis, the only factors to be considered are those costs and revenues that differ across alternatives. Those factors are called **relevant costs**. Costs and revenues that do not differ across alternatives can be ignored when trying to choose between alternatives.

- **Opportunity cost**: Often in choosing one course of action, the company must give up the opportunity to benefit from some other course of action. For example, if a machine is used to make one type of product, the benefit of making another type of product with that machine is lost. This lost benefit is referred to as **opportunity cost**.

- **Sunk cost**: Costs that have already been incurred and will not be changed or avoided by any future decision are referred to as **sunk costs**. For example, if you have already purchased a machine, and now a new, more efficient machine is available, the book value of the original machine is a sunk cost. It should have no bearing on your decision whether to buy the new machine. **Sunk costs are not relevant costs**.

LO 2: Describe the concept of incremental analysis.
Incremental analysis is the process of identifying the financial data that:

a. Do not change under alternative courses of action.

b. Change under alternative courses of action.

c. Are mixed under alternative courses of action.

d. No correct answer is given.
Types of Incremental Analysis

- Accept an order at a special price
- Make or buy components or finished products
- Sell products or process further
- Retain or replace equipment
- Eliminate an unprofitable business segment
- Allocate limited resources

LO 2: Describe the concept of incremental analysis.
Accept an Order at a Special Price

- Obtain additional business by making price concessions to a specific customer
- Assumes sales of the product in other markets would not be affected by this special order
- Assumes company is not operating at full capacity

LO 3: Identify the relevant costs in accepting an order at a special price.
Accept an Order at a Special Price

Example

Mexico Co. offers to buy a special order of 2,000 blenders at $11 per unit from Sunbelt.

No effect on normal sales; sufficient plant capacity
Operating at 80 percent capacity = 100,000 units
Current fixed manufacturing costs = $400,000 or $4 per unit
Variable manufacturing cost = $8 per unit
Normal selling price = $20 per unit

Based strictly on total cost of $12 per unit ($8 + $4), reject offer as cost exceeds selling price of $11

LO 3: Identify the relevant costs in accepting an order at a special price.
Accept an Order at a Special Price

- Within existing capacity, thus no change in fixed costs - so they are not relevant for this decision

- Total variable costs change - thus they are relevant

- Revenue increases $22,000; variable costs increase $16,000

  Income increases by $6,000

  Accept the Special Order

LO 3: Identify the relevant costs in accepting an order at a special price.
Let’s Review

It costs a company $14 of variable costs and $6 of fixed costs to produce product Z200 that sells for $30. A foreign buyer offers to purchase 3,000 units at $18 each. If the special offer is accepted and produced with unused capacity, net income will:

a. Decrease $6,000.
b. Increase $6,000.
c. **Increase $12,000.**
d. Increase $9,000.

**LO 3:** Identify the relevant costs in accepting an order at a special price.
Management must decide whether to make or buy components.

The decision to buy parts or services rather than making them is called outsourcing.

**Example: Costs to produce 25,000 switches**

<table>
<thead>
<tr>
<th>Cost</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$50,000</td>
</tr>
<tr>
<td>Direct labor</td>
<td>75,000</td>
</tr>
<tr>
<td>Variable manufacturing overhead</td>
<td>40,000</td>
</tr>
<tr>
<td>Fixed manufacturing overhead</td>
<td>60,000</td>
</tr>
<tr>
<td><strong>Total manufacturing costs</strong></td>
<td><strong>$225,000</strong></td>
</tr>
<tr>
<td><strong>Total cost per unit</strong> ($225,000 ÷ 25,000)</td>
<td><strong>$9.00</strong></td>
</tr>
</tbody>
</table>

**LO 4:** Identify the relevant costs in a make-or-buy decision.
Switches can be purchased for $8 per switch (25,000 x $8 = $200,000)

At first look, the switches should be purchased; thus saving $1 per unit

Buying the switches eliminates all variable costs, but only $10,000 of fixed costs

$50,000 of fixed costs remain even if the switches are purchased

LO 4: Identify the relevant costs in a make-or-buy decision.
The relevant costs for incremental analysis are:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Direct materials</strong></td>
<td><strong>$ 50,000</strong></td>
<td><strong>$ 0</strong></td>
<td><strong>$ 50,000</strong></td>
</tr>
<tr>
<td><strong>Direct labor</strong></td>
<td><strong>75,000</strong></td>
<td><strong>0</strong></td>
<td><strong>75,000</strong></td>
</tr>
<tr>
<td><strong>Variable manufacturing costs</strong></td>
<td><strong>40,000</strong></td>
<td><strong>0</strong></td>
<td><strong>40,000</strong></td>
</tr>
<tr>
<td><strong>Fixed manufacturing costs</strong></td>
<td><strong>60,000</strong></td>
<td><strong>50,000</strong></td>
<td><strong>10,000</strong></td>
</tr>
<tr>
<td><strong>Purchase price (25,000 × $8)</strong></td>
<td><strong>0</strong></td>
<td><strong>200,000</strong></td>
<td><strong>(200,000)</strong></td>
</tr>
<tr>
<td><strong>Total annual cost</strong></td>
<td><strong>$225,000</strong></td>
<td><strong>$250,000</strong></td>
<td><strong>$ (25,000)</strong></td>
</tr>
</tbody>
</table>

Baron Company will incur $25,000 additional cost if switches are purchased.

Continue to make switches

LO 4: Identify the relevant costs in a make-or-buy decision.
**Make or Buy**

**Opportunity Costs**

- **Definition:** The potential benefits that may be obtained from following an alternative course of action.

- Assume Baron Company can use the newly available productive capacity from buying the switches to generate additional income of $28,000 by making another product.

- If Baron makes the switches, this income is lost.

**LO 4:** Identify the relevant costs in a make- or- buy decision.
This opportunity cost, the lost income, is added to the “Make” column as an additional “cost” for comparative purposes.

It is now advantageous to buy the switches: Baron Company will be $3,000 better off.

LO 4: Identify the relevant costs in a make- or- buy decision.
In a make-or-buy decision, relevant costs are:

a. Manufacturing costs that will be saved.
b. The purchase price of the units.
c. Opportunity costs.
d. All of the above.

LO 4: Identify the relevant costs in a make-or-buy decision.
Many manufacturers have the option of selling a product now or continuing to process hoping to sell at a higher price.

Decision Rule:

Process further as long as the incremental revenue from such processing exceeds the incremental processing costs.

LO 5: Identify the relevant costs in determining whether to sell or process materials further.
Sell or Process Further - Example

**Single-Product Case**

- **Cost to manufacture one unfinished table:**
  
<table>
<thead>
<tr>
<th>Cost Category</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct materials</td>
<td>$15</td>
</tr>
<tr>
<td>Direct labor</td>
<td>10</td>
</tr>
<tr>
<td>Variable manufacturing overhead</td>
<td>6</td>
</tr>
<tr>
<td>Fixed manufacturing overhead</td>
<td>4</td>
</tr>
<tr>
<td><strong>Manufacturing cost per unit</strong></td>
<td><strong>$35</strong></td>
</tr>
</tbody>
</table>

- **Selling price of unfinished unit is $50; unused capacity can be used to finish the tables to sell for $60**

- **Relevant unit costs of finishing tables:**
  
  - Direct materials increase $2; Direct labor increases $4
  - Variable manufacturing overhead costs increase by $2.40 (60 percent of direct labor increase)
  - Fixed manufacturing costs will not increase

**LO 5:** Identify the relevant costs in determining whether to sell or process materials further.
### Sell or Process Further

Incremental revenues ($10) exceed incremental costs ($8.40); Income increases $1.60 per unit

**Process further**

**LO 5:** Identify the relevant costs in determining whether to sell or process materials further.
Sell or Process Further

Multiple-Product Case

- In many industries, a number of end-products are produced from a single raw material and a common production process.

- Multiple end-products are commonly called joint products:
  - Petroleum - gasoline, lubricating oil, kerosene
  - Meat Packing - meat, hides, bones

LO 5: Identify the relevant costs in determining whether to sell or process materials further.
Multiple-Product Case

- All costs incurred prior to the point at which the products are separately identifiable (the split-off point) are called joint costs.

- Joint costs are (for purposes of determining product cost) allocated to individual products on the basis of relative sales value.

- Joint costs are not relevant for any sell-or-process-further decisions.

Joint product costs are sunk costs. They have already been incurred and cannot be changed.

LO 5: Identify the relevant costs in determining whether to sell or process materials further.
Multiple-Product Case

Marais Creamery must decide whether to:

- Sell cream and skim milk now
- Process each further before selling

LO 5: Identify the relevant costs in determining whether to sell or process materials further.
The daily cost and revenue data for Marais Creamery are:

<table>
<thead>
<tr>
<th>Costs (per day)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint cost allocated to cream</td>
<td>$ 9,000</td>
</tr>
<tr>
<td>Joint cost allocated to skim milk</td>
<td>5,000</td>
</tr>
<tr>
<td>Processing cream into cottage cheese</td>
<td>10,000</td>
</tr>
<tr>
<td>Processing skim milk into condensed milk</td>
<td>8,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Expected Revenues from Products (per day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cream</td>
</tr>
<tr>
<td>Skim milk</td>
</tr>
<tr>
<td>Cottage cheese</td>
</tr>
<tr>
<td>Condensed milk</td>
</tr>
</tbody>
</table>

LO 5: Identify the relevant costs in determining whether to sell or process materials further.
Sell cream or process further into cottage cheese?

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Net Income Increase (Decrease)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales per day</td>
<td>$19,000</td>
<td>$27,000</td>
<td>$8,000</td>
</tr>
<tr>
<td>Cost per day</td>
<td>0</td>
<td>10,000</td>
<td>(10,000)</td>
</tr>
<tr>
<td>Processing cream into cottage cheese</td>
<td>0</td>
<td>10,000</td>
<td>(10,000)</td>
</tr>
<tr>
<td>Total</td>
<td>$19,000</td>
<td>$17,000</td>
<td>$2,000</td>
</tr>
</tbody>
</table>

**Do not process cream further:**
**To do so will incur an incremental loss of $2,000**

**LO 5:** Identify the relevant costs in determining whether to sell or process materials further.
Sell or Process Further

Sell skim milk or process further into condensed milk?

Marais should process the skim milk:
To do so will increase net income by $7,000

LO 5: Identify the relevant costs in determining whether to sell or process materials further.
Let’s Review

The decision rule in a sell-or-process-further decision is:

process further as long as the incremental revenue from processing exceeds:

- a. Incremental processing costs.
- b. Variable processing costs.
- c. Fixed processing costs.
- d. No correct answer is given.

LO 5: Identify the relevant costs in determining whether to sell or process materials further.
Management must decide whether a company should continue to use an asset or replace it.

**Example:** Assessment of replacement of a factory machine:

<table>
<thead>
<tr>
<th></th>
<th><strong>Old Machine</strong></th>
<th><strong>New Machine</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Book value</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td>$120,000</td>
</tr>
<tr>
<td>Remaining useful life</td>
<td>four years</td>
<td>four years</td>
</tr>
<tr>
<td>Scrap value</td>
<td>- 0 -</td>
<td>- 0 -</td>
</tr>
</tbody>
</table>

**Variable costs:**
Decrease from $160,000 to $125,000 annually

LO 6: Identify the relevant costs to be considered in retaining or replacing equipment.
Replace the equipment - Lower variable manufacturing costs more than offset cost of new equipment.

The book value of the old machine does not affect the decision - it is a sunk cost.

However, any trade-in allowance or cash disposal value of the old asset is relevant.

LO 6: Identify the relevant costs to be considered in retaining or replacing equipment.
In a decision to retain or replace equipment, the book value of the old equipment is a(an):

a. Opportunity cost.

b. Sunk cost.

c. Incremental cost.

d. Marginal cost.

LO 6: Identify the relevant costs to be considered in retaining or replacing equipment.
Eliminate an Unprofitable Segment

- Should the company eliminate an unprofitable segment?
- Key: Focus on relevant costs
- Consider effect on related product lines
- Fixed costs allocated to the unprofitable segment must be absorbed by the other segments
- Net income may decrease when an unprofitable segment is eliminated
- Decision Rule:
  Retain the segment unless fixed costs eliminated exceed the contribution margin lost

LO 7: Identify the relevant costs in deciding whether to eliminate an unprofitable segment.
Eliminate an Unprofitable Segment - Example

Martina Company manufactures three models of tennis racquets: Profitable lines: Pro and Master. Unprofitable line: Champ.

Condensed Income Statement data:

<table>
<thead>
<tr>
<th></th>
<th>Pro</th>
<th>Master</th>
<th>Champ</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$800,000</td>
<td>$300,000</td>
<td>$100,000</td>
<td>$1,200,000</td>
</tr>
<tr>
<td>Variable costs</td>
<td>520,000</td>
<td>210,000</td>
<td>90,000</td>
<td>820,000</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>280,000</td>
<td>90,000</td>
<td>10,000</td>
<td>380,000</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>80,000</td>
<td>50,000</td>
<td>30,000</td>
<td>160,000</td>
</tr>
<tr>
<td>Net income</td>
<td>$200,000</td>
<td>$40,000</td>
<td>$(20,000)</td>
<td>$220,000</td>
</tr>
</tbody>
</table>

Should the Champ line be eliminated?

LO 7: Identify the relevant costs in deciding whether to eliminate an unprofitable segment.
Eliminate an Unprofitable Segment - Example

- If Champ is eliminated, must allocate its $30,000 share of fixed costs: 2/3 to Pro and 1/3 to Master
- Revised Income Statement data:

<table>
<thead>
<tr>
<th></th>
<th>Pro</th>
<th>Master</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$800,000</td>
<td>$300,000</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>Variable costs</td>
<td>520,000</td>
<td>210,000</td>
<td>730,000</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>280,000</td>
<td>90,000</td>
<td>370,000</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>100,000</td>
<td>60,000</td>
<td>160,000</td>
</tr>
<tr>
<td>Net income</td>
<td>$180,000</td>
<td>$30,000</td>
<td>$210,000</td>
</tr>
</tbody>
</table>

- Total income has decreased by $10,000 ($220,000 - $210,000)

LO 7: Identify the relevant costs in deciding whether to eliminate an unprofitable segment.
Eliminate an Unprofitable Segment - Example

Incremental analysis of Champ provides the same results:

<table>
<thead>
<tr>
<th></th>
<th>Continue</th>
<th>Eliminate</th>
<th>Net Income Increase (Decrease)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>$100,000</td>
<td>$0</td>
<td>$(100,000)</td>
</tr>
<tr>
<td>Variable costs</td>
<td>90,000</td>
<td>0</td>
<td>90,000</td>
</tr>
<tr>
<td>Contribution margin</td>
<td>10,000</td>
<td>0</td>
<td>(10,000)</td>
</tr>
<tr>
<td>Fixed costs</td>
<td>30,000</td>
<td>30,000</td>
<td>0</td>
</tr>
<tr>
<td>Net income</td>
<td>$(20,000)</td>
<td>$(30,000)</td>
<td>$(10,000)</td>
</tr>
</tbody>
</table>

Decision: Do not eliminate Champ

LO 7: Identify the relevant costs in deciding whether to eliminate an unprofitable segment.
If an unprofitable segment is eliminated:

a. Net income will always increase.

b. Variable expenses of the eliminated segment will have to be absorbed by other segments.

c. Fixed expenses allocated to the eliminated segment will have to be absorbed by other segments.

d. Net income will always decrease.

Let’s Review

LO 7: Identify the relevant costs in deciding whether to eliminate an unprofitable segment.
Many decisions involving incremental analysis have important qualitative features that must be considered in addition to the quantitative factors.

Example - cost of lost morale due to outsourcing or eliminating a plant

Incremental analysis is completely consistent with activity-based costing (ABC)

ABC often results in better identification of relevant costs and, thus, better incremental analysis
What is a Degree Worth?

Over a lifetime of work, college graduates earn an average of $500,000 more than associate degree holders and $900,000 more than high-school graduates.

Tuition costs about $8,655 a year to attend a public four-year college and about $1,359 for a public two-year institution.

About 600,000 students drop out of four-year colleges each year.
What is a Degree Worth?

- You are working two jobs, your grades are suffering, you feel depressed: Should you drop out of school?

- Is it better to stay in school even if you only take one class each semester?
Chapter Review - Exercise 7-1

Identify each of the following statements as true or false.

1. The first step in management’s decision-making process is “Determine and evaluate possible courses of action.”  
   - False

2. The final step in management’s decision-making process is to actually make the decision.  
   - False

3. Accounting’s contribution to management’s decision-making process occurs primarily in evaluating possible courses of action and in reviewing the results.  
   - True

4. In making business decisions, management ordinarily considers only financial information because it is objectively determined.  
   - False
5. Decisions involve a choice among alternative courses of action.  **True**

6. The process used to identify the financial data that change under alternative courses of action is called incremental analysis.  **True**

7. Costs that are the same under all alternative courses of action sometimes affect the decision.  **False**

8. When using incremental analysis, some costs will always change under alternative courses of action, but revenues will not.  **False**

9. Variable costs will change under alternative courses of action, but fixed costs will not.  **False**
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