

# Chapter 9 Lecture - Making Capital Investment Decisions

## CHAPTER 9 LECTURE - MAKING CAPITAL INVESTMENT DECISIONS SECTIONS (9.1, 9.2, 9.6)



### LEARNING OBJECTIVES

After studying this chapter, you should be able to:

**LO1** Determine the relevant cash flows for a proposed investment.

**LO2** Evaluate an estimated NPV.

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### Relevant Cash Flows

- Include only cash flows that will only occur if the project is accepted
- *Incremental cash flows*
- The *stand-alone principle* allows us to analyze each project in isolation from the firm simply by focusing on

#### Incremental Cash Flows

Corporate cash flow **with** the project

Minus (-)

Corporate cash flow **without** the project

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### Relevant Cash Flows

- **“Sunk” Costs** ..... N
- **Opportunity Costs** ..... Y
- **Side Effects/Erosion**..... Y
- **Net Working Capital**..... Y
- **Financing Costs**..... N
- **Tax Effects** ..... Y

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### Sunk Costs (N)

- A **sunk cost**, by definition, is a cost we have already paid or have already incurred the liability to pay.
- Such a cost cannot be changed by the decision today to accept or reject a project.
- Put another way, the firm will have to pay this cost no matter what.
- Based on our general definition of incremental cash flow, such a cost is clearly not relevant to the decision at hand.
- So, we will always be careful to exclude sunk costs from our analysis.

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## Opportunity Costs (Y)

- An **opportunity cost** is slightly different; it requires us to give up a benefit.
- A common situation arises where a firm already owns some of the assets a proposed project will be using.
- For example, we might be thinking of converting an old rustic cotton mill we bought years ago for \$100,000 into "upmarket" condominiums.
- If we undertake this project, there will be no direct cash outflow associated with buying the old mill since we already own it.
- For purposes of evaluating the condo project, should we then treat the mill as "free"? The answer is no. The mill is a valuable resource used by the project. If we didn't use it here, we could do something else with it.

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## Side Effects (Y)

- Remember that the incremental cash flows for a project include all the changes in the *firm's* future cash flows. It would not be unusual for a project to have **side, or spillover, effects, both good and bad.**
- In this case, the cash flows from the new line should be adjusted downward to reflect lost profits on other lines.
- In accounting for erosion, it is important to recognize that any sales lost as a result of our launching a new product might be lost anyway because of future competition. Erosion is only relevant when the sales would not otherwise be lost.

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## Net Working Capital (Y)

- **Net Working Capital** Normally, a project will require that the firm invest in net working capital in addition to long-term assets.
- For example, a project will generally need some amount of cash on hand to pay any expenses that arise. In addition, a project will need an initial investment in inventories and accounts receivable (to cover credit sales).
- This balance represents the investment in net working capital.

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## Financing Costs (N) and Other Issues (Y)

- **Financing Costs.** In analyzing a proposed investment, we will not include interest paid or any other financing costs such as dividends or principal repaid, because we are interested in the cash flow generated by the assets of the project
- More generally, our goal in project evaluation is to compare the cash flow from a project to the cost of acquiring that project in order to estimate NPV.
- **Other Issues.** First, we are only interested in measuring cash flow.
- Moreover, we are interested in measuring it when it actually occurs, not when it accrues in an accounting sense.
- Second, we are always interested in *aftertax* cash flow since taxes are definitely a cash outflow. In fact, whenever we write "incremental cash flows," we mean aftertax incremental cash flows.

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## Evaluating NPV Estimates

- NPV estimates are only estimates
- Forecasting risk:
  - Sensitivity of NPV to changes in cash flow estimates
    - The more sensitive, the greater the forecasting risk
- Sources of value
  - Be able to articulate why this project creates value

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## Scenario Analysis

- Examines several possible situations:
  - Worst case
  - Base case or most likely case
  - Best case
- Provides a range of possible outcomes

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## Scenario Analysis Example

	Base	Lower	Upper
Units	6,000	5,500	6,500
Price/unit	\$ 80.00	\$ 75.00	\$ 85.00
Variable cost/unit	\$ 60.00	\$ 58.00	\$ 62.00
Fixed cost/year	\$ 50,000	\$ 45,000	\$ 55,000
	BASE	BEST	WORST

Initial investment \$ 200,000  
 Depreciated to salvage value of 0 over 5 years  
 Deprec/yr \$ 40,000  
 Project Life 5 years  
 Tax rate 34%  
 Required return 12%

Note: "Lower" ≠ Worst  
 "Upper" ≠ Best

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## Scenario Analysis Example

	BASE	WORST	BEST
Units	6,000	5,500	6,500
Price/unit	\$ 80.00	\$ 75.00	\$ 85.00
Variable cost/unit	\$ 60.00	\$ 62.00	\$ 58.00
Fixed Cost	\$ 50,000	\$ 55,000	\$ 45,000
Sales	\$ 480,000	\$ 412,500	\$ 552,500
Variable Cost	360,000	341,000	377,000
Fixed Cost	50,000	55,000	45,000
Depreciation	40,000	40,000	40,000
EBIT	30,000	(23,500)	90,500
Taxes	10,200	(7,990)	30,770
Net Income	19,800	(15,510)	59,730
+ Deprec	40,000	40,000	40,000
<b>TOTAL CF</b>	<b>59,800</b>	<b>24,490</b>	<b>99,730</b>
NPV	15,566	(111,719)	159,504
IRR	15.1%	-14.4%	40.9%

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## Problems with Scenario Analysis

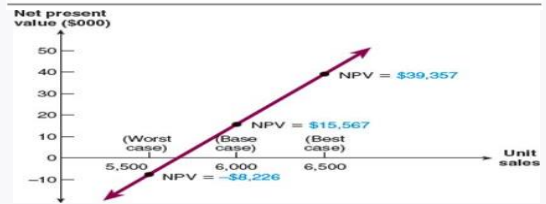
- Considers only a few possible out-comes
- Assumes perfectly correlated inputs
  - All “bad” values occur together and all “good” values occur together
- Focuses on stand-alone risk, although subjective adjustments can be made
- Definition of **Stand-alone Risk** - The risk associated with a single operating unit of a company or asset. Standalone involves the risks created by a specific division or project, which would not exist if operations in that area were to cease.

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## Sensitivity Analysis

- Shows how changes in an input variable affect NPV or IRR
- Each variable is fixed except one
  - Change one variable to see the effect on NPV or IRR
- Answers “what if” questions

Scenario	Unit Sales	Cash Flow	Net Present Value	IRR
Base case	6,000	\$9,800	\$15,567	15.1%
Worst case	5,500	53,200	-8,226	10.3
Best case	6,500	66,400	39,357	19.7



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## Sensitivity Analysis:

- **Strengths**
  - Provides indication of stand-alone risk.
  - Identifies dangerous variables.
  - Gives some breakeven information.
- **Weaknesses**
  - Does not reflect diversification.
  - Says nothing about the likelihood of change in a variable.
  - Ignores relationships among variables.

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## Managerial Options

- Contingency planning
- Option to expand
  - Expansion of existing product line
  - New products
  - New geographic markets
- Option to abandon
  - Contraction
  - Temporary suspension
- Option to wait

## Capital Rationing

- Capital rationing occurs when a firm or division has limited resources
  - Soft rationing – the limited resources are temporary, often self-imposed
  - Hard rationing – capital will never be available for this project
- The profitability index is a useful tool when faced with soft rationing

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