

CAPITAL BUDGETING (Reading 36)

EXERCISE PROBLEMS:

1. A project has the following annual cash flows:

| Year 0 | Year 1 | Year 2 | Year 3 |
|------------|-------------|--------------|-------------|
| -\$606,061 | \$2,151,515 | -\$2,542,424 | \$1,000,000 |

Which discount rate *most likely* provides a positive net present value?

- A. 15%
- B. 18%
- C. 21%

Ans: C;

C is correct because the NPV at 21% is \$14.7; the other two NPVs are negative

2. Which of the following capital budgeting techniques is *most* directly related to stock price?

- A. Net present value
- B. Profitability index
- C. Discounted payback period

Ans: A;

A is correct. The NPV criterion is the criterion most directly related to stock prices. If a corporation invests in positive NPV projects, these should add to the wealth of its shareholders.

3. When computing the cash flows for a capital project, which of the following is *least likely* to be included?

- A. Tax effects
- B. Financing costs
- C. Opportunity costs

Ans: B;

B is correct. Financing costs are not included in a cash flow calculation but are considered in the calculation of the discount rate.

4. A project has the following annual cash flows:

| Year 0 | Year 1 | Year 2 | Year 3 | Year 4 |
|-----------|----------|----------|----------|----------|
| -\$75,000 | \$21,600 | \$23,328 | \$37,791 | \$40,815 |

With a discount rate of 8%, the discounted payback period (in years) is *closest* to:

- A. 2.8.
- B. 3.0.
- C. 3.2.

Ans: C;

| Year | Cash Flow | PV (Cash Flow) @ 8% $CF_n \div (1.08)^n$ | Amount to Pay Back [CF ₀ – Cumulative PV cash flows] |
|------|-----------|--|---|
| 0 | -75,000 | -75,000 | 75,000 |
| 1 | 21,600 | 20,000 | 55,000 |
| 2 | 23,328 | 20,000 | 35,000 |
| 3 | 37,791 | 30,000 | 5,000 |
| 4 | 40,814 | 30,000 | |

The first three cash flows recover \$70,000 (in present value terms) of the cost, making only \$5,000 of the \$30,000 in Year 4 necessary to completely recover the cost.

Therefore, the discounted payback is $3 + \frac{5,000}{30,000} = 3.2$ years.

5. When considering two mutually exclusive capital budgeting projects with conflicting rankings (one has the higher positive NPV, the other has a higher IRR), the *most* appropriate conclusion is to choose the project with the:

- A. higher IRR.
- B. higher NPV.
- C. shorter payback.

Ans: B;

“When the IRR and NPV rules conflict in ranking projects, we should take directions from the NPV rule. Why that preference? The NPV of an investment represents the expected addition to shareholder wealth from an investment, and we take the maximization of shareholder wealth to be a basic financial objective of a company.”

Note also that payback suffers from severe deficiencies as a decision tool.

6. A company’s optimal capital budget *most likely* occurs at the intersection of the:

- A. net present value and internal rate of return profiles.
- B. marginal cost of capital and net present value profiles.
- C. marginal cost of capital and investment opportunity schedule.

Ans: C;

C is the correct choice because the point where the marginal cost of capital (MCC) intersects the investment opportunity schedule (IOS) is the optimal capital budget .

7. The post-audit performed as part of the capital budgeting process is *least likely* to:

- A. improve a firm's operations.
- B. produce concrete ideas for future investments.
- C. force management to revise the original forecast to match actual results.

Ans: C;

C is correct because The purposes of the post-audit process are to monitor forecasts, improve operations, and generate concrete ideas for future investments. The original forecast is, in effect, a "sunk cost." The point is not to revise after the fact the original forecast, but to create a more accurate forecast over the new planning horizon.

8. A company is considering building a distribution center on undeveloped land that it acquired more than ten years ago at a cost of \$400,000. The company estimates the cost of putting in utilities, sewers, roads and other such costs of preparing the land for the distribution center at \$200,000. Alternatively, the undeveloped land could be sold today to another company for \$600,000. In evaluating this capital project, the investment outlay associated with the use of the land by the distribution center will *most likely* be:

- A. \$400,000.
- B. \$600,000.
- C. \$800,000.

Ans: C;

C is correct. The investment outlay associated with the use of the land should reflect the opportunity cost of the foregone sale (\$600,000) plus the incremental cost of preparing the land for use as a distribution center (\$200,000). \$600,000 plus \$200,000 equals \$800,000.

9. When considering capital projects, which of the following statements is *most* accurate? Compared to the NPV method, the IRR method:

- A. can result in multiple values.
- B. has the more appropriate reinvestment rate assumption.
- C. uses more accurate estimates of the project's cash flows.

Ans: A;

A is correct. If the cash flows of the project are nonconventional, the IRR method can result in multiple IRRs.

10. A company that sells ice cream is evaluating an expansion of its production facilities to also produce frozen yogurt. A marketing study has concluded that producing frozen yogurt would increase the company's ice cream sales because of an increase in brand awareness. What impact will the cash flows from the expected increase in ice cream sales *most likely* have on the NPV of the yogurt project?

- A. Increase
- B. Decrease
- C. No effect

Ans: **A**;

The increase in ice cream sales represents a positive externality that will increase the NPV of the project and should be included in the NPV analysis.

11. An analyst is developing net present value (NPV) profiles for two investment projects. The only difference between the two projects is that Project 1 is expected to receive larger cash flows early in the life of the project, while Project 2 is expected to receive larger cash flows late in the life of the project. The sensitivities of the projects' NPVs to changes in the discount rate is *best* described as:

- A. equal for the two projects.
- B. lower for Project 1 than for Project 2.
- C. greater for Project 1 than for Project 2.

Ans: **B**;

B is the correct because A delay in the receipt of cash flows (as in Project 2) will make a project's net present value more sensitive to changes in the discount rate.

12. Given two mutually exclusive projects with normal cash flows, the points at which the net present value profiles intersect the horizontal axis are *most likely* to be the:

- A. crossover rate for the projects.
- B. internal rates of return of the projects.
- C. the company's weighted average cost of capital (WACC).

Ans: **B**;

B is the correct because when the net present value profiles intersect the horizontal axis, NPV of the projects equals to zero.

13. Which of the following is *least likely* classified as an opportunity cost?

- A. The cash savings related to adopting a new production process.
- B. The cash flows generated by an old machine that is to be replaced.
- C. The market value of vacant land to be used for a distribution center.

Ans: A;

The cash savings related to adopting a new production process is an incremental cash flow, not an opportunity cost.

14. A capital project with a net present value (NPV) of \$23.29 has the following cash flows:

| | | | | | | |
|-----------|------|----|----|----|----|----|
| Year | 0 | 1 | 2 | 3 | 4 | 5 |
| Cash flow | -100 | 30 | 40 | 50 | 20 | 10 |

The internal rate of return (IRR) for the project is *closest* to:

- A. 10%.
- B. 12%.
- C. 18%.

Ans: C;

Using a calculator, enter $CF_0 = -100$, $CF_1 = 30$, $CF_2 = 40$, $CF_3 = 50$, $CF_4 = 20$, $CF_5 = 10$, solve for IRR. The IRR is 17.63%

15. Two mutually exclusive projects have conventional cash flows, but one project has a larger NPV while the other project has a higher IRR. Which of the following *least likely* explains this conflict?

- A. Reinvestment rate assumption.
- B. Size of the projects' initial investments.
- C. Risk of the projects as reflected in the required rate of return.

Ans: C;

Conflicting decision rules based on the NPV and IRR methods are related to the reinvestment rate assumption, the timing of the cash flows, or the scale of the projects. Differing required rates of return are not related to conflicting NPV and IRR decisions.

16. A large corporation accepts a project which generates no revenue and has a negative net present value. The project *most likely* is classified in which of the following categories?

- A. Replacement project.
- B. New product or service.
- C. Regulatory or environmental project.

Ans: C;

Regulatory, safety, and environmental projects are often mandated by governmental agencies. They may generate no revenue and might not be undertaken by a company maximizing its own private interests. For example, a corporation may be required to install equipment to meet a regulatory standard, and the cost of satisfying the standard is born by the corporation. In this case, the corporation selects the lowest cost alternative that meets the requirement, i.e., the alternative with the least negative net present value.

17. A company recently opened a limestone quarry at a location outside its traditional service area. Because limestone is a major ingredient in concrete, if the quarry is successful the company plans to build a ready-mix concrete plant at the same location. The investment in the concrete plant is *best* described as:

- A. an externality.
- B. project sequencing.
- C. an example of investment synergy.

Ans: B;

Project sequencing occurs when the investment in one project creates the option to invest in future projects.