**Chapter 11**

11-1

**NPV** Project L costs $65,000, its expected cash inflows are $12,000 per year for 9 years, and its WACC is 9%. What is the project’s NPV?

* 11-2

**IRR** Refer to **problem 11-1**. What is the project’s IRR?

* 11-3

**MIRR** Refer to **problem 11-1**. What is the project’s MIRR?

* 11-4

**PAYBACK PERIOD** Refer to **problem 11-1**. What is the project’s payback?

 11-6

**NPV** Your division is considering two projects with the following cash flows (in millions):

Year 0 1 2 3

Project A -25 5 10 17

Project B -20 10 9 6

What are the projects’ NPVs assuming the WACC is 5%? 10%? 15%?

* 1. What are the projects’ IRRs at each of these WACCs?
	2. If the WACC was 5% and A and B were mutually exclusive, which project would you choose? What if the WACC was 10%? 15%? (Hint: The crossover rate is 7.81%.)
* 11-7

**CAPITAL BUDGETING CRITERIA**A firm with a 14% WACC is evaluating two projects for this year’s capital budget. After-tax cash flows, including depreciation, are as follows:

Years 0 1 THRU 5

Project A -30,000 10,000

Project B -90,000 28,000

* 1. Calculate NPV, IRR, MIRR, payback, for each project.
	2. Assuming the projects are independent, which one(s) would you recommend?
	3. If the projects are mutually exclusive, which would you recommend?
	4. Notice that the projects have the same cash flow timing pattern. Why is there a conflict between NPV and IRR?
* 11-8

**CAPITAL BUDGETING CRITERIA: ETHICAL CONSIDERATIONS**A mining company is considering a new project. Because the mine has received a permit, the project would be legal, but it would cause significant harm to a nearby river. The firm could spend an additional $10 million at Year 0 to mitigate the environmental problem, but it would not be required to do so. Developing the mine (without mitigation) would cost $60 million, and the expected cash inflows would be $20 million per year for 5 years. If the firm does invest in mitigation, the annual inflows would be $21 million. The risk-adjusted WACC is 12%.

* 1. Calculate the NPV and IRR with and without mitigation.
	2. How should the environmental effects be dealt with when this project is evaluated?
	3. Should this project be undertaken? If so, should the firm do the mitigation?
* 11-9

**CAPITAL BUDGETING CRITERIA: ETHICAL CONSIDERATIONS** An electric utility is considering a new power plant in northern Arizona. Power from the plant would be sold in the Phoenix area, where it is badly needed. Because the firm has received a permit, the plant would be legal, but it would cause some air pollution. The company could spend an additional $40 million at Year 0 to mitigate the environmental problem, but it would not be required to do so. The plant without mitigation would cost $240 million, and the expected cash inflows would be $80 million per year for 5 years. If the firm does invest in mitigation, the annual inflows would be $84 million. Unemployment in the area where the plant would be built is high, and the plant would provide about 350 good jobs. The risk-adjusted WACC is 17%.

* 1. Calculate the NPV and IRR with and without mitigation.
	2. How should the environmental effects be dealt with when evaluating this project?
	3. Should this project be undertaken? If so, should the firm do the mitigation? Why or why not?
* 11-10

**CAPITAL BUDGETING CRITERIA: MUTUALLY EXCLUSIVE PROJECTS** A firm with a WACC of 10% is considering the following mutually exclusive projects:



Which project would you recommend? Explain.

* 11-11

**CAPITAL BUDGETING CRITERIA: MUTUALLY EXCLUSIVE PROJECTS** Project S costs $17,000, and its expected cash flows would be $5,000 per year for 5 years. Mutually exclusive Project L costs $30,000, and its expected cash flows would be $8,750 per year for 5 years. If both projects have a WACC of 12%, which project would you recommend? Explain.

* 11-12

**IRR AND NPV** A company is analyzing two mutually exclusive projects, S and L, with the following cash flows:

Year S L

0 -1,000 -1,000

1 870 0

2 250 250

3 25 400

4 25 845

The company’s WACC is 8.5%. What is the IRR of the *better* project? (Hint: The better project may or may not be the one with the higher IRR.)

* 11-13

**MIRR**A firm is considering two mutually exclusive projects, X and Y, with the following cash flows:

Year X Y

0 -1,000 -1,000

1 110 1,100

2 300 90

3 430 55

4 700 50

The projects are equally risky, and their WACC is 11%. What is the MIRR of the project that maximizes shareholder value?