# CAPITAL BUDGETING

**Text Problem Solutions**

1. You are considering an investment in two projects, A and B. Both projects will cost $50,000, and the projected cash flows are as follows:

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| **Year** | **Project A** | **Project B** |
| 1 | 20,000 | 35,000 |
| 2 | 25,000 | 30,000 |
| 3 | 30,000 | 25,000 |
| 4 | 35,000 | 20,000 |
| 5 | 40,000 | 15,000 |

a. Assuming that the WACC is 12%, calculate the payback period, discounted payback period, NPV, PI, IRR, and MIRR. If the projects are mutually exclusive, which project should be selected?

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b. Create an NPV profile chart for projects A and B. What is the exact crossover rate for these two projects?

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2. The Ocean City water park is considering the purchase of a new log flume ride. The cost to purchase the equipment is $1,650,000 and it will cost an additional $180,000 to have it installed. The equipment has an expected life of 6 years, and it will be depreciated using a MACRS 5-year class life. Management expects to run about 250 rides per day, with each ride averaging 8 riders. The season will last for 120 days per year. In the first year, the ticket price per rider is expected to be $3.50 and it will be increased by 4% per year. The variable cost per rider will be $1.40, and total fixed costs will be $240,000 per year. After six years, the ride will be dismantled at a cost of $75,000 and the parts will be sold for $650,000. The cost of capital is 12% and its marginal tax rate is 40%.

a. Calculate the initial outlay, annual after-tax cash flows, and the terminal cash flow.

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b. Calculate the NPV, IRR, and MIRR of the new equipment. Is the project acceptable?

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c. Using the Goal Seek tool, calculate the minimum ticket price that must be charged in the first year in order to make the project acceptable.

*Answer*: The first-year ticket price must be at least $3.93 (rounded up) in order for the NPV to be equal to 0.

3. The Auraria Pet Foods Company is considering the purchase of more flexible equipment that will allow them to create new products and will also be less expensive to operate than the current machinery. The existing equipment could be sold for $50,000 after taxes. As of today, management forecasts call for after-tax cash flows of $15,000 next year if the current machinery is retained. The cash flows are expected to increase at a rate of 6% per year for the next five years. The new machinery under consideration has a price of $70,000. It would be expected to produce cash flows of $20,000 next year, and the cash flows would grow by 8% per year for the next five years. The firm’s WACC is 15%.

a. Calculate the net present value, IRR, and MIRR of the existing equipment. If the new equipment was not available, would it make more sense to keep the existing equipment or to sell it?

*Possible Answer*: It would make more sense to keep the existing equipment than to sell it for $50,000. At that price, it has a positive NPV and the IRR and MIRR exceed the WACC.

b. Calculate the net present value, IRR, and MIRR of the new equipment. If the new equipment is treated as a stand-alone investment, would it make sense to make the investment?

*Possible Answer*: The new equipment also has a positive NPV, and the IRR and MIRR exceed the WACC. Therefore, it would make a good stand-alone investment.

d. If you had to choose between keeping the existing equipment, or investing in the new equipment, which would you choose? Make the comparison by looking at both the NPVs and IRRs.

c. Calculate the incremental cost and annual after-tax cash flows if the new equipment is purchased. Evaluate the investment in the new equipment as a replacement project. Would you make the investment? Use the NPV, IRR and MIRR to explain your decision.

*Possible Answer*: It makes more sense to purchase the new equipment than to keep the old equipment. We can see this by either comparing their NPV's, or by calculating the NPV of the difference in the cash flows. Typically, we would evaluate the NPV of the incremental cash flows only. This problem is meant to demonstrate the reason that we do it that way. We could just as well evaluate the existing project and compare it to the potential new project (they are mutually exclusive projects). The crossover rate is a WACC of 17.33% as seen in the chart.

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e. At what discount rate would you be indifferent between keeping the existing equipment or purchasing the new equipment?

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4. Chicago Turkey is considering a new turkey farm to service their western region stores. The stores currently require 500,000 turkeys per year, and they are purchased from various local turkey farms for an average price of $7 per bird. The managers believe that their new farm would lower the cost per bird to $6, while maintaining the average selling price of $10 per bird. However, due to the centralized structure of this operation, shipping expenses will increase to $1.50 per bird from the current $1.00. The firm will need to increase its inventory of live turkeys by $15,000. It will cost $150,000 to purchase the land, and $300,000 to construct the buildings and purchase equipment. In addition, labor expense will rise by $130,000 per year. The buildings and equipment will be depreciated using the straight-line method over five years to a salvage value of $100,000. After five years, the company will sell the farm for $300,000 ($100,000 for the buildings and equipment, $200,000 for the land). The firm’s marginal tax rate is 35%, and note that land is not depreciable.

a. Calculate the initial outlay, after-tax cash flows, and terminal cash flow for this project.

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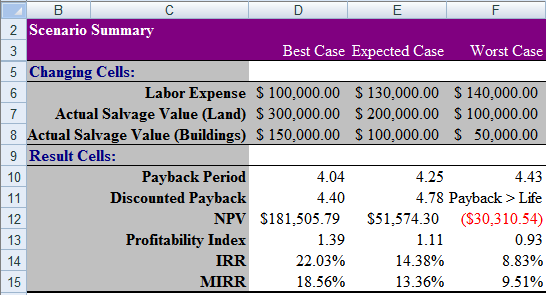
b. If the WACC is 11%, calculate the payback period, discounted payback period, NPV, PI, IRR, and MIRR.

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c. Management is uncertain about several of the variables in your analysis and have asked you to provide three different scenarios.

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| **Scenario** | **Labor Expense** | **Salvage Value of Buildings** | **Salvage Value of Land** |
| Best Case | $100,000 | $150,000 | $300,000 |
| Expected Case | 130,000 | 100,000 | 200,000 |
| Worst Case | 140,000 | 50,000 | 100,000 |

Create a scenario analysis showing the profitability measures for this investment using the information in the table above. (Note: The salvage value of the buildings is the actual forecasted salvage value, not that used for depreciation.)



5. The Chief Financial Officer of Eaton Medical Devices has determined that the firm’s capital investment budget will be $5,000,000 for the upcoming year. Unfortunately, this amount is not sufficient to cover all of the positive NPV projects that are available to the firm.

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| **Project** | **Cost** | **NPV** |
| A | $628,200 | $72,658 |
| B | 352,100 | 36,418 |
| C | 1,245,600 | 212,150 |
| D | 814,300 | 70,925 |
| E | 124,500 | 11,400 |
| F | 985,000 | 56,842 |
| G | 2,356,400 | 93,600 |
| H | 226,900 | 65,350 |
| I | 1,650,000 | 48,842 |
| J | 714,650 | 39,815 |

You have been asked to choose which investments, of those listed in the table, should be made.

a. Using the Solver, determine which of the above projects should be included in the budget if the firm’s goal is to maximize shareholder wealth. (Note: Make sure to set the Solver options to Assume Linear Model.)

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b. Now assume that the CFO has informed you that projects A and B are mutually exclusive, but one of them must be selected. Change your Solver constraints to account for this new information and find the new solution.

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| The same as in part a, except for: |
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c. Ignore the constraints from part b. The CFO has now informed you that Project I is of great strategic importance to the survival of the firm. For this reason it must be accepted. Change your Solver constraints to account for this new information and find the new solution.

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| The same as in part a |