

GESTÃO FINANCEIRA II

PROBLEM SET 2:
Chapters 7 and 8
Investment Decision Rules
Fundamentals of Capital Budgeting

(FROM BERK AND DEMARZO'S "CORPORATE FINANCE")

LICENCIATURA – UNDERGRADUATE COURSE

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Chapter 7

Investment Decision Rules

- 7-5. Bill Clinton reportedly was paid \$10 million to write his book *My Way*. The book took three years to write. In the time he spent writing, Clinton could have been paid to make speeches. Given his popularity, assume that he could earn \$8 million per year (paid at the end of the year) speaking instead of writing. Assume his cost of capital is 10% per year.
- What is the NPV of agreeing to write the book (ignoring any royalty payments)?
 - Assume that, once the book is finished, it is expected to generate royalties of \$5 million in the first year (paid at the end of the year) and these royalties are expected to decrease at a rate of 30% per year in perpetuity. What is the NPV of the book with the royalty payments?
- 7-6. FastTrack Bikes, Inc. is thinking of developing a new composite road bike. Development will take six years and the cost is \$200,000 per year. Once in production, the bike is expected to make \$300,000 per year for 10 years. Assume the cost of capital is 10%.
- Calculate the NPV of this investment opportunity, assuming all cash flows occur at the end of each year. Should the company make the investment?
 - By how much must the cost of capital estimate deviate to change the decision? (*Hint: Use Excel to calculate the IRR.*)
 - What is the NPV of the investment if the cost of capital is 14%?
- 7-11. How many IRRs are there in part (a) of Problem 5? Does the IRR rule give the right answer in this case? How many IRRs are there in part (b) of Problem 5? Does the IRR rule work in this case?
- 7-20. You are considering making a movie. The movie is expected to cost \$10 million upfront and take a year to make. After that, it is expected to make \$5 million when it is released in one year and \$2 million per year for the following four years. What is the payback period of this investment? If you require a payback period of two years, will you make the movie? Does the movie have positive NPV if the cost of capital is 10%?

- 7-23. You are deciding between two mutually exclusive investment opportunities. Both require the same initial investment of \$10 million. Investment A will generate \$2 million per year (starting at the end of the first year) in perpetuity. Investment B will generate \$1.5 million at the end of the first year and its revenues will grow at 2% per year for every year after that.
- Which investment has the higher IRR?
 - Which investment has the higher NPV when the cost of capital is 7%?
 - In this case, for what values of the cost of capital does picking the higher IRR give the correct answer as to which investment is the best opportunity?
 - Use the incremental IRR rule to correctly choose between the investments when the cost of capital is 7%. At what cost of capital would your decision change?
- 7-24. You work for an outdoor play structure manufacturing company and are trying to decide between two projects:

Project	Year-End Cash Flows (\$ thousands)			IRR
	0	1	2	
Playhouse	-30	15	20	10.4%
Fort	-80	39	52	8.6%

You can undertake only one project. If your cost of capital is 8%, use the incremental IRR rule to make the correct decision.

- 7-31. Kaimalino Properties (KP) is evaluating six real estate investments. Management plans to buy the properties today and sell them five years from today. The following table summarizes the initial cost and the expected sale price for each property, as well as the appropriate discount rate based on the risk of each venture.

Project	Cost Today	Discount Rate	Expected Sale Price in Year 5
Mountain Ridge	\$ 3,000,000	15%	\$18,000,000
Ocean Park Estates	15,000,000	15%	75,500,000
Lakeview	9,000,000	15%	50,000,000
Seabreeze	6,000,000	8%	35,500,000
Green Hills	3,000,000	8%	10,000,000
West Ranch	9,000,000	8%	46,500,000

KP has a total capital budget of \$18,000,000 to invest in properties.

- What is the IRR of each investment?
- What is the NPV of each investment?
- Given its budget of \$18,000,000, which properties should KP choose?
- Explain why the profitability index method could not be used if KP's budget were \$12,000,000 instead. Which properties should KP choose in this case?

Chapter 8

Fundamentals of Capital Budgeting

- 8-2. Kokomochi is considering the launch of an advertising campaign for its latest dessert product, the Mini Mochi Munch. Kokomochi plans to spend \$5 million on TV, radio, and print advertising this year for the campaign. The ads are expected to boost sales of the Mini Mochi Munch by \$9 million this year and by \$7 million next year. In addition, the company expects that new consumers who try the Mini Mochi Munch will be more likely to try Kokomochi's other products. As a result, sales of other products are expected to rise by \$2 million each year. Kokomochi's gross profit margin for the Mini Mochi Munch is 35%, and its gross profit margin averages 25% for all other products. The company's marginal corporate tax rate is 35% both this year and next year. What are the incremental earnings associated with the advertising campaign?
- 8-3. Home Builder Supply, a retailer in the home improvement industry, currently operates seven retail outlets in Georgia and South Carolina. Management is contemplating building an eighth retail store across town from its most successful retail outlet. The company already owns the land for this store, which currently has an abandoned warehouse located on it. Last month, the marketing department spent \$10,000 on market research to determine the extent of customer demand for the new store. Now Home Builder Supply must decide whether to build and open the new store. Which of the following should be included as part of the incremental earnings for the proposed new retail store?
- The cost of the land where the store will be located.
 - The cost of demolishing the abandoned warehouse and clearing the lot.
 - The loss of sales in the existing retail outlet, if customers who previously drove across town to shop at the existing outlet become customers of the new store instead.
 - The \$10,000 in market research spent to evaluate customer demand.
 - Construction costs for the new store.
 - The value of the land if sold.
 - Interest expense on the debt borrowed to pay the construction costs.

- 8-7. Castle View Games would like to invest in a division to develop software for video games. To evaluate this decision, the firm first attempts to project the working capital needs for this operation. Its chief financial officer has developed the following estimates (in millions of dollars):

	Year 1	Year 2	Year 3	Year 4	Year 5
Cash	6	12	15	15	15
Accounts Receivable	21	22	24	24	24
Inventory	5	7	10	12	13
Accounts Payable	18	22	24	25	30

Assuming that Castle View currently does not have any working capital invested in this division, calculate the cash flows associated with changes in working capital for the first five years of this investment.

- 8-9. Elmdale Enterprises is deciding whether to expand its production facilities. Although long-term cash flows are difficult to estimate, management has projected the following cash flows for the first two years (in millions of dollars):

	Year 1	Year 2
Revenues	125	160
Costs of goods sold and operating expenses other than depreciation	40	60
Depreciation	25	36
Increase in net working capital	5	8
Capital expenditures	30	40
Marginal corporate tax rate	35%	35%

- a. What are the incremental earnings for this project for years 1 and 2?
 - b. What are the free cash flows for this project for the first two years?
- 8-17. Arnold Inc. is considering a proposal to manufacture high-end protein bars used as food supplements by body builders. The project requires use of an existing warehouse, which the firm acquired three years ago for \$1m and which it currently rents out for \$120,000. Rental rates are not expected to change going forward. In addition to using the warehouse, the project requires an up-front investment into machines and other equipment of \$1.4m. This investment can be fully depreciated straight-line over the next 10 years for tax purposes. However, Arnold Inc. expects to terminate the project at the end of eight years and to sell the machines and equipment for \$500,000. Finally, the project requires an initial investment into net working capital equal to 10% of predicted first-year sales. Subsequently, net working capital is 10% of the predicted sales over the following year. Sales of protein bars are expected to be \$4.8m in the first year and to stay constant for eight years. Total manufacturing costs and operating expenses (excluding depreciation) are 80% of sales, and profits are taxed at 30%.
- a. What are the free cash flows of the project?
 - b. If the cost of capital is 15%, what is the NPV of the project?

8-23. Bauer Industries is an automobile manufacturer. Management is currently evaluating a proposal to build a plant that will manufacture lightweight trucks. Bauer plans to use a cost of capital of 12% to evaluate this project. Based on extensive research, it has prepared the following incremental free cash flow projections (in millions of dollars):

	Year 0	Years 1–9	Year 10
Revenues		100.0	100.0
– Manufacturing expenses (other than depreciation)		–35.0	–35.0
– Marketing expenses		–10.0	–10.0
– Depreciation		–15.0	–15.0
= EBIT		40.0	40.0
– Taxes (35%)		–14.0	–14.0
= Unlevered net income		26.0	26.0
+ Depreciation		+15.0	+15.0
– Increases in net working capital		–5.0	–5.0
– Capital expenditures	–150.0		
+ Continuation value			+12.0
= Free cash flow	–150.0	36.0	48.0

- For this base-case scenario, what is the NPV of the plant to manufacture lightweight trucks?**
- Based on input from the marketing department, Bauer is uncertain about its revenue forecast. In particular, management would like to examine the sensitivity of the NPV to the revenue assumptions. What is the NPV of this project if revenues are 10% higher than forecast? What is the NPV if revenues are 10% lower than forecast?**
- Rather than assuming that cash flows for this project are constant, management would like to explore the sensitivity of its analysis to possible growth in revenues and operating expenses. Specifically, management would like to assume that revenues, manufacturing expenses, and marketing expenses are as given in the table for year 1 and grow by 2% per year every year starting in year 2. Management also plans to assume that the initial capital expenditures (and therefore depreciation), additions to working capital, and continuation value remain as initially specified in the table. What is the NPV of this project under these alternative assumptions? How does the NPV change if the revenues and operating expenses grow by 5% per year rather than by 2%?**
- To examine the sensitivity of this project to the discount rate, management would like to compute the NPV for different discount rates. Create a graph, with the discount rate on the x-axis and the NPV on the y-axis, for discount rates ranging from 5% to 30%. For what ranges of discount rates does the project have a positive NPV?**