CHAPTER 3

(readings: chapter 5 of BMA)

1. Payback.

a. What is the payback period on each of the following projects?

	Cash Flows ($)				
Project	C_0	C_1	C_2	C_3	C_4
A	–5,000	+1,000	+1,000	+3,000	0
B	–1,000	0	+1,000	+2,000	+3,000
C	–5,000	+1,000	+1,000	+3,000	+5,000

b. Given that you wish to use the payback rule with a cutoff period of two years, which projects would you accept?
c. If you use a cutoff period of three years, which projects would you accept?
d. If the opportunity cost of capital is 10%, which projects have positive NPVs?
e. "If a firm uses a single cutoff period for all projects, it is likely to accept too many shortlived projects." True or false?
f. If the firm uses the discounted-payback rule, will it accept any negative-NPV projects? Will it turn down any positive-NPV projects?

2. Payback and IRR rules. Respond to the following comments:

a. "I like the IRR rule. I can use it to rank projects without having to specify a discount rate."
b. "I like the payback rule. As long as the minimum payback period is short, the rule makes sure that the company takes no borderline projects. That reduces risk."

3. IRR.

a. Calculate the net present value of the following project for discount rates of 0, 50, and 100%:

Cash Flows ($)		
C_0	C_1	C_2
–6,750	+4,500	+18,000

b. What is the IRR of the project?

4. IRR rule. Consider projects Alpha and Beta:

	Cash Flows ($)			
Project	C_0	C_1	C_2	IRR (%)
Alpha	–400,000	+241,000	+293,000	21
Beta	–200,000	+131,000	+172,000	31

The opportunity cost of capital is 8%. Suppose you can undertake Alpha or Beta, but not both. Use the IRR rule to make the choice. (Hint: What's the incremental investment in Alpha?)

5. IRR rule. Consider the following two mutually exclusive projects:

	Cash flows ($)			
Project	C_0	C_1	C_2	C_3
A	−100	+60	+60	0
B	−100	0	0	+140

a. Calculate the NPV of each project for discount rates of 0%, 10%, and 20%. Plot these on a graph with NPV on the vertical axis and discount rate on the horizontal axis.
b. What is the approximate IRR for each project?
c. In what circumstances should the company accept project A?
d. Calculate the NPV of the incremental investment (B – A) for discount rates of 0%, 10%, and 20%. Plot these on your graph. Show that the circumstances in which you would accept A are also those in which the IRR on the incremental investment is less than the opportunity cost of capital.

6. Payback Consider the following projects:

	Cash Flows ($)					
Project	C_0	C_1	C_2	C_3	C_4	C_5
A	–1,000	+1,000	0	0	0	0
B	–2,000	+1,000	+1,000	+4,000	+1,000	+1,000
C	–3,000	+1,000	+1,000	0	+1,000	+1,000

a. . If the opportunity cost of capital is 10%, which projects have a positive NPV?
b. Calculate the payback period for each project.
c. Which project(s) would a firm using the payback rule accept if the cutoff period were three years?
d. Calculate the discounted payback period for each project.
e. Which project(s) would a firm using the discounted payback rule accept if the cutoff period were three years?

7. Capital rationing. Borgia Pharmaceuticals has $1 million allocated for capital expenditures. Which of the following projects should the company accept to stay within the $1 million budget? How much does the budget limit cost the company in terms of its market value? The opportunity cost of capital for each project is 11%.

Project	Investment ($ thousand)	NPV ($ thousand)	IRR (%)
1	300	66	17.2
2	200	–4	10.7
3	250	43	16.6
4	100	14	12.1
5	100	7	11.8
6	350	63	18.0
7	400	48	13.0