

MATH 2600/STAT 2600, Theory of Interest

FALL 2013

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Homework Sheet 5

Due: Thursday 14th November: 11:30 PM

1. A company are considering a project. The project has the following expected cash flows (all amounts are calculated at the beginning of the year):

Year	0	1	2	3	4	5	6	7	8	9
Net Cash Flow (000)	-100	10	20	20	-10	20	20	20	30	30

- (a) What is the Net Present value of the project at  $j_1 = 3\%$ ?
  - (b) What is the Net Present value of the project at  $j_1 = 11\%$ ?
  - (c) What is the internal rate of return?
2. A company are considering two projects. The projects have the following expected cash flows (all amounts are calculated at the beginning of the year):

Year	0	1	2	3	4	5	6	7	8
Project 1 Net Cash Flow (000)	-150	10	10	20	30	40	40	40	20
Project 2 Net Cash Flow (000)	-70	30	10	10	20	10	20	10	-30

- (a) Which project should they prefer if the cost of capital is  $j_1 = 2\%$ ?
  - (b) Which project should they prefer if the cost of capital is  $j_1 = 12\%$ ?
3. Mrs. Butler has \$200,000 in her investment fund at the start of the year. One month later, she withdraws \$130,000. Another 3 months later (4 months from the start of the year), she withdraws a further \$80,000 (there is enough money in the fund to cover this withdrawal). After another 5 months, (9 months from the start of the year), she wins the lottery and invests \$3,000,000 in the fund. At the end of the year, her investment advisor proudly tells her that her dollar-weighted return for the year is 11%. How much does she have in the fund at the end of the year?
  4. Dr. Campbell is managing an investment fund. At the start of the year, there is \$7,000,000 in the fund. The fund activity is summarised in the following table:

Months from start of year	Fund value before transaction	Net Deposit	Fund value after transaction
0			7,000,000
1	7,020,000	-100,000	6,920,000
3	7,250,000	500,000	7,750,000
4	7,720,000	-100,000	7,620,000
5	7,830,000	600,000	8,430,000
6	7,660,000	-200,000	7,460,000
8	7,540,000	500,000	8,040,000
10	7,220,000	-100,000	7,120,000
12	7,420,000		7,420,000

Calculate her time-weighted rate of return for the year.

5. A company has an account which pays interest at  $j_1 = 2.5\%$  on credit balances, and charges interest at  $j_1 = 6\%$  on debit balances. The company is considering using this account to fund possible projects with the following expected cashflows: (All amounts are calculated at the beginning of the year.)

Year	0	1	2	3	4	5	6	7
Project 1 Net Cash Flow (000)	-200	10	20	30	40	50	50	50
Project 2 Net Cash Flow (000)	-100	30	10	10	30	50	20	10

How much money does the company have in its account at the end of 7 years if it invests in:

- (a) The first project?
- (b) The second project?
- (c) Both projects?