

MATH 2600/STAT 2600, Theory of Interest

FALL 2014

Toby Kenney

Homework Sheet 5

Due: Thursday 13th 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)	-500	100	200	150	0	-100	300	200	300	100

- (a) What is the Net Present value of the project at $j_1 = 4\%$?
 - (b) What is the Net Present value of the project at $j_1 = 9\%$?
 - (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
Project 1 Net Cash Flow (000)	-350	100	100	200	50	30	10
Project 2 Net Cash Flow (000)	-120	10	20	30	30	30	40

- (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 $j_1 = 12\%$?
 - (c) Which project has the higher internal rate of return?
3. Mr. Zhang has \$250,000 in his investment fund at the start of the year. 2 months later, he withdraws \$110,000. Another 3 months later (5 months from the start of the year), he withdraws a further \$80,000 (there is enough money in the fund to cover this withdrawal). After another 3 months, (8 months from the start of the year), he inherits some money and invests \$300,000 in the fund. At the end of the year, there is \$410,000 in the fund. What is his Dollar-weighted rate of return for the year?
 4. Mr. Archibald is managing a pension fund. At the start of the year, there is \$8,000,000 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			8,000,000
2	7,820,000	-100,000	7,720,000
3	7,750,000	-400,000	7,350,000
5	7,220,000	-100,000	7,120,000
7	7,770,000	600,000	8,370,000
8	8,160,000	-200,000	7,860,000
10	7,990,000	100,000	8,090,000
12	7,920,000		7,920,000

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

5. A company has an account which pays interest at $j_1 = 3.5\%$ on credit balances, and charges interest at $j_1 = 5\%$ 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
Project 1 Net Cash Flow (000)	-150	10	20	30	50	60	30
Project 2 Net Cash Flow (000)	-180	60	60	40	40	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?