Lesson 10-2 – Incremental Rate of Return

Incremental Analysis

- The rate of return is the most frequently used measure of merit to evaluate investments in business and industry.
- In rate of return analysis, two or more alternatives are compared using the incremental rate of return (ΔIRR).
- Compare the ΔIRR to the minimum acceptable rate of return (MARR)
- The project increment is ordered by:
  - Higher initial cost project – Lower initial cost project = Increment
- The new cash flow created from the cash flow increments is evaluated.
  - The ΔIRR of the new cash flow is determined.

Getting to School

- Need to get to UBC
- Maximium time willing to spend in transit: 3 hours per day

- Option A: Transit - $6 return, 90 minutes each way
- Option B: Drive - $2 in gas and $10 in parking. 60 minutes each way

- Consider option A: Cost - $6, benefit – Commute time 3 hours
  - Acceptable as an option. Now my base case
- Consider option B: Cost - $12, benefit – Commute time 2 hours
  - Default is taking transit and spending $6
  - Question is now “do I spend another $6 to commute one hour less”

Incremental Analysis Continued…

- The decision is then based on the MARR:
  - If ΔIRR ≥ MARR choose the higher initial cost alternative.
    - This indicates that the additional cost is justified; accept the investment
  - If ΔIRR < MARR choose the lower initial cost alternative.
    - This indicates that the additional cost is NOT justified; do not accept the investment
- The opposite is true if the viewpoint is from the borrowing perspective instead of the investment perspective.
- Example 7-10 demonstrates a good example (Pg. 241)

Mining Example

- A coal mine is considering what size of shovels to purchase.
  - Option A: 3 x 45 yard shovels at $80 million each
  - Option B: 3 x 60 yard shovels at $97 million each
  - Option C: 4 x 30 yard shovels at $58 million each
- With the 45 yard shovels, mine revenue is estimated to be $122 million per year
- With the 60 yard shovels, mine revenue is estimated to be $147 million per year
- With the 30 yard shovels, mine revenue is expected to be $106 million per year

- The MARR for the mine is 40% and will operate for 20 years

Mining Example

- Option C is the cheapest at $232 million
  - Use a spreadsheet to calculate IRR: 46%
- Option A is the next cheapest
  - Incremental cost to C: $8 million
  - Incremental benefits: $16 million per year
  - IRR of $16 million for 20 years on an $8M investment: 200%
  - Worth taking Option A over C
- Option B is the most expensive
  - Incremental cost to A: $51 million
  - Incremental benefits: $25 million per year
  - Delta IRR: 49%
  - Worth taking over A

	Cashflows (in $M)		
Year	**30 Yard**	**45 Yard**	**60 yard**
0	-$ 232	-$ 240	-$ 291
1	$ 106	$ 122	$ 147
2	$ 106	$ 122	$ 147
3	$ 106	$ 122	$ 147
4	$ 106	$ 122	$ 147
5	$ 106	$ 122	$ 147
6	$ 106	$ 122	$ 147
7	$ 106	$ 122	$ 147
8	$ 106	$ 122	$ 147
9	$ 106	$ 122	$ 147
10	$ 106	$ 122	$ 147
11	$ 106	$ 122	$ 147
12	$ 106	$ 122	$ 147
13	$ 106	$ 122	$ 147
14	$ 106	$ 122	$ 147
15	$ 106	$ 122	$ 147
16	$ 106	$ 122	$ 147
17	$ 106	$ 122	$ 147
18	$ 106	$ 122	$ 147
19	$ 106	$ 122	$ 147
20	$ 106	$ 122	$ 147
IRR	46%	51%	51%