



Lecture 26. Review for Final Exam

FOR 2022. Financial Analysis for
Natural Resources.



School of Forest Resources



Material for quiz three...

- Lectures 18-25:
 - Marginal analysis
 - Inflation, real and nominal dollars
 - Using price indices
 - Sensitivity analysis
 - Risk and expected net present value
 - Sunk and opportunity costs
 - Capital theory

Example question 1

- Examine the two cash flows below. What is the marginal rate of return for the fertilization that occurs in year 26?

Year(s)	Activity	W/O Fert. Cash Flow	W/Fert Cash Flow
0	Establishment	(250.00)	(250.00)
1-35	Annual costs	(5.00)	(5.00)
1	Competition control	(100.00)	(100.00)
17	Pulpwood thinning	400.00	400.00
25	CNS/Pulpwood thinning	1,500.00	1,500.00
26	Fertilization	-	(100.00)
35	Regeneration felling	3,500.00	4,250.00

$$MROR = \left[\sqrt[9]{\frac{750}{100}} - 1 \right] 100 = 25.1\%$$

Example question 2

- The annual average CPI in 1963 was 30.6. In 2003, the annual average CPI was 183.3. What was the average annual rate of inflation from 1963 to 2003?

$$f = \left[\sqrt[40]{\frac{183.3}{30.6}} - 1 \right] 100 = 4.58\%$$



Example question 3

- For the following pine plantation, how much could establishment costs increase before the internal rate of return would be less than 10%?

Year(s)	Activity	Cash Flow	10%
0	Establishment	(175.00)	(175.00)
1-35	Annual costs	(6.25)	(60.28)
1	Competition control	(85.00)	(77.27)
17	Pulpwood thinning	625.00	123.65
25	CNS/Pulpwood thinning	1,600.00	147.67
26	Fertilization	(140.00)	(11.75)
35	Regeneration felling	5,000.00	177.92
		NPV =	124.95

Answer: \$124.95



Example question 4

- You invest \$10,000 in a project that has a 40% chance of returning \$60,000 in 30 years, a 30% chance of returning \$90,000 in 30 years, a 20% chance of returning 120,000 in 30 years, and a 10% chance of returning \$150,000 in 30 years.
- If your cost of capital is 10%, what is the expected NPV of this investment?

$$\begin{aligned}\text{Expected returns in year 30} &= \$60,000(0.4) + \$90,000(0.3) + \$120,000(0.2) + \$150,000(0.1) \\ &= \$90,000\end{aligned}$$

$$NPV = (\$10,000) + \$90,000(1.1)^{-30} = (\$4,842)$$



Example question 5

- Three years ago, you purchased the rights to a stand of trees for \$15,000. Based on current volumes and stumpage prices, the stand is currently worth \$13,500. If you let the stand grow another 10 years, based on current stumpage prices and expected growth, the stand will be worth \$32,000.
 - What is the NPV of waiting to harvest the stand in 10 years with a cost of capital of 9%?

ANSWER:

The \$15,000 purchase price is a sunk cost. It is irrelevant.

The \$13,500 value today is an opportunity cost. You must forego this to obtain the \$32,000 ten years from now.

$$NPV = (\$13,500) + \$32,000(1.09)^{-10} = \$17$$

Essentially, the IRR is 9% on this investment.



Example question 6

- A forest products company wants to raise \$100 million dollars in new capital to purchase timberlands. The company wants to raise 60% of this through loans and 40% through sale of common stock. The company is currently in a 45% income tax bracket. If the pre-tax cost of debt is 9% and the pre-tax cost of investment capital is 14%, what is the overall after-tax cost of capital this company should charge against land purchases made from this endeavor?

Capital Source	Proportion of total capital (W_i)	Before tax cost of capital	After-tax cost of capital	Weighted average cost
Debt	0.60	9%	4.95%	2.97%
Common stock	0.40	14%	7.7%	3.08%
				6.05%

About the final exam

- Comprehensive
 - All lecture and reading material are fair game
 - Learning objectives 6-10 greater emphasis
 - Questions available on all learning objectives
- Format:
 - Each student can prepare their own “note sheets”
 - 2 sheets of 8 ½ by 11” paper
 - Can use both sides
 - Can use any sized font or printing
 - No restrictions on what you put on your note sheets
 - Each person must use their own – no sharing!

Next...

Quiz Number Three
and
Final Exam

