LECTURE TEN - PART FIVE

Let's Do Some Real World Examples!

- Let me show you how you can use these same formulas to solve several of the real world puzzles I posed to you in our very first lecture.

The Refrigerator Choice

- You have a choice between a new, energy-efficient refrigerator which costs $750 or the cheaper model at $500.

- If you buy the energy-efficient refrigerator, your electricity bill will be $120 a year cheaper over the 5-year life of the refrigerator.

Question
Assuming an interest rate of 8 percent, which refrigerator should you buy?

Pause the presentation now if you want to try your hand at the math!

The NPV Math

- Subtract the purchase price of the cheaper refrigerator from the purchase price of the more expensive refrigerator to get the net additional investment required to buy the more expensive model.

- This is $250, which we put a minus sign in front of because it is an investment outlay.

A Non-Intuitive Outcome

$$NPV = -\$250 + \frac{120}{1.05} + \frac{120}{1.05^2} + \frac{120}{1.05^3} + \frac{120}{1.05^4} + \frac{120}{1.05^5}$$

Investment
Outlay

$479

= $229

To MBA or Not to MBA

- Now how about an investment in a different kind of capital, your own human capital.

- To illustrate this, let's recall the dilemma of Priscilla and Phil from our first lecture.

An Important Decision

- As a family, they are trying to decide whether Phil should quit his job in order to enter a two-year program for his MBA.

- Phil is 45 years old, and he is making good money at his job as a salesman at a medical equipment company -- $50,000 a year.

Fortunately

- Priscilla brings home a decent salary -- one big enough to support Phil and their two children over the next two years.

- So the only question they have is whether it makes financial sense for Phil to take this major step.

- So what should Priscilla and Phil do, assuming an interest rate of 6%?

Pause the presentation now if you want to try this exercise.

Here's The Numbers

- Did you remember to count Phil's foregone salary as an opportunity cost of entering the program?

- That's $50,000 per year for two years.

- And that plus the $40,000 tuition for two years gives an <u>annual</u> cost of Phil's investment in human capital of $90,000.

$$NPV = \frac{90{,}000}{1.06} + \frac{90{,}000}{1.06^2} = \$165{,}903$$

The Other Side Of The Coin

- Phil's incremental income from getting his MBA will be $35,000 per year, the difference between his current and future salary.
  - However, his new salary won't start until year three.
- Properly discounting this income flow through year ten when Phil reaches retirement yields $193,434.
- So what's the NPV of Phil and Priscilla's investment?

Pause the presentation now to finish the math!

He Should Get His MBA

- That's right, it's a positive $27,531, which is simply the difference between the NPV of the investment outlay and the NPV of the income stream.

- So Phil should go get his MBA!

- But would that still be the case if interest rates were 12 percent?

Pause the presentation now if you want to work this one out on your own.