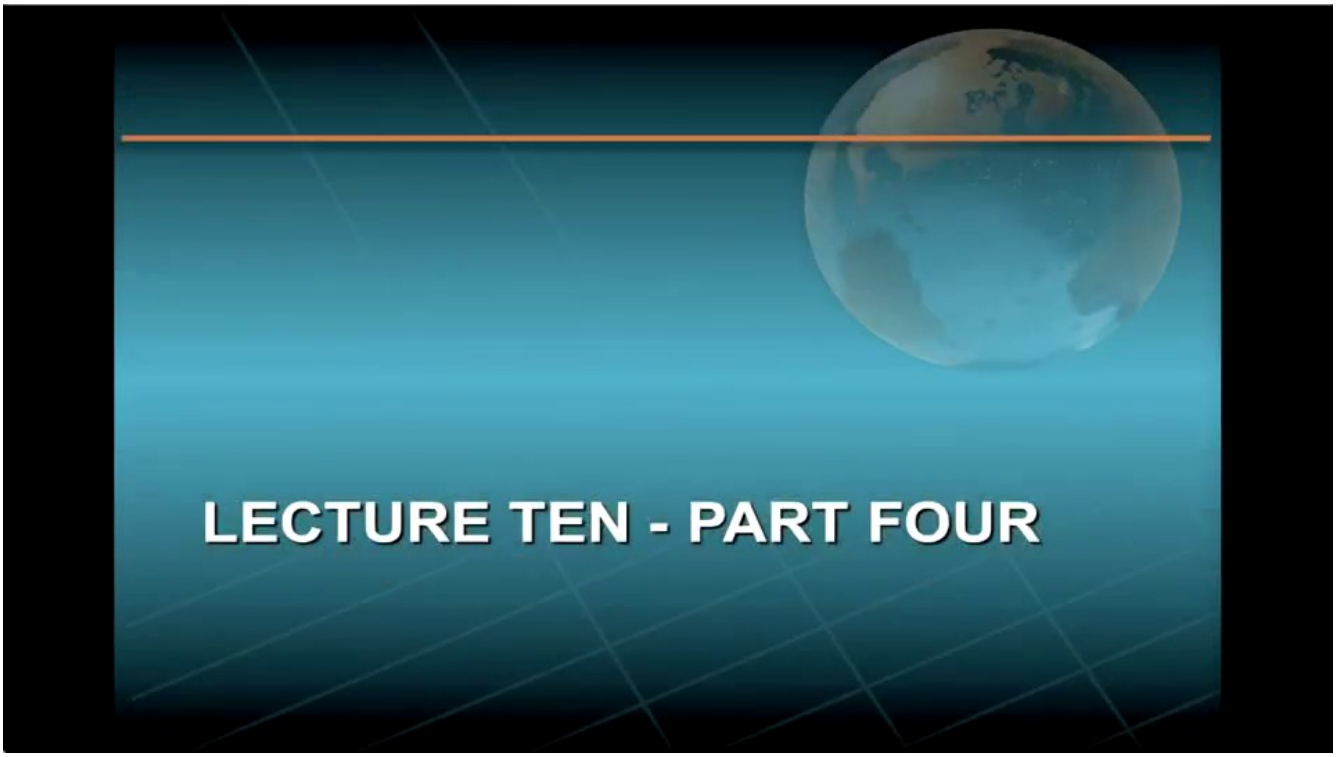
LECTURE TEN - PART FOUR

NPV In the Real World

- Suppose that instead of an asset generating the same amount of income each year, the asset generates a different amount of income each year.
- Instead of generating a stream of income from now to eternity, the asset generates a stream of income over a fixed period of time – maybe 5 years, maybe 10 years, maybe 50 years.

You Are a Textile Industry CEO

- Your company is considering replacing your old mechanical looms with a set of highly computerized looms.
- But these new machines won't come cheap.

The Price Tag: A Cool $2 Million

- Note, however, that your chief economist forecasts that these new machines will increase revenues by $500,000 for each of the five years of the service life of the looms.
- Also, at the end of five years, the machines will have a salvage value of another $500,000.

From This Data

- It may seem pretty obvious that the company should make the investment.
- After all, while the machines will cost $2 million, they will generate an even cooler $3 million in revenues and salvage value over the five-year period.

An Important Equation

- Let's not forget about the time value of money.
- And here's the formula you would use to calculate the net present value of this investment.

$$NPV = -(I_0) + \frac{N_1}{1+i} + \frac{N_2}{(1+i)^2} + \ldots\ldots + \frac{N_t}{(1+i)^t} + \ldots\ldots$$

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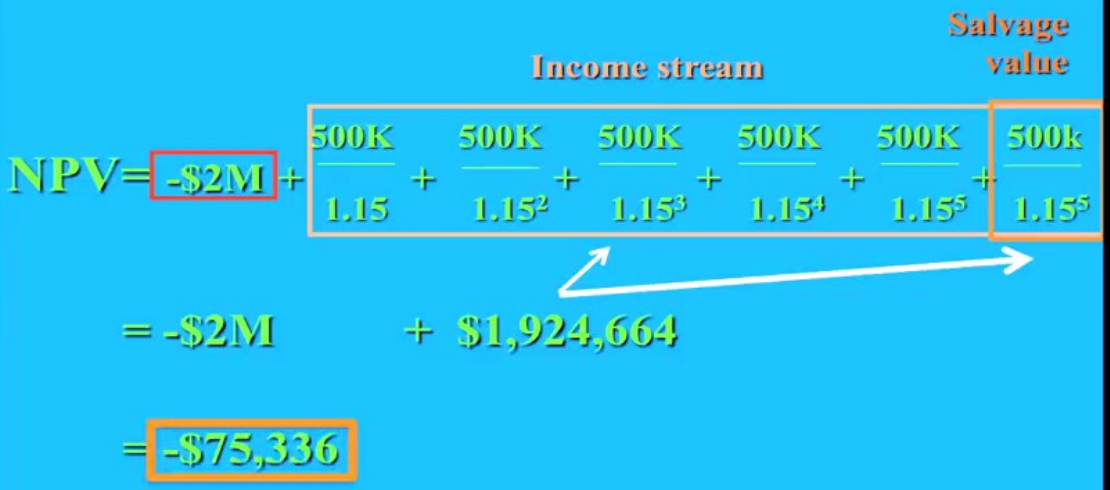
- I_o: Initial investment at time period zero.
- i: One-period market interest rate (assume at 15%).
- N_1: Net receipts from investment in first period.
- N_2: Net receipts in the second period, and so on.
- The sum of the initial investment and the stream of payments – N_1, N_2, and so on – will have the present value NPV given by the formula.

Here's The Math



When The NPV Is Negative

- Your company should not make the investment.
- This is despite the fact that over the life of the investment, the investment will generate an undiscounted sum a full half million dollars greater than the initial investment!!!!

Investment Is Interest-rate Sensitive!

Question
What if the interest rate were 5%. Would your company now make the investment?

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

Yes, You Would Make The Investment!

$$NPV = -\$2M + \frac{500K}{1.05} + \frac{500K}{1.05^2} + \frac{500K}{1.05^3} + \frac{500K}{1.05^4} + \frac{500K}{1.05^5} + \frac{500k}{1.05^5}$$

$$= \$556{,}501$$

From An Intuitive Perspective

- The higher the interest rate, the more one has to discount the revenue stream.
- This, in turn, reduces the present value of the revenue stream and vice versa.