Test 3, Lecture 4 Review

Optimal Cycle Length

* How long should we run a project before terminating it?
	+ The goal is to end a project when it maximizes value
* For a one-time project, continue the project until the year in which revenue is maximized
	+ Value of quitting after year N > Value of continuing another year
		- $TCF\_{N}$ > $\frac{FCF+TCF}{(1+r)}$
* For a repeatable project, find the Effective Annual Annuity (EAA)
	+ Convert the NPV of 1 cycle to an EAA
		- EAA = PMT or yearly value
	+ Repeatable Cycle Steps:
1. Find the NPV of each years cycle
2. Convert each NPV to a yearly payment

$$NPV=\frac{EAA}{r}\*\left[1-\left(\frac{1}{1+r}\right)^{N}\right]$$

Solve for PMT (EAA) using CF on calculator

1. Whichever year has the highest PMT (EAA) is the year in which you want to terminate the project

Project Risk

* So far, we’ve assumed that the CFs for projects are known with certainty
	+ This is seldom the case in practice, so we need to account for uncertainty in projects
* The 3 Ways to Measure Uncertainty in Projects:
1. Sensitivity Analysis: pick one variable and adjust its value to see its impact on NPV
	1. What is the flexibility or robustness of the project?
2. Scenario Analysis: look at three possible outcomes for NPV (good, bad, average), assign probabilities to each outcome, and find the expected NPV

$$NPV=\frac{FCF}{r-g}+FCF\_{0}$$

$$E\left(NPV\right)=\left(prob\_{good}\*NPV\_{good}\right)+(prob\_{bad}\*NPV\_{bad})$$

Break-Even Probability:

$$E\left(NPV\right)=0$$

$$prob\_{good}+prob\_{bad}=100\%=1$$

$$y=prob\_{good}$$

$$0=y\*NPV\_{good}+\left(1-y\right)\*NPV\_{bad}$$

y = what the firm needs to break-even in profitability expectations

1. Monte Carlo Analysis: simulation in which we assign a range of outcomes for every variable and randomly pull a value for each variable to calculate the NPV for that trial
	1. Conduct 500-1000 trials
	2. Gives us an expected NPV and a probability that NPV $\geq $ 0