1 Perfect Competition

Market Structure	# Sellers	Commodity	Barriers to Entry	Price Control
Perfect Comp.	A lot	Homogenous	None	None
Monop. Comp.	Many	Differentiated	Few	Some
Oligopoly	Very Few	Homo. and Diff.	Many	More
Monopoly	1	Unique	Near Impossible	Complete

2 EUAW

$$NPV = EUAW \times \left[\frac{(1+i)^n - 1}{i(1+i)^n}\right]$$

$$EUAW = EUAB - EUAC$$

3 Time-Value

$$(F/A, i, n) \coloneqq FV = A\frac{(1+i)^n - 1}{i}$$

$$(P/A, i, n) \coloneqq PV = A\frac{(1+i)^n - 1}{i(1+i)^n}$$

$$Perpetuity \coloneqq PV = \frac{A}{i}$$

$$Loan\_Payment = \frac{i \times (PV)}{1 - (1+i)^{-n}}$$

$$(F/P, i, n) \coloneqq F = PV(1+i)^n$$

$$(P/F, i, n) \coloneqq P = \frac{FV}{(1+i)^n}$$

4 Incremental IRR

For **lending**: Accept $Option_1$ if $IRR_{1-2} > MARR$.
Opposite for **borrowing**.
If either individual IRR < MARR, then don't accept that one.

$$\Delta IRR = init_{high} - init_{low}$$

If ΔIRR found $\geq$ MARR, then $init_{high}$, else $init_{low}$.

5 Ranges and Risk

$$mean = \frac{optimistic + 4 \times most\_likely + pessimistic}{6}$$

$$\sigma = \sqrt{\sum_j x_j^2 \times P(x_j) - [E(X)]^2} = \sqrt{E(X^2) - E(X)^2}$$

$$\sigma = \sqrt{E(X - mean)^2}$$