Criteria: Managers should manage their firm's resources with the ultimate objective of raising the firm's market value.

1 Investment Decisions

Time Value of Money - Time and Uncertainty (risk). Dollar today does not equal dollar tomorrow.

"Always Draw A Timeline To Visualize The Timing of Cashflows"

1. Identify timing and amount of the cash flows. Visualize them in a timeline
2. Compute relevant discount factors for different points in time: $(1+r)^{-t}$
3. Discount the single cash flows to time 0 using the corresponding discount factors
4. Aggregate the cash flows at time 0

$$c0----c1----c2----c3$$
$$|------|------|------|$$

To move money forward:

$$FV_t(c) = C \cdot (1+r)^t$$

To move money backward:

$$PV_t(C) = \frac{C}{(1+r)^t}$$

Compounding:

$$FV = \sum_t C_t \cdot (1+r)^{T-t}$$

Risky cash flows:
$ExpectedValue(CF) = p_1(C_1) + p_2(C_2)$
If you are risk averse, discount even higher rate:

Terminal value: steady state performance - FCF grow at constant rate
$NPV = PV(benefits - costs)$

$$NPV = \sum_{t=0}^{T} E(FCF_t)/(1+k)^t$$

Discounting:

$$PV = \sum_t \frac{C_t}{(1+r)^{T-t}}$$

Perpetuity:

$$PV_{perpetuity} = \frac{C}{r}$$

Important: The first cash flow arrives one period from today Non-zero-start perpetuities:

$$V_0 = \frac{(\frac{C}{r})}{(1+r)^t_{future}}$$

or $V_0 = C_{immediate} + \frac{C}{r}$
Annuity - a finite stream of cash flows of identical magnitude and equal spacing in time:

$$PV_{annuity} = C \cdot \frac{1-(1+r)^{-T}}{r}$$

Growing perpetuity - when r ¿ g:

$$PV_{gp} = \frac{C}{r-g}$$

Growing annuity:

$$PV_{ga} = \frac{C}{r-g} \cdot (1 - (\frac{1+r}{1+g})^{-T})$$

$\frac{C}{(1+r)+RP}$ where RP is risk premium
In other words, risk needs compensation:
$PV = \sum_t \frac{E(C_t)}{(1+r+RP)^t}$

$$IRR = \sum_{t=0}^{T} E(FCF_t)/(1+IRR)^t == 0$$

2 Financing Decisions

Bonds (debt financing) and Stocks (equity financing)

The discount rate that equates the present value of a zero-coupon bond with maturity T to its current market price P is called the spot rate.

$$sr_T = (\frac{F}{P_t})^{-1/T} - 1$$

For coupon-bearing bond with varying annual rates:

$$P_T = \frac{CP}{1+y} + \frac{CP_2}{(1+y)^2} + ... + \frac{CP+F}{(1+y)^T}$$

where y is Yield-to-Market - the unique rate that makes PV of all future payments equal to price

Invested capital: $IC = PPE + WC$ and $ROIC = \frac{NOPLAT}{IC}$ and
EBIT is $EBIT = OPREV - OPEXP - DEPR$ and
NOPLAT is $NOPLAT = EBIT \cdot (1-\tau)$ and
Net WC is $NWC = OperatingCash + Inventory + Receivables + PrepaidExpences - Payables - DeferredRevenue - AccruedExpenses$

$$FCF = NOPLAT + DEPR - CAPEX - \Delta NWC$$

Credit risk is

$$c_{debt} = risk_{free-rate} + creditspread$$

Stocks Returns: $R = \frac{divididend + P_{t+1} - P_t}{P_t}$
Covariance: $Cov[R_A, R_B] = \sigma_{AB} == \rho_{AB}\sigma_A\sigma_B$
Correlation: $\rho_{AB} = \frac{\sigma_{AB}}{\sigma_A\sigma_B}$

The portfolio of two stocks, A and B:

$$\mathbf{E}(R_p) = w_a E[R_a] + w_b E[R_b]$$

$$\mathbf{V}(R_p) = w_a^2\sigma_a^2 + w_b^2\sigma_b^2 + 2w_a w_b \sigma_{ab}$$

Risk plane: $\{x = VOL, y = RATE\}$

CAPM Two-Fund Separation Theorem: the optimal portfolio needs only two funds: the risk-free asset and the Tangent Portfolio

3 Valuations

TODO

TODO