Agenda

1. **Introduction**
2. **Cost of Equity (CAPM)**
3. **Cost of Debt**
4. **Cost of Preferred Stock**
5. **Weighted Average Cost of Capital (WACC)**
6. **Wrap-Up & Q&A**

Cost of Capital - Why Does it Matter?

- Two main types of capital: debt and equity

  - Debt: Money borrowed from a lender that must be repaid

  - Equity: Money received by selling ownership stakes in the company.

- New projects should generate a return higher than the cost of capital.

- Highly risky projects almost always constitute a higher cost of capital than just upgrading a project.

Cost of Equity (Capital Asset Pricing Model)

$$R_e = R_f + \beta(R_m - R_f)$$

R_f = Risk-Free Rate (US Treasury Bonds are standard)

R_m - R_f = Equity Market Risk Premium (Estimate for R_m - S&P 500 typical returns are standard)

R_e = Cost of Equity

β = Sensitivity of stock's returns to the market

- If an investment has a higher beta, investors will demand higher returns → higher cost of equity.

- Assumptions:
  - No idiosyncratic risk
  - Linear Relationship between Beta and Expected Return
  - Efficient Markets

Limitations of CAPM and Real-World Examples

- Various Assumptions are made about markets that aren't necessarily true

- Beta is backward-looking so it may not capture future risk

- Ignores other risk factors

- Market Risk Premium can vary

- Doesn't explain why some high-beta stocks underperform

Real World Examples

- Tech startups have a high cost of equity due to uncertainty and limited assets → harder to debt finance

- Manufacturing, on the other hand, typically have assets, so collateral is available for debt financing

- Stable cash flow = easier to fund because of a low risk premium

Cost of Debt

$$Cost\ of\ Debt = \frac{Interest\ Expense}{Total\ Debt} \times (1 - T)$$

- If an investment has a higher beta, investors will demand higher returns → higher cost of equity.
- Adjust for tax because interest is tax-deductible.
- Assumptions:
  - No idiosyncratic risk
  - Linear Relationship between Beta and Expected Return
  - Efficient Markets

Cost of Preferred Stock

$$R_{ps} = \frac{D_{ps}}{P_{ps}}$$

R_{ps} = cost of preferred stock

D_{ps} = Annual dividend on preferred stock

P_{ps} = Current market price of the preferred stock

- Preferred stock is a hybrid between debt and equity
- They provide dividends like interest on debt, but not legally required to.
- Preferred stockholders get paid dividends before common stock and in case of liquidation, get assets before common stockholders.

Weighted Average Cost of Capital

$$WACC = Cost\ of\ Debt * W_D + Cost\ of\ Equity * W_e$$

W_D = Weightage of Debt

W_e = Weightage of Equity

- The firm's average cost of raising capital (equity, debt, preferred)
- Used as the discount rate in DCF and hurdle rate for projects.
- Lowering WACC (via cheaper debt or optimized capital structure) increases firm value.

What does WACC say in plain English?

Ex. WACC = 8%

- For every $100 the firm raises (from equity, debt, preferred), investors expect on average $8 per year in return.

Quick Case Comparison: Ford v Apple

Ford (Auto, Capital-Intensive)

- WACC: ~9–11% (historically higher than Apple's)
- Why higher?
  - Heavy debt load to fund factories, equipment, supply chain.
  - Highly cyclical industry → exposed to recessions, commodity prices, interest rates.
  - Higher equity beta and higher borrowing costs push up WACC.

Apple (Asset-Light, Tech)

- WACC: ~7–8% (varies with market conditions)
- Why so low?
  - Tons of cash on the balance sheet (almost risk-free buffer).
  - Steady global demand, sticky ecosystem, high margins.
  - Investors see it as relatively safe, so they don't demand crazy high returns.

Applications of WACC

- **Discount Rate in Valuations**

  - Used as the discount rate in **DCF models** to calculate enterprise value.

  - If your WACC is off, your valuation is worthless.

- **Project Evaluation / Capital Budgeting**

  - Firms use WACC as the **hurdle rate** for new investments.

  - If expected return > WACC → accept. If < WACC → reject.

- **Performance Benchmark**

  - Compare **ROIC (Return on Invested Capital)** to WACC.

  - ROIC > WACC → value creation. ROIC < WACC → value destruction.

- **Capital Structure Decisions**

  - Managers weigh debt vs. equity financing to minimize WACC.

  - Example: adding some debt lowers WACC because of the tax shield, but too much increases default risk.

- **M&A and Strategic Decisions**

  - Acquirers use WACC to value target companies and test if a deal is accretive or dilutive.

- **Industry Comparisons**

  - WACC shows how risky different industries are. Utilities → low WACC. Airlines → high WACC.

Example: Estimating WACC for Company X

1. Cost of Equity (CAPM)

    A.   Risk-free rate = 4% (10Y Treasury)

    B.   Market Risk Premium = 5%

$$R_e = R_f + \beta(R_m - R_f) = 4\% + 1.2(5\%) = 10\%$$

2. Cost of Debt

    A.   Interest Expense = $600

    B.   Total Debt = $10,000

$$R_d = \frac{600}{10000}(1 - 0.25) = 6\%(0.75) = 4.5\%$$

3. Cost of Preferred Stock

    A.   Dividend = $5 per share

    B.   Market Price = $100

$$R_{ps} = \frac{5}{100} = 5\%$$

4. Capital Structure

    A.   Equity = $200m (50%)

    B.   Debt = $150m (37.5%)

    C.   Preferred = $50m (12.5%)

    D.   Total Capital (V) = $400m

5. Weighted Average Cost of Capital

$$WACC = (0.50)(10\%) + (0.375)(4.5\%) + (0.125)(5\%) = 7.1\%$$

Wrap-Up and Q&A

- CAPM → Cost of Equity

- Add Debt & Preferred

- Multiply each by the weight of influence it has on capital

- Calculates WACC

- WACC = hurdle rate / discount rate