Weighted Average Cost of Capital

How Do Firms Estimate the Cost of Raising Money?

- Weighted Average Cost of Capital (WACC)
  - Aggregate, current cost of raising new money
  - Based on estimate of returns expected by investors

- A common starting point, but limits to use as discount rate
  - May represent a minimum threshold
  - Does not reflect opportunity cost
  - Does not say anything about individual project risk
How Do Firms Estimate the Cost of Raising Money? (2)

- Issues to address
  - How do firms raise money?
  - What do investors expect?
  - Mechanics of WACC estimation
  - Conditions and pitfalls of applying WACC as discount rate

- Treatment of risk comes later

How Do Companies Raise Money?

- **Debt -- Borrow money**
  - Bank loans and bond issues most typical
  - Company uses immediate proceeds
  - Lenders are repaid over time with interest

- **Equity -- Sell shares of stock**
  - Company uses proceeds
  - Shareholders gain ownership in the company
  - Shareholders expect future earnings and growth
  - (Most trades occur in secondary market, company only gets money once)

- Formally, debt and equity called securities
What Do Investors Expect?

• Holders of debt and equity expect positive returns
  – Explicit for debt: interest rate
  – Implicit for equity: combination of growth and earnings (dividends or retained)

• To company, expected returns are the cost of raising money
  – Pay back loan with interest
  – Sell company today that is expected to return more tomorrow

What Do Investors Expect? (2)

• Confidence in company affects
  – Interest rate company pays to borrow
  – Price investors pay for stock

• General factors that affect cost of raising money
  – Start-up company versus large corporation
  – Financially or strategically weak company versus strong and healthy
  – Risky versus safer industries
Calculating Weighted Average Cost of Capital (I)

- The basic idea: proportional average of expected returns
- Calculation, ignoring tax implications

\[ WACC = r_{equity} \times (\% \text{ equity}) + r_{debt} \times (\% \text{ debt}) \]

- \( r_{equity} = \text{current expected rate of return on stock} \)
- \( r_{debt} = \text{current rate of borrowing} \)

- return on equity difficult to estimate
  - Estimate future growth and earnings
  - Examine historical returns for similar companies

A Simple Example: Electron-X Corporation

- Electron-X is a start-up company
  - First money raising effort
  - No outstanding debts or other securities

- Equity
  - Will sell $10 million of common stock
  - Estimate of expected returns is 15%

- Debt
  - Will issue $5 million of debt
  - Bonds to sell for $1000 and pay $100 (10%)

- \[ WACC = 15\% \times (10/(10+5)) + 10\% \times (5/(10+5)) \]
  - = 13.33%
Calculating
Weighted Average Cost of Capital (2)

- Process of raising capital not limited to start-up firms
  - Most companies have previously released securities outstanding
  - WACC estimation more complicated for these cases
  - Expected debt and equity returns estimated from market prices of securities

- Calculation, again ignoring tax implications

Calculating
Weighted Average Cost of Capital (3)

\[ \text{WACC} = r_{\text{equity}} \left( \frac{E}{V} \right) + r_{\text{debt}} \left( \frac{D}{V} \right) \]

- \( D, E \) = current market value of debt and equity
- \( V = D + E \) = sum of debt and equity value
- \( r_{\text{debt}} \) = current rate of borrowing
- \( r_{\text{equity}} \) = current expected rate of return on stock

- Again, return on equity includes earnings and growth
A Continued Example for Electron-X Corporation (1)

- Electron-X, now 10 years old, has issued securities often

- Current market value of its securities
  - Debt: $50 million, average annual coupon payments of $4 million
  - Equity: $100 million, imputed average expected return of 20 percent

\[ \text{WACC} = r_{\text{equity}} \frac{E}{V} = r_{\text{debt}} \frac{D}{V} \]

A Continued Example for Electron-X Corporation (2)

- WACC = 20\% \times \left(\frac{100}{150}\right) + 8\% \times \left(\frac{50}{150}\right) = 16\%

- Represents current average expectations of investors

- Represents average cost Electron-X would face
Potential Use and Mis-use of WACC as Discount Rate (1)

- **Uses of WACC**
  - Performance metric: cost of money over time
  - Comparison metric: intra and inter-industry
  - Discount rate?

- **Sometimes WACC is a reasonable discount rate**
  - If project represents an average investment for the firm
  - McDonald's #10,001 pretty much the same as predecessors

Potential Use and Mis-use of WACC as Discount Rate (2)

- **More often WACC is an inappropriate discount rate**
  - Many projects not average (some more risky than others)
  - WACC is cost of money, not necessarily opportunity cost

- **Will explore the risk issue in more detail later in course**
WACC Summary

- WACC is an average cost of raising money; proportional average of investor expectations

- Useful metric for some activities
  - Tracking performance over time
  - Comparisons of companies and industries
  - A starting point for project analysis

- Use of WACC as discount rate with caution
  - Is the investment a "carbon-copy" of the existing firm?
  - If not, WACC is probably not applicable