
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
$$\text{WACC} = r_{\text{equity}} * (\% \text{ equity}) + r_{\text{debt}} * (\% \text{ debt})$$
$$r_{\text{equity}} = \text{current expected rate of return on stock}$$
$$r_{\text{debt}} = \text{current rate of borrowing}$$
- 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%)
- $\text{WACC} = 15\% * (10 / (10 + 5)) + 10\% * (5 / (10 + 5))$
 $= 13.33\%$

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)

$$\text{WACC} = r_{\text{equity}} (E/V) + r_{\text{debt}} (D/V)$$

D, E = current market value of debt and equity

V = D + E = sum of debt and equity value

r_{debt} = current rate of borrowing

r_{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

$$\text{WACC} = r_{\text{equity}} (E/V) + r_{\text{debt}} (D/V)$$

A Continued Example for Electron-X Corporation (2)

- $\text{WACC} = 20\% \cdot (100/150) + 8\% \cdot (50/150) = 16\%$
- 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