

Cost of Capital

Overview, Insights, and Applications

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Cost of Capital

I. Introduction

A Hot Topic

From a noted portfolio manager...

He is interested in companies with a sustainable competitive advantage and the ability to earn above their cost of capital.

From Arthur Levitt, former chairman of the SEC...

I think that in a globalized economy we can no longer take our capital markets for granted. I think serious damage has been done. I think the cost of capital has risen. A loss of confidence is very serious for markets, which depend for their viability on their transparency.

Fed Ex, as an example, provides an interesting snapshot of corporate America. It met its fiscal fourth quarter numbers courtesy of aggressive cost cutting. It is reducing capital intensity – lower capital spending means it is now cashflow positive.



Cost of Capital

Definition and Overview

Cost of capital is the expected rate of return that the market requires in order to attract funds to a particular investment.

In economic terms, the cost of capital for a particular investment is an opportunity cost—that is, the cost of foregoing the next best alternative investment.

There are different costs associated with different financing options such as revolving lines of credit, senior subordinated debt and equity.

Common capital components include:

- Bonds and notes
- Common stock
- Preferred stock
- Retained earnings



Cost of Capital

Why Is It Important?

The cost of capital estimate is the essential link that enables us to convert a stream of expected income into an estimate of present value. This allows us to make informed pricing decisions for purchases and sales and a comparison of one investment opportunity against another.

In valuation and financial decision making, the cost of capital estimate is just as important as the estimate of the expected amounts of income that will be discounted or capitalized.



Cost of Capital

Function of the Investment

The cost of capital is a function of the investment, not the investor. The cost of capital comes from the marketplace. The marketplace is the universe of investors for a particular asset.



Cost of Capital

Forward Looking

1. The “real” rate of return they expect to obtain in exchange for letting someone else use their money on a riskless basis.
2. Expected inflation—the expected depreciation in purchasing power while the money is tied up.
3. Risk—the uncertainty as to when and how much cash flow or other economic income will be received.



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Data Availability

You can see transaction data by:

- Interest rate
- Fee
- Target internal rate of return
- Years to maturity
- Investment multiple
- Type of transaction
- Size of transaction
- Company sales
- Industry sector



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Misunderstood Animal

- Critical in both valuation and corporate decision-making
- But theory less understood than theory of forecasting expected cash flows
- Mistakes are largely logic errors, not judgment errors
- Usually must be estimated



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II. Risk and Cost of Capital: How Are They Related?

Definition of Risk

The degree of certainty or uncertainty as to the realization of expected returns. This means uncertainty as to both the amount and the timing of expected returns.



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Types of Risk

1. Maturity risk (also called horizon risk or interest rate risk)
2. Systematic risk (also called market risk)
3. Unsystematic risk (also called company risk, investment-specific risk, or residual risk)



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Risk Impact

1. Risk-free rate—a rate of return that is available in the market on an investment that is free of default risk, usually the yield to maturity on a U.S. government security.
2. A risk premium—An expected amount of return over and above the risk-free rate to compensate the investor for accepting risk.



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Impact of Risk on Value

- For a given level of expected future economic income (e.g., cash flow, dividends), the lower the risk, the higher the present value or, conversely, the higher the risk, the lower the present value.
- Risk generally is reflected in the valuation through the discount or capitalization rates applied to the financial variables.
- The market determines a basic risk-free required rate of return and the amount of premium required for assuming various levels of risk.



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III. Cost of Equity Capital

Capital Asset Pricing Model

Overview

The Capital Asset Pricing Model (CAPM) is part of a larger body of economic theory known as *capital market theory*. Capital market theory also includes *security analysis* and *portfolio management theory*, a *normative theory* that describes how investors *should* behave in selecting common stocks for their portfolios, under a given set of assumptions. CAPM is a *positive* theory, meaning it describes the market relationships that *will* result *if* investors behave in the manner prescribed by portfolio theory.



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Capital Asset Pricing Model Components

$$\text{CAPM} = R_f + \beta(R_m - R_f) + \alpha$$

where:

R_f = risk-free rate

β = industry beta

$R_m - R_f$ = equity risk premium

α = unsystematic risk premium



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Capital Asset Pricing Model Components

Example:

$$\text{CAPM} = 5.62 + .75(7.40) + 5.33 = 16.50$$

where:

5.62 = risk-free rate

.75 = industry beta

7.40 = equity risk premium

5.33 = unsystematic risk premium



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Components—Risk-Free Rate

1. Rental rate: A real return for lending out the funds over the investment period, thus forgoing consumption for which the funds otherwise could be used.
2. Inflation: The expected rate of inflation over the term of the risk-free investment.
3. Maturity risk or investment rate risk: The risk that the principal's market value will rise or fall during the period to maturity as a function of changes in the general level of interest rates.



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Components—Equity Risk Premium

On an equity investment, the return on investment that the investor will (or has the opportunity to) realize usually has two components:

1. Distributions during the holding period
2. The capital gain or loss in the value of the investment

Obviously, these expected amounts of returns on equities are much less certain (or more risky) than the interest and maturity payments on U.S. Treasury obligations. To accept this greater risk, investors demand higher expected returns for investing in equities than for investing in U.S. Treasury obligations.



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Components—Industry Beta

Systematic risk is measured in the CAPM by a factor called *beta*. Beta is a function of the relationship between the return on an individual security and the return on the market as measured by a broad market index such as the Standard and Poor's 500 Stock Composite Index.

Because we cannot compute a beta directly for a privately held company, we go to reference sources to obtain betas for guideline public companies or industries so as to determine a proxy beta to use for our private company. These sources will be discussed later in our presentation.



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Components—Alpha

- Alpha captures risk that is not otherwise included in the CAPM calculation of cost of equity capital.
- Alpha is primarily used to reflect the size premium attributable to required returns on companies that are smaller than those used to estimate the other components of the CAPM.



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Build-up Model

Overview

The build-up model allows the analyst to construct, or build-up, a cost of equity capital by simply adding the various risk premiums to the risk-free rate.

This model does not include an industry beta as this risk is reflected in an unsystematic risk component.



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Build-up Model Components

$$E(R_i) = R_f + (R_m - R_f) + RP_s + RP_u$$

where:

- R_f = risk-free rate
- $R_m - R_f$ = equity risk premium
- RP_s = size risk premium
- RP_u = unsystematic risk premium



Cost of Capital

Components—Risk-Free Rate

1. Rental rate: A real return for lending out the funds over the investment period, thus forgoing consumption for which the funds otherwise could be used.
2. Inflation: The expected rate of inflation over the term of the risk-free investment.
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Cost of Capital

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III. Cost of Equity Capital

Components—Unsystematic Risk Premium

Unsystematic Risk—a function of the characteristics of the industry, the individual company, and the type of investment interest.



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IV. Weighted Average Cost of Capital (WACC)

Overview

- The WACC estimates the blended required rate of return for all investors—both equity and debt—in the subject company.
- Critical point—the relative weightings of equity and debt or other capital components are based on the market values of each component, not on the book values.



Cost of Capital

Components

$$WACC = (K_e \times W_e) + (K_d [1 - t] \times W_d)$$

where:

K_e = cost of equity capital

W_e = weight of equity capital in capital structure

K_d = pretax cost of debt capital

t = income tax rate

W_d = weight of debt capital in capital structure



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Components

Example:

$$\text{WACC} = (16.50 \times 65\%) + (7.04 [1 - 38\%] \times 35\%) = 12.3$$

where:

16.50 = cost of equity capital

65% = weight of equity capital in capital structure

7.04 = pretax cost of debt capital

38% = income tax rate

35% = weight of debt capital in capital structure



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V. Direct Capitalization Rate

Overview

- Discount rate and capitalization rate are two distinctly different concepts.
- Discount rate is a rate applied to all expected incremental returns to convert the expected return stream to a present value.
- A capitalization rate is a divisor applied to one single element of return to estimate a present value.
- Using a direct capitalization rate assumes that the cash flow for the projected period will increase at a constant annual growth rate in perpetuity.



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Components

Direct capitalization rate = $k_e - g_e$

where:

k_e = cost of equity capital

g_e = estimated long-term sustainable growth rate
of cash flows available to equity investors

or

Direct capitalization rate = $k_{WACC} - g_{TIC}$

where:

k_{WACC} = weighted average cost of capital

g_{TIC} = estimated long-term sustainable growth rate
of cash flows available to all investors



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After-Tax versus Pretax

Whether using the CAPM or the build-up model, the components of the cost of equity capital are derived from after-tax rates of return. As such, both the CAPM and the build-up model conclude after-tax costs of equity capital.



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After-Tax versus Pretax

$$k_{\text{pretax}} = [(k_{\text{after tax}} - g) / (1 - t)] + g$$

where:

k = cost of equity capital

g = estimated long-term sustainable growth rate

t = income tax rate



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After-Tax versus Pretax

$$k_{\text{pretax}} = [(20\% - 5\%) / (1 - 40\%)] + 5\% = 30\%$$

where:

20% = after-tax cost of capital

5% = estimated long-term sustainable
growth rate

40% = income tax rate



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After-Tax versus Pretax

Example:

Pretax income = \$100

After-tax income = \$60

Pretax Direct Capitalization:

$$\$100 / (30\% - 5\%) = \$400$$

After-Tax Direct Capitalization:

$$\$60 / (20\% - 5\%) = \$400$$



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VI. Cost of Capital and Intangible Assets

Income Capitalization Rates

1. The appropriate income capitalization rate to use in the income approach analysis is the cost of capital appropriate for an investment in the subject intangible.
2. The cost of capital is a function of the risk of the investment in the subject intangible.
3. While these statements are conceptually correct, they represent practical problems associated with selecting the appropriate income capitalization rate:
 - a) What is the cost of capital appropriate for an investment in the subject intangible?
 - b) What is the degree of risk associated with an investment in the subject intangible?



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Income Capitalization Rates

Before applying the mechanics of income capitalization rate analysis, one should consider whether to value the intangible asset as:

1. one component of a going-concern business enterprise or
2. an individual economic entity, independent of the contributory effects of a going-concern business enterprise.



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Income Capitalization Rates

Three factors to consider in determining which capitalization rate scenario is appropriate:

1. What is the objective of the valuation/economic analysis?
2. What is the highest and best use of the intangible?
3. How is the intangible actually being used? Or, how will the intangible be used if the intended use is different from the current use?



VI. Cost of Capital and Intangible Assets

Excess Earnings Method

- The excess earnings method is a form of a capitalization method requiring separate estimation of two capitalization rates. The reason for the two rates is that the income stream being capitalized is broken down into two parts:
 1. *Income attributable to tangible assets.* Less risky, lower required rate of return.
 2. *Income attributable to intangible assets.* More risky, generally higher required rate of return.
- In this regard, the rule is simply that the weighted average of the two rates based on asset components (weighted at market values, of course) should approximately equal capitalization rates based on capital structure components estimated by methods previously discussed.



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VII. When and How to Use All of These Discount Rates

Cash Flow and Income

Net cash flow is that portion of the cash flow over which the control owner has discretion as to its disposition. It is not necessary to retain net cash flow in order to sustain the business; rather, it is available to be paid out to owners or used for any other desired purpose. This is the measure of economic income of greatest interest to most investors.



Cost of Capital

VII. When and How to Use All of These Discount Rates

After-Tax Cost of Equity Capital

Net income (after tax)

- + Noncash charges (e.g., depreciation, amortization, deferred revenue, deferred taxes)
- Capital expenditures*
- Additions to net working capital*
- + Changes in long-term debt (add cash from borrowing, subtract repayments)*
- = Net cash flow to invested equity capital

* Only amounts necessary to support projected operations



Cost of Capital

VII. When and How to Use All of These Discount Rates

Pretax Cost of Equity Capital

Pretax income

- + Noncash charges (e.g., depreciation, amortization, deferred revenue, deferred taxes)
- Capital expenditures*
- Additions to net working capital*
- + Changes in long-term debt (add cash from borrowing, subtract repayments)*
- = Net cash flow to invested equity capital

* Only amounts necessary to support projected operations



Cost of Capital

VII. When and How to Use All of These Discount Rates

After-Tax WACC

Net income (after tax)

- + Interest expense, tax-affected
- + Noncash charges (e.g., depreciation, amortization, deferred revenue, deferred taxes)
- Capital expenditures*
- Additions to net working capital *
- = Net cash flow to all investors

* Only amounts necessary to support projected operations



Cost of Capital

VII. When and How to Use All of These Discount Rates

Pretax WACC

Pretax Income

- + Interest expense
- + Noncash charges (e.g., depreciation, amortization, deferred revenue, deferred taxes)
- Capital expenditures*
- Additions to net working capital *
- = Net cash flow to all investors

* Only amounts necessary to support projected operations



Cost of Capital

VII. When and How to Use All of These Discount Rates

Single-Period Capitalization of Earnings

The same rules apply for calculating the cash flows, depending on the use of a cost of equity capital or a WACC.

The next year's cash flow is projected and then divided by the direct capitalization rate.



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VIII. Resources

1. The Ibbotson Associates Studies
2. PricewaterhouseCoopers Studies
3. Arbitrage Pricing Theory Data Source



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Ibbotson Associates offers analyses on more than 300 industries, 5,000 companies, and 145 countries.

Cost of Capital —includes cost of capital data for more than 300 industries, including: industry betas, costs of equity, WACCs, and other important financial statistics. Measures of beta are presented, including levered and unlevered betas, peer group adjusted betas, betas for thinly traded securities, and the Fama-French 3-factor model. Tax rate analysis includes more than 5,000 companies and is provided by industry or on an individual company basis.



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Global Analysis—Ibbotson offers several reports for international cost of capital analysis:

1. International Cost of Capital Report—Provides cost of equity estimates for more than 145 countries from the perspective of U.S. investors.
2. International Cost of Capital Perspectives Report—Provides cost of equity estimates for more than 145 countries from the perspective of international investors.
3. International Equity Risk Premia—Equity risk premia now available for 16 countries, with data back to 1970 for most countries.
4. Canadian Risk Premia Report—Provides Canadian equity premiums over all time periods. Choose your own start and end date.
5. United Kingdom Risk Premia Report—Provides U.K. equity premiums over all time periods. Choose your own start date and end date.



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The following provide data regarding risk premia:

1. Stocks, Bonds, Bills, and Inflation: Valuation Edition Yearbook—includes information on equity and small company risk premiums.
2. International Equity Risk Premia—Equity risk premiums available for 16 countries, with data back to 1970 for most countries.
3. Risk Premia Over Time Report—Provides equity and size premiums over all time periods.
4. S&P CVC Risk Premium Report—Formerly sold as the PricewaterhouseCoopers Risk Premia Study, this updated report divides companies into 25 separate size groups for risk premium analysis.
5. Canadian Risk Premia Report—Provides Canadian equity premiums over all time periods.
6. United Kingdom Risk Premia Report—Provides U.K. equity premiums over all time periods.



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XI. Summary and Conclusion

Make sure your cost of capital and your cash flows are right for each other.

- Risk (or uncertainty) associated with projected cash flows reflected in cost of capital.
- Equity versus total invested capital
- Pretax versus after-tax
- Multi-period versus single period

