

CHAPTER I

Defining Cost of Capital

Introduction

Cost of Capital Is Multifaceted

- Cost of Capital Is Forward-Looking

- Cost of Capital Is Based on Market Value

- Cost of Capital Is Usually Stated in Nominal Terms

Cost of Capital Equals the Discount Rate

Cost of Capital Should Reflect the Risk of the Investment

- Defining Risk

- Understanding the Role of Risk

Introduction

Cost of capital is either explicitly or implicitly a factor in virtually every business transaction in the world, but this book focuses on the United States and Canada. Cost of capital is an integral part of business valuation in many contexts such as, for example,

- valuation of closely held business investments as part of a marital estate,
- mergers and acquisitions or divestitures,
- allocation of investment capital (i.e., capital budgeting),
- gift and estate tax valuations,
- dissenting stockholder suits,
- shareholder oppression disputes,
- owner disputes (e.g., buy-out disputes),
- intellectual property disputes.

The *cost of capital* is the expected rate of return that market participants require in order to attract funds to a particular investment.

In economic terms, the cost of capital for a particular investment is an opportunity cost—the cost of forgoing the next best alternative investment with comparable risk. In this sense, it relates to the principle of substitution; that is, an investor will not invest in a particular asset if there is a more attractive substitute with comparable risk.

We consider *capital* in this context as a long-term financing source, that is, equity or long-term funding investments (e.g., bonds or long-term bank financing). We consider capital in this context to be distinct from short-term sources of funds such as the accounts payable component of working capital and revolving bank loans that vary depending on the volume of inventory.

The cost of capital usually is expressed in percentage terms, that is, the annual amount of dollars that the investor requires or expects to realize, expressed as a percentage of the dollar amount invested.

Put another way:

Since the cost of anything can be defined as the price one must pay to get it, the cost of capital is the return a company must promise in order to get capital from the market, either debt or equity. A company does not set its own cost of capital; it must go into the market to discover it. Yet meeting this cost is the financial market's one basic yardstick for determining whether a company's performance is adequate.¹

As the quote suggests, most of the information for estimating the cost of capital for a business, security, or project comes from the investment market.

1. Mike Kaufman, *Profitability and the Cost of Capital*, ch. 8 in *HANDBOOK OF BUDGETING* (Robert Rachlin ed., 4th ed. 1999).

The cost of capital is always an *expected* (or forward-looking) *return*. Thus, analysts and would-be investors never actually observe the market's views as to expected returns at the time of their investment. However, we often form our views of the future by analyzing historical market data.

The term *market* refers to the universe of investors who are reasonable candidates to fund a particular investment. Capital or funds are usually provided in the form of cash, although in some instances capital may be provided in the form of other assets.

Cost of Capital Is Multifaceted

Cost of Capital Is Forward-Looking

The cost of capital represents investors' *expectations*. There are two elements to these expectations:

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. It is a "nominal" rate and embeds several expectations:
 - Rental rate. A real return for lending the funds risk-free, thus forgoing consumption for which the funds otherwise could be used.
 - Inflation. The expected rate of inflation over the term of the risk-free investment.
 - Maturity (or investment rate) risk. The risk that the investment's principal market value will rise or fall during the period to maturity as a function of changes in the general level of interest rates.
2. *Premium for risk*. An expected amount of return over and above the risk-free rate to compensate the investor for accepting risk (e.g., risk of amount and timing of net cash flows, and liquidity of the asset).

Even though these expectations, including assessment of risk, may be different for different investors, the market tends to form a consensus with respect to a particular investment or category of investments. That consensus determines the cost of capital for investments of varying levels of risk.

The cost of capital, derived from investors' expectations and the market's consensus of those expectations, is applied to expected economic income, usually measured in terms of net cash flows.

We convert the stream of expected economic benefits to its present value equivalent to compare investment alternatives of similar or differing levels of risk. *Present value*, in this context, refers to the dollar amount that a rational and well-informed investor would be willing to pay today for the stream of expected economic income. In mathematical terms, the cost of capital is the percentage rate of return that equates the stream of expected economic income with its present cash value.

Cost of Capital Is Based on Market Value

The cost of capital is the expected rate of return on some base value. That base value is measured as the market value of an asset, not its book value, par value, or carrying value. For example, the yield to maturity² shown in the bond quotations in the financial press is based on the closing market price of a bond, not on its face value. Similarly, the implied cost of equity for a company's stock is based on the market price per share at which it trades, not on the company's book value per share of stock. The cost of capital is estimated from market data.

These data refer to expected returns relative to market prices. By applying the cost of capital derived from market expectations to the expected net cash flows (or other measure of economic income) from the investment or project under consideration, the market value can be estimated.

Cost of Capital Is Usually Stated in Nominal Terms

Keep in mind that we have talked about expectations including inflation. Assuming inflationary expectations, the return an investor requires includes compensation for reduced purchasing power of the currency over the life of the investment. Therefore, when the analyst or investor applies the cost of capital to expected returns in order to estimate value, he or she must also include expected inflation in the expected economic income (i.e., the net cash flows should reflect expected inflation). Thus, both the cost of capital and the expected economic income are stated in "nominal" terms (i.e., including inflation expectations).

This matching of nominal economic income with the nominal cost of capital assumes that investors have reasonable consensus expectations regarding inflation. For example, in the United States, common practice is to measure both economic income and the cost of capital in nominal terms even if there are differences in inflation expectations among economists. For countries subject to unpredictable hyperinflation, however, it is sometimes more practical to estimate the cost of capital in real terms rather than in nominal terms and to apply it to expected net cash flows expressed in real terms, that is, not including inflation.

Cost of Capital Equals the Discount Rate

The essence of the cost of capital is that it is the percentage rate of return that equates expected economic income with present value. The expected rate of return in this context is called a *discount rate*. By "discount rate," the financial community means an *annually compounded rate* at which each increment of expected economic income is discounted back to its present value.

2. Yield to maturity is the discount rate that equates the market value with (1) the stream of interest payments expected over the remaining life of the bond and (2) the return of principal at the maturity of the bond.

A discount rate reflects both the time value of money and risk. Therefore, in its totality it represents the cost of capital. The sum of the discounted present values of each future period's net cash flow or other measure of return equals the present value of the investment, reflecting the expected amounts of return over the life of the investment. The terms "discount rate," "cost of capital," and "required rate of return" are often used interchangeably.

The economic income referenced here represents *total expected benefits*. In other words, this economic income includes increments of cash flow realized by the investor while holding the investment, as well as the proceeds to the investor upon liquidation of the investment. The rate at which these expected future total returns are reduced to present value is the discount rate, which is the cost of capital (required rate of return) for a particular investment.

Cost of Capital Should Reflect the Risk of the Investment

Estimating the cost of capital is first and foremost an exercise in pricing risk.³ As we stated above, the cost of capital for any given investment is typically quantified as a combination of two basic factors: a *risk-free rate* and a *premium for risk*.

The generalized cost of capital relationship is

Formula 1-1

$$E(R_i) = R_f + RP_i$$

where:

$E(R_i)$ = expected return of asset i

R_f = risk-free rate

RP_i = risk premium for asset i

The risk-free rate is the return available, as of the valuation date, on a security that the market generally regards as free of the risk of default, but not free of inflation (i.e., expected changes in purchasing power) or interest rate (i.e., change in principal value due to changes in interest rates) risks. The risk-free rate serves as an inflation adjustment mechanism, increasing or decreasing the cost of capital as inflation estimates change.

Quantifying the amount by which the risk premium affects the cost of capital for any particular business or investment is arguably one of the most fundamental and yet most difficult analyses in the field of corporate finance, including valuation and capital budgeting.

3. SHANNON P. PRATT & ROGER J. GRABOWSKI, *COST OF CAPITAL: APPLICATIONS AND EXAMPLES* (5th ed. 2014): 71. For a more extensive discussion of the relationship between risk and cost of capital, see ch. 6 in that book.

Defining Risk

Probably the most widely accepted definition of risk in the context of business valuation is *the degree of uncertainty (or lack thereof) of achieving future expectations at the times and in the amounts expected*.⁴ The definition implies uncertainty as to both the amounts and the timing of *expected economic income*. By “expected economic income,” in a technical sense, we mean the expected value (i.e., mean or average) of the probability distribution of possible economic income for each forecast period. The point to understand here is that the uncertainty encompasses the full distribution of possible economic income for each period both above and below the expected value.

Inasmuch as uncertainty is within the mind of the individual investor, we cannot measure the risk directly. Consequently, participants in the financial markets have developed ways of measuring factors that investors normally would consider in their effort to incorporate risk into their required rate of return.

Throughout this book we equate risk with uncertainty, as does most related literature. However, some analysts make a useful distinction between the two terms. That is, risk is present where the parameters of uncertainty are defined (i.e., when the generating function is known with certainty), as in a coin toss (e.g., if forecasters all agree that recession will occur next year, then the subject business’s net cash flows will still vary, but within the forecast of recession). Uncertainty beyond risk occurs when analysts have the possibility of an infinite number of subjective inputs (e.g., wide divergence of opinions among forecasters as to whether there will be a recession next year or not).⁵

Understanding the Role of Risk

As shown in Formula 1-1, the cost of capital for any given investment is typically quantified as a combination of two basic factors: a *risk-free rate*, R_f , and a *premium for risk*, RP_i .

As the market’s perception of the degree of risk of an investment increases, the risk premium, RP_i , increases so that the rate of return that the market requires (the discount rate) increases for a given set of expected cash flows. The greater the market’s required rate of return, the less is the present value of the investment; the less the market’s required rate of return, the greater is the present value of the investment.

Risk is a major concern of investors. The risk-free rate compensates investors for renting out their money (i.e., for delaying consumption over some future time period with a return of currency with less purchasing power in the future).

4. DAVID LARO & SHANNON P. PRATT, *BUSINESS VALUATION AND TAXES: PROCEDURE, LAW, AND PERSPECTIVE* ch. 12 (2d ed. 2010).

5. Evan W. Anderson, Eric Ghysels & Jennifer L. Juergens, *The Impact of Risk and Uncertainty on Expected Returns*, AFA 2007 Chicago Meetings Paper (last rev. Sept. 18, 2012), available at <http://ssrn.com/abstract=890621>.

This component of the cost of capital is readily observable in the marketplace and generally differs from one investment to another only to the extent of the time horizon (maturity) selected for measurement of the risk-free rate. The risk-free rate is sometimes referred to as the *time value of money*.

The risk premium results from the uncertainty of expected returns and varies widely from one prospective capital investment to another. We could say that the market abhors uncertainty and consequently requires a high rate of return to accept uncertainty.

Equity investors are subject to the greatest uncertainty as to timing and amounts of future net cash flow because they stand behind all other providers of capital. Providers of debt capital and preferred capital receive their returns before equity investors. Because the risk is greatest for equity investors, the high risk requires equity investors as a class of providers of capital to have the highest cost of capital.

No matter how many probability distributions or Monte Carlo simulations are used to create a financial forecast, all risk cannot be eliminated. Therefore, *projected net cash flows cannot be discounted at the risk-free rate*.

This book is largely about analyzing risk and using that analysis to estimate the cost of capital, with emphasis on the cost of equity.