The determination of the yield required by investors for common share investments (becoming the cost of equity financing, with some adjustments) is difficult in practice because the future payments to shareholders have greater uncertainty than with bonds or preferreds. Two valuation models have been developed to determine the return required by common equity investors:

- ***Dividend model***, which is based on dividends to be paid and their growth over time
- ***Capital asset pricing model (CAPM)***, which is based on a relationship between risk and return

It is unlikely that both models, in practice, will provide the same result because of the many assumptions and variables that must be determined. Nevertheless, they should produce similar results, and using two models can improve the accuracy in estimating the expected returns from common equity as each model acts as a check on the other.

In determining the cost of common equity we consider the following:

- Will internal or external funds be required (with a possible adjustment for flotation costs)?
- Will the dividend valuation model, CAPM, or an average of both be used to determine the yield and, thus, cost to the firm?

Valuation Approach (Dividend Model)

The cost of common stock is a function of the pricing and performance demands of current and future shareholders. An appropriate approach is to develop a model for valuing common stock that is dependent on the required return demanded from it. Investors receive their return from dividends and the increase in share price. Our dividend valuation model (or dividend capitalization model) uses both components to derive a cost of equity capital.

In Chapter 10, the constant dividend growth model yielded the following relationship between stock price and demanded return:

$$P_0 = \frac{D_1}{K_e - g} \quad (10\text{–}8)$$

Where

P_0 = Price of the stock today
D_1 = Dividend at the end of the first year (or period)
K_e = Required rate of return/cost of equity
g = Constant growth rate in dividends

We then found we could rearrange the terms in the to solve for ***formula*** K_e instead of P_0. This was presented in formula 10–9 and, once again, here as formula 11–3.

$$K_e = \frac{D_1}{P_0} + g \quad (11\text{–}3)$$

The required rate of return (K_e) is equal to the dividend at the end of the first year (D_1), divided by the price of the stock today (P_0), plus a constant growth rate (g). Although the growth rate applies directly to dividends, it must also apply to earnings over the long term. The formula's assumption that there is a constant relationship between earnings per share and dividends per share (i.e., a constant payout ratio) ensures the ability to sustain the growth in dividend payments.

In the Baker Corporation example, the expected dividend for this year is $2, the current stock price is $40, and the dividends have been and are expected to continue to grow at a rate of 7 percent. Given that information, we would calculate K_e to be equal to 12 percent.

$$K_e = \frac{D_1}{P_0} + g = \frac{\$2}{\$40} + 7\% = 5\% + 7\% = 12\%$$

This result assumes shareholders expect to receive a 5 percent return on their investment by way of dividends and a 7 percent return by way of an increase in the price of their shares. Thus, they are investing in this stock on the basis that they demand and expect to receive a 12 percent return on their investment.

Cost of Retained Earnings

Up to this point, we have discussed the cost (required return) of common stock equity capital in a general sense. These funds can be supplied by

- Purchasers of new shares of common stock (external)
- Income kept in the firm as retained earnings (internal)

In 2016, Statistics Canada reported Canadian nonfinancial corporations as having $1 trillion of their historical equity financing as retained earnings and $1.7 trillion as common share issues.[4] Retained earnings form an important source of ownership or equity capital investment funds.

Statistics Canada
statcan.ca

Retained earnings represent

- Past and present earnings of the firm (reinvested)
- Minus previously distributed dividends

Retained earnings, by law, belong to common shareholders. They represent a source of equity capital supplied by the current shareholders. But just because the firm did not have to go to the market to raise new funds does not mean these internally generated funds are free.

There is an opportunity cost involved as the funds could be paid out as dividends to the current shareholders, who could then redeploy them by buying other stocks, bonds, real estate, and so forth. The expected rate of return on these alternative investments becomes the opportunity cost of not having paid out the earnings in dividends. It seems reasonable to assume shareholders could earn a return equivalent to that provided by their present investment in the firm (on an equal-risk basis).[5] This is represented by $\boldsymbol{D_1/P_0 + g}$.

Computing the cost of retained earnings takes us back to where we began our discussion of the cost of common stock. The cost of retained earnings is equivalent to the rate of return on the firm's common stock. This is the opportunity cost. Thus, we say the cost of common equity in the form of retained earnings is equal to the required rate of return on the firm's stock.[6]

$$K_e = \frac{D_1}{P_0} + g \quad \textbf{(11–3)}$$

Thus, $\boldsymbol{K_e}$ represents not only the required return on common stock as previously defined, but also the cost of equity in the form of retained earnings. It is a symbol with double significance.

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[4]This represents the most recent published data. Statistics Canada, *Quarterly Financial Statistics for Enterprises*, Catalogue No. 61-008.

[5]Chapter 14, in dealing with the concept of efficient markets, provides more insight as to why this assumption is reasonable.

[6]One could make the seemingly logical suggestion that this is not a perfectly equivalent relationship. For example, if shareholders receive a distribution of retained earnings in the form of dividends, they may have to pay taxes on the dividends before they can reinvest them in equivalent yield investments. Additionally, the shareholder may incur brokerage costs in the process. For these reasons, one might suggest that the opportunity cost of retained earnings is less than the rate of return on the firm's common stock. The current majority view, however, is that the appropriate cost for retained earnings is equal to the rate of return on the firm's common stock. The strongest argument for this equality position is that for a publicly traded company, a firm always has the option of buying back some of its shares in the market. Given that this is so, it is assured a return of K_e. Thus, the firm should never make an alternative investment that has an expected equity return of less than K_e. Nevertheless, students may wish to look into the minority view as well. In the event a tax adjustment is made, the cost of retained earnings can be represented as $K_r = K_e(1 - t_e)$, where K_r is the cost of retained earnings, K_e is the required return on common stock, and t_e is the average shareholder marginal tax rate on dividend income.

The cost of common equity in the form of retained earnings for Baker Corporation is equal to 12 percent, the previously calculated required rate of return of shareholders. Please refer back to Table 11–1 and observe in column 1 that 12 percent is the value we have used for common equity.

Cost of New Common Stock

Let's now consider the other source of equity capital, new common stock. If we are issuing ***new*** common stock, we must pay a slightly higher return than K_e, which represents the required rate of return of ***present*** shareholders. The higher return is needed to cover the distribution costs of the new securities. If the required return for current shareholders was 12 percent and shares were quoted to the public at $40, a new distribution of securities would need to earn slightly more than 12 percent to compensate for sales commissions and other expenses. The corporation does not receive the full $40 because of these costs. The formula for K_e is restated as K_n (the cost of new common stock) to reflect this requirement.

Common stock

$$K_e = \frac{D_1}{P_0} + g$$

New common stock

$$K_n = \left(\frac{D_1}{P_0} + g\right)\frac{P_0}{P_n} \text{ or } K_n = \frac{\frac{D_1}{P_0} + g}{1 - F} \quad (11\text{–}4)$$

The only new term is P_n (net proceeds received on a new share issue after flotation costs and any underpricing of the share price).

If net proceeds are expressed as a percentage we can divide K_e by the net proceeds to get K_n.

Assume

$$D_1 = \$2$$
$$P_0 = \$40$$
$$F = \$4$$
$$g = 7\%$$

$$P_n = P_0 - F = \$40 - \$4 = \$36$$

Then

$$K_n = \left(\frac{\$2}{\$40} + 7\%\right)\left(\frac{\$40}{\$36}\right) = (5\% + 7\%)(1.111) = 13.33\%$$

The cost of new common stock to the Baker Corporation is 13.3 percent. This value is used more extensively later in the chapter. New common stock was not included in the original assumed capital structure for the Baker Corporation presented in Table 11–1.

The flotation costs in this example are 10 percent of proceeds, as the firm will net $36 on a $40 common share with the seller of the shares, the underwriter, receiving $4 ($4/$40 = .10 = 10%). The calculation would then be

$$K_n = \frac{\frac{D_1}{P_0} + g}{1 - F} = \frac{\frac{\$2}{\$10} + .07}{1 - .10} = \frac{.12}{.90} = 0.1333 = 13.33\%$$

The flotation cost adjustment applies to the complete formula for K_n. It is the required return of investors, which is increased to determine the cost to the firm when flotation costs are considered and investors base their expectations on what they pay, not what the firm receives.

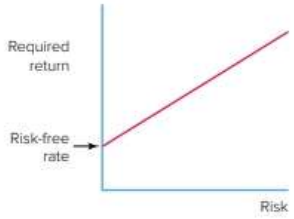
CAPM for the Required Return on Common Stock

An alternative model for calculating the required return on common stock is represented by the capital asset pricing model (CAPM). The attributes of this model are covered in Appendix 11A, so we consider it only briefly at this point. Some proclaim the capital asset pricing model as an important advance in our attempts at common stock valuation, but others suggest that it is not a valid description of how the real world operates.

The model is based on a risk-return relationship for determining the required rate of return for common equity or, indeed, any capital asset. The model follows from the discussion in Chapter 10 on yield to maturity, in which an expected return is developed as follows:

Required return = Risk-free rate + Risk premium

This can be presented graphically as a linear relationship between the required rate of return (K_j) and a measure of risk (β) for the firm's business. Greater risk in a firm's business operations requires a greater rate of return for common shareholders.



The CAPM develops the risk premium from the relationship between a share's returns and the returns of the stock market as a whole. Under CAPM, the required return for common stock (or other investments) expressed as a cost to the firm can be described by the following formula:

$$K_j = R_f + \beta_j (R_m - R_f) \quad \text{(11–5)}$$

Where

K_j = Required return on common stock or the cost of equity.
R_f = Risk-free rate of return; often taken as equivalent to the current rate on short-term Government of Canada Treasury bills.
β_j = Beta coefficient. The beta measures the historical volatility (risk) of an individual stock's (j) return relative to a stock market index. A beta greater than one indicates greater volatility (as measured by price movements) than the market; the reverse would be true for a beta less than one.
R_m = Return in the market as measured by an appropriate index.

A flotation cost adjustment can be achieved, for new equity, by adjusting the formula by

$$K_{jn} = \frac{K_j}{1 - F} \text{ or } K_{jn} = K_j \left(\frac{P_0}{P_n} \right) \quad \text{(11–6)}$$

Where

K_{jn} = Cost of new equity (CAPM)
P_0 = Current price
P_n = Net proceeds received on a new share issue after flotation costs (and any underpricing of the share price)

FINANCE IN ACTION

Canadian Utilities, Return on Common Equity, and Cost of Capital

Canadian Utilities (CU) is primarily a holding company for power generation, utilities management, and energy services. By 2017, it had assets exceeding $18 billion and revenues of about $3.3 billion. Although nonregulated subsidiaries have played an increasing role in the sector, and deregulation has occurred in the energy business, Canadian Utilities continues to face the demands of government regulation. Its subsidiary companies must appear before the Alberta Utilities Commission (AUC) to determine the cost of service rates. These rates become the charges customers pay for their gas.

To determine the cost of service rates, each utility prepares for an intensive hearing to establish the cost of financing the utility's operation. Often, there are divergent views on the costs of the various components of the firm's capital structure, a fair rate of return, and indeed, the nature of the capital structure itself. These costs and structure are debated in an attempt to reach consensus on the firm's cost of capital. In early 2017, Canadian Utilities had the following.

Capital Structure	Book Value
Accounts payable	5%
Other liabilities	18
Long-term debt	44
Preferreds	8
Common equity	25

Its profits are restrained by AUC decisions, which established CU's return on equity for 2017 at 8.50 percent. Furthermore, the common equity ratio within the capital structure was under review, as debt was taking on a more significant role.

Regulatory matters are discussed in the management discussion and analysis of the financial statements.

Q1 Have recent AUB decisions impacted CU's return on common equity?

Q2 What is the rating on CU's commercial paper, debentures, and preferred shares?

canadianutilities.com
Symbol: CU

dbrs.com

standardandpoors.com

In the Baker Corporation example, the following values might apply:

$$R_f = 9\%$$
$$R_m = 11\%$$
$$\beta_j = 1.5$$

Based on formula 11–4, K_j would then equal

$$K_j = 9\% + 1.5(11\% - 9\%) = 9\% + 1.5(2\%)$$
$$= 9\% + 3\% = 12\%$$

In this case, we have structured the data so that K_j (the required return under the CAPM) would equal K_e (the required return under the dividend valuation model). In both cases, the computations lead to a 12 percent estimate as the cost of common equity. In real life, the two models rarely give exactly the same estimate. Nevertheless, both models are attempting to determine the same thing—the expected, or required, return of investors.

For now, we use the dividend valuation model; that is, $K_e = D_1/P_0 + g$. Those who wish to study the capital asset pricing model further are referred to Appendix 11A.

With flotation costs ($P_0 = \$40$, $F = \$4$)

$$K_{jn} = K_j\left(\frac{P_0}{P_n}\right) = 12\%\left(\frac{\$40}{\$36}\right) = 13.33\%$$

Or

$$K_{jn} = \frac{K_j}{1-F} = \frac{12\%}{1-0.10} = 13.33\%$$

Overview of Common Stock Costs

For those of you who are suffering from an overexposure to K's in the computation of cost of common stock, let us recap. We have to consider which model to use to establish the investor's required return on common equity and then determine whether or not flotation costs will be required.

Dividend valuation or dividend capitalization model:

Internally generated (retained earnings)

$$K_e = \frac{D_1}{P_0} + g$$

Externally generated (new common stock)

$$K_n = \frac{\frac{D_1}{P_0} + g}{1-F} \quad \text{or} \quad K_n = \left(\frac{D_1}{P_0} + g\right)\frac{P_0}{P_n}$$

Capital asset pricing model (CAPM):

Internally generated (retained earnings)

$$K_j = R_f + \beta_j(R_m - R_f)$$

Externally generated (new common stock)

$$K_{jn} = \left(\frac{K_j}{1-F}\right) \quad \text{or} \quad K_{jn} = K_j\left(\frac{P_0}{P_n}\right)$$

OPTIMAL CAPITAL STRUCTURE—WEIGHTING COSTS

LO4 Having established the techniques for computing the cost of the various elements in the capital structure, we must now discuss methods of assigning weights to these costs to determine our weighted average cost of capital. We attempt to weight capital components in accordance with our desire to achieve a minimum overall cost of capital. That will be the optimum capital structure because at that point the value of shareholders' wealth is maximized. For purposes of this discussion, Table 11–1 (cost of capital for the Baker Corporation) is reproduced here.

		Cost (after tax)	Weights	Weighted Cost
Debt	K_d	6.55%	30%	1.97%
Preferred stock	K_p	10.94	10	1.09
Common equity (retained earnings)	K_e	12.00	60	7.20
Weighted average cost of capital	K_a			10.26%

By formula the weighted average cost of capital (WACC) is

$$K_a = \left(\frac{V_d}{V_a}\right)K_d + \left(\frac{V_p}{V_a}\right)K_p + \left(\frac{V_e}{V_a}\right)K_e \quad (11\text{–}7)$$

$\boldsymbol{V}$ = Value of components (subscripts) of capital structure (expressed as market value)

How does the firm decide on the appropriate weights for debt, preferred stock, and common stock financing? In other words, why not use all debt for future financing since the preceding chart indicates that it is substantially cheaper than the alternatives? The use of debt beyond a reasonable point will probably greatly increase the firm's financial risk and thereby drive up the costs of all sources of financing. For a more complete discussion of the theory related to this point, please see Appendix 11B.

One way for us to explore this critical point is to assume that you plan to start your own company and are considering the following three different capital structures. For ease of presentation, only debt and equity (common stock) are being considered. As it happens, the costs of the components in the capital structure change each time you vary the proposed debt-equity mix (weights).

Financial Plan A:	Cost (after tax)	Weights	Weighted Cost
Debt	6.5%	20%	1.3%
Equity	12.0	80	9.6
			10.9%
Financial Plan B:			
Debt	7.0%	40%	2.8%
Equity	12.5	60	7.5
			10.3%
Financial Plan C:			
Debt	9.0%	60%	5.4%
Equity	15.0	40	6.0
			11.4%

We see that the firm can reduce the cost of capital by including more debt financing as we consider plan B versus plan A. Beyond a point, however, the continued use of debt becomes unattractive, causing increases in the costs of the various sources of financing that more than offset the benefit of substituting cheaper debt for more expensive equity. In our example, that point seems to occur somewhere around the debt-equity mix represented by plan B. Traditional financial theory maintains that there is a U-shaped cost of capital curve relative to debt-equity mixes for the firm, as illustrated in Figure 11–1. In this illustration, the optimum capital structure occurs at a 40 percent debt-to-equity ratio.

Most firms are able to use 40 to 70 percent total debt (total debt/total assets) in their capital structure without exceeding norms acceptable to creditors and investors. Distinctions should be made, however, between firms that carry high or low business risks. As discussed in Chapter 5, a growth firm in a reasonably stable industry can afford to absorb more debt than its counterparts in cyclical industries. Examples of debt used by companies in various industries are presented in Table 11–3.

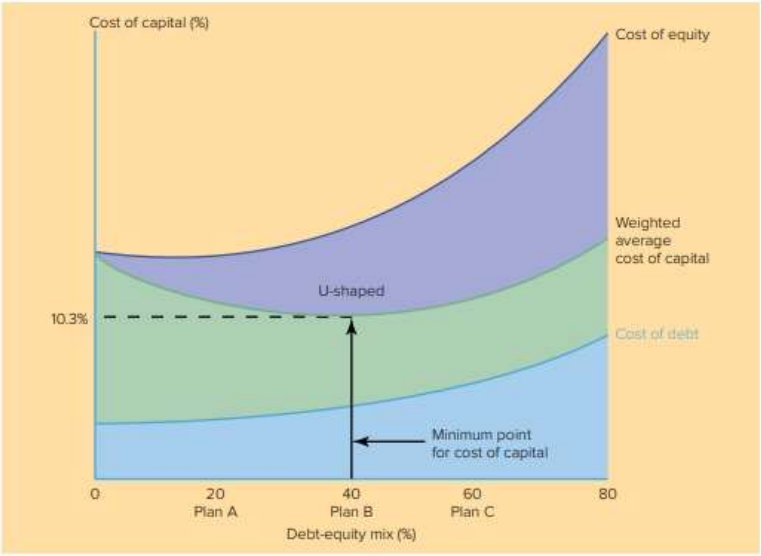


Figure 11–1 Cost of capital curve

Selected Companies with Industry Designation	Symbol	Debt/Assets Percent
Air Canada (airlines)	AC.A	92
Bank of Montreal (financials)	BMO	93
Canadian Tire (consumer retail)	CTC	68
Descartes (software)	DSG	14
Encana (energy)	ECA	58
Melcor (real estate)	MRD	47
Potash (fertilizers)	POT	52
Loblaw (consumer staples)	L	62
BlackBerry (communications)	BB	42
Teck (mining)	TECK.B	51
West Fraser (forest products)	WFT	38

Table 11–3 Debt (total) to total assets, early 2017

In determining the appropriate capital mix, the firm generally begins with its present capital structure and ascertains whether that structure is optimal. If it is not, subsequent financing should carry the firm toward a financing mix deemed more desirable. Note that only the costs of new or incremental financing should be considered. The historical costs of financing to the firm are not relevant except to the extent that they provide clues as to what future financing costs are likely to be.

Market Value Weightings

To calculate the cost of capital, we weight each component of the capital structure based on how the corporation will raise funds in the future (presumably its optimal capital

structure) and it is with that capital structure mix that new investments must find their success. If the firm is to be successful, the new investments must achieve a rate of return equal to the overall cost of the financing used. Past costs are not relevant. Unless the corporation has calculated its optimal capital structure, we presume that the present structure will be maintained and is appropriate for cost of capital calculations.

These ratios were calculated as follows: 1 – (equity/total assets) from the latest balance sheet available at each company's website. Company sites can be accessed through the TSX site under listed companies. Please note that these are based on book values not market values.

Toronto Stock Exchange
tmx.com

1. What are the latest debt ratios for the above companies?
2. Compare the book value of equity of these companies with their market capitalization.

However, the present capital structure should be based on the market value of debt and equity. It should not be based on book values from the financial statements. Why? Remember that the cost of funding for each component in the capital structure is based on the expectations of investors for the returns they require from the corporation. In Chapter 6, we discovered that expectations about the future are part of today's interest rates (the expectations hypothesis) and that the returns expected by investors from their investment are based on what they have at stake—the market value of their investment.

Suppose an investor purchased shares in a corporation several years ago for $1,000 and those shares are now worth $10,000. (Book value = $1,000, market value = $10,000). If that investor expected the investment to generate a 12 percent return over the next year, by way of dividends or a capital gain from an increasing share price, $1,200 would be expected based on the market value, and not $120 based on the book value. Therefore, investors have the market value of their investment at stake at any time and this is what determines their required rates of return and the costs of financing to the firm.

If there is an active market for the securities of the corporation, such as the Toronto Stock Exchange, it is easy to identify their market value. The market value will be available in the newspaper or by calling an investment dealer. Without an active market for a firm's securities we must use the present value models from Chapter 10 to determine market value.

Present value models are employed to revalue the debt, preferreds, and common equity of the firm's financial statements from their book value to market value. The historically based book values and the financial footnotes should disclose information for each of these components of the capital structure to identify the cash flows (future values, payments, time periods) needed for the present value models.

Furthermore, to calculate the current market values of each component of the capital structure we will need discount rates. We will use the current yields (interest rates) from the market. Current yields on securities of similar risk are found in newspapers, on many websites, and from investment dealers. Table 11–2 illustrates how these yields are found.

Calculating Market Value Weightings

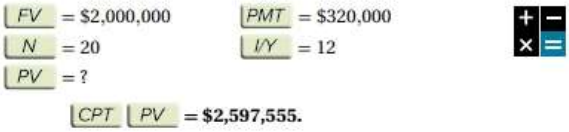
From the financial statements (often historically based) with the accompanying notes, the following is determined:

- Debt: 20 years to maturity, annual coupon rate of 16 percent, current yield 12 percent
- Preferreds: Dividend rate of 7 percent, current yield 10 percent
- Common shares: 1 million shares outstanding, currently trading at $8 per share in the market

The capital structure is as follows:

	Book Value	Book Value Weightings	Market Value	Market Value Weightings
Debt	$2,000,000	0.29	$ 2,597,555	0.23
Preferreds	1,000,000	0.14	700,000	0.06
Common stock	1,000,000	0.14	8,000,000	0.71
Retained earnings	3,000,000	0.43		
	$7,000,000	1.00	$11,297,555	1.00

The debt's market value was calculated using the maturity value, or future value, of $2 million; annual payments of $320,000 (16% of $2,000,000); and a period of 20 years, all identified from the financial statements. The discount rate applied to determine the present value of the debt was 12 percent, which is the current yield on debt. Interest payments, by contract, are based on the maturity value.



The preferreds' market value was calculated by using the formula

$$P_p = \frac{D_p}{K_p} \quad (10\text{–}3)$$

With

D_p = $70,000 (7% of $1,000,000)
K_p = 10%, the current yield on the preferreds

Notice that for the market value of equity, the accounting categories of common stock and retained earnings are combined into equity. The investors' market value of shares at $8 represents both equity accounts. Therefore, the value of equity is $8 times the 1 million shares outstanding, or $8 million.

The market value weightings would now be combined with the costs of the various components, as in Table 11–1, to derive the cost of capital. Today, when the capital markets are highly dynamic and often unforgiving, it is essential that the financial manager base decision making on the market value of assets and evaluate those assets with the current yields or costs of the various components of the capital structure. Nowhere is this more important than in making capital investment decisions based on a discount rate derived from a cost of capital calculation.

CAPITAL ACQUISITION AND INVESTMENT DECISION MAKING

So far, the various costs of financial capital and the optimum capital structure have been discussed. Financial capital consists of bonds, preferred stock, and common equity. These forms of financial capital appear on the corporate balance sheet under liabilities and equity. The money raised by selling these securities, along with the earnings retained in the firm, is invested in the real capital of the firm, the long-term productive assets of plant and equipment.