CHAPTER

11

Cost of Capital

LEARNING OBJECTIVES

LO1 Explain that the cost of capital represents the overall cost of financing to the firm.

LO2 Define the cost of capital as the discount rate normally used to analyze an investment. It is an evaluation tool.

LO3 Construct the cost of capital based on the various valuation techniques from Chapter 10 as applied to bonds, preferred stocks, and common shares.

LO4 Examine how a firm attempts to find a minimum cost of capital by varying the mix of its sources of financing.

LO5 Apply the marginal cost of capital concept.

Determining an appropriate discount rate to value future cash flows is one of the most important considerations in finance and in business. The analysis process will directly affect decisions and the future strategic direction of firms and individuals.

Suppose a young doctor is rendered incapable of practising medicine due to an auto accident in the last year of her residency. In a subsequent legal action, the court determines that the best approximation of her future earning potential before the accident was $100,000 a year for the next 30 years. If her lawyer argues for a 5 percent discount rate, the settlement value becomes $1,537,300, while the insurance company's argument for a 12 percent rate becomes $805,500. The difference is not trivial.

For a firm to decide whether expected future inflows justify a current investment, we evaluate with an appropriately selected discount rate. This evaluation yardstick determines whether an investment proposal is acceptable or not acceptable in maximizing shareholders' wealth. This chapter sets out the concepts, methods, and procedures for making that determination.

The minimal acceptable return for capital invested today, to receive benefits in the future, should be what it costs us to acquire the funds for investment. If the firm's cost of funds is 12 percent, projects of the same risk as the average of the firm's existing assets must be tested to make sure they earn at least 12 percent. By using this as the discount rate, we can decide whether we can reasonably expect to earn the financial cost of doing business. The 12 percent discount rate would not be appropriate for considering projects that exhibit different risks than the average of the existing assets of the firm.

THE OVERALL CONCEPT

LO1 Decisions made by the financial manager are aimed at increasing shareholder value and should be judged against a cost of capital standard. A firm's cost of capital is

- A composite of the various costs of the borrowed or assembled financings
- Determined by the components of its capital structure (debt and equity)
- Based on the costs (or yields) currently demanded by investors in the financial markets

Funds (capital) will be invested in the firm's assets to produce future cash flows. The present value (benefit) of these cash flows should be compared in value against the cost of acquiring the assets. This comparison requires a discount rate or a cost of capital. The cost of capital is the tool used to evaluate (discount) future cash flows and assign a value to them. It is the standard that will satisfy shareholders.

To illustrate this concept, examine two projects of equal risk:

- A plant superintendent wishes to purchase a conveyor system (8 percent rate of return (ROR))
  - borrowing funds at 6 percent (aftertax cost)
- A division manager suggests the development of a new digital component for one of the company's products (14 percent ROR)
  - selling common shares at an effective cost of 15 percent

Judging each investment against the specific means of financing used to fund it runs the risk of making investment selection decisions arbitrary and inconsistent. If projects and financing are matched in this way, the project with the lower return would be accepted and the project with the higher return would be rejected.

If stock and debt are sold in equal proportions, the average cost of financing would be

$$0.5 \times 0.06 = 0.03$$
$$0.5 \times 0.15 = \underline{0.075}$$
$$\text{Overall} = 0.105 = 10.5\%$$

We would now reject the 8 percent conveyor system and accept the 14 percent component project. This would be a rational and consistent decision.

Though an investment financed by low-cost debt might appear acceptable at first glance, the use of debt might increase the overall risk to the firm (as discussed in Chapter 5), eventually making all forms of financing more expensive. Therefore, the general conclusion has been that each project must be measured against the overall cost of funds to the firm.

LO2 The use of the cost of capital to analyze investment projects, as determined with the Baker Corporation example below, rests on two important assumptions:

- The capital structure of the firm will be the same as that currently in place.
- Investment proposals analyzed are of the same risk as the firm's current investments.

If the financial leverage (capital structure) of the firm is altered, the risks to the investors from holding debt or equity will change. Investors will then require different rates of return and, as these required rates of return are the firm's costs of financing, the firm's cost of capital must be revised.

If new proposals are riskier than the current investments of the firm, investors, through their debt or equity holdings, will expect and demand higher returns from their investments, and the cost of capital calculation must be revised upward accordingly. Otherwise, projects might be accepted that do not satisfy the risk and return preferences of investors, thus causing the firm value to drop.

The determination of cost of capital can best be understood by examining the capital structure of a hypothetical firm, the Baker Corporation, in Table 11–1. Note that the aftertax costs of the individual sources of financing are determined, weights are then assigned to each, and finally, a weighted average cost is determined. The relevant costs are those related to new funds that might be raised in future financings rather than the costs of funds raised to fund investments in the past. The remainder of the chapter examines each of these procedural steps.

		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%

Table 11–1 Cost of capital—Baker Corporation

Each element in the capital structure (on the right side of the balance sheet) has an explicit or opportunity cost associated with it, herein referred to by the symbol **K**. Although all liabilities have some cost associated with them, we usually only determine the cost of longer-term liabilities for simplicity in a cost of capital calculation. Nevertheless, current liabilities can sometimes be significant in the capital structure of a firm.

FINANCE IN ACTION

Capital Availability for Small Business

The options for raising capital in a small business are limited because the full scope of the capital market is not available to the smaller firm. Investors and the investment dealers that put together financing packages in the capital markets shy away from the small business because of the risks perceived in a small business and because the amount of capital required is limited. Capital markets operate as wholesale markets, and require financing deals of a sufficient size to achieve economies of scale. Small business risks may relate only to a lack of understanding of the business by the capital markets, but nevertheless, the small business owner will likely have to raise capital elsewhere.

Debt financing is generally limited to bank operating loans that are used to support liquid current assets and term loans secured by capital assets. The cost of these loans is often several percentage points above the prime rate, unless special government or bank programs are available.

As for equity, options are personal savings, love money (from family and good friends), government assistance, and venture capital funding. The sale of shares (equity) in the capital markets is pretty well impossible in the startup phase of the business. Money from "angels" or venture capital firms is also difficult to access in the firm, on the expectations of rates of return of between 25 to 40 percent annually. Family and friends may have similar expectations.

Canada's Venture Capital and Private Equity Association (CVCA) is a significant source of information on the venture capital business in Canada.

Considering the higher debt costs and the high expectations for equity returns by investors, the cost of capital in the small business will be substantial. This places a significant demand on the returns that need to be achieved by the business. Cost of capital is used to evaluate the desirability of capital investment projects by the firm.

Q1 What are the financing options available to the small firm from Small Business BC?

Q2 Can you describe two recent venture capital deals with the amounts involved?

smallbusinessbc.ca/growing-a-business
cvca.ca

FINANCE IN ACTION

Double Double with that Capital!

In 2006, Tim Hortons wanted to raise additional capital for its operations by going to the public financial markets. Capital can be raised through securities issued as bonds, preferreds, or common equity. In this instance, common shares were sold to the public at $27 per share to raise approximately $775 million.

To raise capital successfully in the public capital markets, the services of investment firms (as underwriters), lawyers, accountants, and others are required. The firm pays these experts for raising, or floating, the capital on their behalf. This reduces the proceeds received by the firm from the amount paid by the public. These flotation costs increase the cost of raising capital.

Out of the approximately $775 million worth of common equity sold to the public, the investment firms received fees of approximately $47 million. Other expenses incurred by the issue amounted to $12.25 million.

Therefore, the flotation costs of this issue were approximately 7.6 percent (59.25/775) of the price paid by the public. As the public based their expectation of a return on the price they paid, the flotation expenses increased Tim Hortons cost of the issue.

By the end of 2014 Tim Hortons had merged with Burger King and was bought by Restaurant Brands International (QSP on TSX).

Q1 What are the current yields on 10-year bonds in the above countries?

Q2 What are the flotation costs of Freshii's subordinated voting share issue of early 2017?

sedar.com

This cost is directly related to the valuation concepts developed in the previous chapter. The cost of a security is a function of how the security is valued in the marketplace by investors. Once we decide on the proper method for valuing a particular security, the mathematics involved are relatively simple. In Chapter 10, we examined the valuation techniques for financial assets. Let us now examine how the various components of the capital structure might be calculated by a firm's financial analyst.

COST OF DEBT

LO3 The cost of debt is measured by the interest rate, or yield, that would have to be paid to bondholders to persuade them to buy bonds. The present market-determined yield that we have seen in the term structure of interest rates is a reflection of future interest rate expectations. This is an appropriate yield to use, because the investment proposals to be evaluated will be successful or not successful in the future as well. A simple case might involve our being able to sell $1,000 bonds, paying $100 in annual interest for $1,000. Our cost of debt would, thus, be 10 percent. Of course, the computation becomes a little more difficult if our $1,000 bonds sell for an amount more or less than $1,000. If this is the case, we could use the yield-to-maturity techniques discussed in Chapter 10.

For example, assume Baker Corporation is preparing to issue new debt. To determine the likely cost of the new debt in the marketplace, the firm computes the yield on its currently outstanding debt. This is not the rate at which the old debt was issued; it is the

rate that investors are demanding today. Assume the debt issue pays $100 per year in interest, has a 20-year life, and is currently selling for $940.

$$i = \boxed{CPT} \ \boxed{I/Y} = 10.74\%.$$
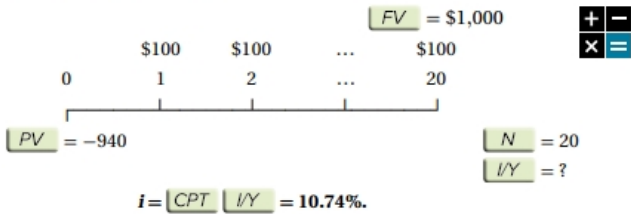
Spreadsheet: Yield to maturity calculation

	A	B	C	D	E	F	G	H
1	nper	N	20		"= +RATE(C1,C2,C3,C4,)			
2	pmt	PMT	$100		"= rate(nper,(pmt),(pv),fv,[type], [guess])			
3	pv	PV	-$940		10.74%			
4	fv	FV	$1,000					
5					"= +RATE(20,100,-940,1000)			
6					"= rate(nper,(pmt),(pv),fv,[type], [guess])			
7					10.74%			

In many cases, we do not have to compute the yield to maturity. It is available from other sources, such as the financial pages of various daily and weekly newspapers, from one of the larger investment dealers that deal in bond trading, or from several websites. The type of information available on a sample of outstanding bonds is presented in Table 11–2.

Issuer	Interest Payable	Maturity	Price	Yield	Rating (AAA = lowest risk)
Canada	1.50%	June 2026	98.91	1.63	AAA
	5.00	June.2037	144.05	2.27	AAA
TD Bank	4.859	Mar. 2026	112.64	3.22	AA
Hydro One	4.39	Sept. 2041	110.17	3.75	A (high)
Suncor	5.39	Mar. 2037	115.00	4.26	A (low)
TELUS	4.40	Oct. 2042	96.83	4.61	BBB (high)
Greece		10 years		7.11	CCC

Note: Pricing for June 2014. Greece's 10-year bond suggested yield in Feb. 2012 was 36%.
Source: CBID Perimeter Financial, pfin.ca/canadianfixedincome/Default.aspx; S&P, standardandpoors.com; DBRS, dbrs.com.

Table 11–2 Sample bond information

If the firm involved were TD Bank, for example, the financial manager could observe that debt maturing in 2026 would have a yield to maturity of 3.22 percent. This is true even though the debt was originally issued at a yield close to 4.859 percent, the established coupon rate. The financial manager should also observe that lower-rated bonds typically offer the investing public a higher rate of return. TELUS, with an BBB (high) rating, had a yield of 4.61 percent, whereas Hydro One, with a similar maturity and an A (high) rating, offered the yield of 3.75 percent.

www.

Hydro One
hydroone.com

Adjustments With the bond's yield to maturity determined by calculation or by going to the current published market yields (or it is given) we must adjust the yield for
- Tax considerations (interest payments are a tax-deductible expense)
- Flotation costs (costs incurred to sell new debt)

The yield to maturity indicates how much the corporation has to pay on a before-tax basis and does not consider the costs the firm will incur to sell new debt.

Since interest is tax deductible, the true cost of the bond is less than the interest paid because the government is picking up part of the cost by allowing the firm to reduce taxes. The aftertax cost of debt (with a simplifying assumption) is the yield to maturity times one minus the tax rate. This is presented as formula 11–1a.

$$K_d = Y(1-T) \quad \text{(11–1a)}$$

Where

K_d = Cost of debt
Y = Yield (or yield to maturity)
T = Tax rate

Earlier, we determined that current yield on existing debt for Baker Corporation was 10.74 percent. Assuming that new debt can be issued at the same going market rate and that the firm is in a 39 percent tax bracket, the aftertax cost of debt would be 6.55 percent.[1]

$$
\begin{aligned}
K_d &= Y(1-T) \\
&= 10.74\%(1 - .39) \\
&= 10.74\%(.61) \\
&= 6.55\%
\end{aligned}
$$

Observe in Table 11–1, column 1, that the aftertax cost of debt for Baker Corporation is the 6.55 percent that we have just computed.

The aftertax cost of debt to the firm should also consider all selling and distribution costs, known as flotation costs. These costs are usually quite small, and they are often bypassed in some types of loans. To explicitly include flotation costs we would have[2]

$$K_d = \frac{Y(1-T)}{1-F} \quad \text{(11–1b)}$$

Where

F = Flotation, or selling, cost (after tax)

The flotation cost (F) in this formula is expressed as a percentage of the funds raised. Therefore, $1 - F$ will also be a percentage, equal to net proceeds (P_n) received by the firm as a percentage of gross proceeds raised from the public. The difference is absorbed by investment dealers, accountants, lawyers, and others. With flotation costs typically in the 2 to 10 percent range for a bond issue, the firm will net over 90 percent of the funds invested by the bondholders. The bondholder's expected yield will be based on the amount they have invested and not on what the firm has received. Thus, flotation costs increase the cost of the debt to the firm.

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[1] More accurately, we could use a time–line development to compute the aftertax yield with a present value calculation. We would adjust the initial proceeds by the flotation costs and by the present value of the tax savings resulting from the flotation costs over the first five years of the bond's life. The annual interest payments would be included at one minus the tax rate. The final payment on the debt would be included in the calculation as a future value. This would have only a minor impact on the final cost of debt. For example, a 20–year bond K_d= 6.83% (PV = –970, PMT = 65.51, FV = 1,000, N = 20, compute I/Y = 6.83).

[2] Actually, the rate might be slightly higher to reflect that generally yields are lower for bonds trading at a discount from par ($940 in this case) because of potential tax advantages and higher leverage potential. This is not really a major issue in this case.

Expressed alternatively, a bond issue (with a $1,000 face value) with net aftertax proceeds to the firm of $970 can be said to have net proceeds $(1 - F)$ of 97 percent ($970/$1,000), or flotation costs of 3 percent ($30/$1,000).

If flotation costs had been 3 percent of proceeds or, in other words, if the firm netted $970 on a $1,000 bond with the seller of the bonds, known as the investment dealer or underwriter, receiving $30, then the following adjustment would be made:

$$K_d = \frac{Y(1-T)}{1-F} = \frac{10.74\%(1-0.39)}{1-0.03} = \frac{6.55\%}{0.97} = 6.75\%$$

We will continue our example with 6.55%, without the flotation cost adjustment.

FINANCE IN ACTION

Debt Costs Around the Globe

A corporation needing long-term debt financing usually looks first in its own backyard; that is, in the country where it will invest the capital. However, multinational corporations will carefully investigate global interest rates to find those that are the most cost effective. A risk of borrowing in a foreign country is the likelihood that exchange rates will change before the debt is paid back. This may make the debt cost far greater than anticipated.

In April 2017, the following long-term interest rates were demanded in capital markets for government securities with 10 years to maturity. Top-rated corporations would expect to pay 1 to 2 percent above these rates.

Canada	1.60%
Australia	2.70
Brazil	10.20
Germany	0.40
Greece	7.11
Japan	0.05
Britain	1.16
U.S.	2.37

Notice the low rate in Japan compared to the other countries. The Japanese economy has stagnated for a considerable time with deflationary pressures; low rates are an attempt to stimulate economic activity. Also examine the rate of borrowing in Brazil, a country with a tendency toward high inflation and economic troubles. Greek rates, down considerably from recent history, were high due to high debt loads and a shaky economy.

Of course, the key from a Canadian perspective would be how exchange rates moved as debt borrowed abroad was paid back.

Q1 What are the current yields on 10-year bonds in the above countries?

Q2 What are the current interest rates as reported in OECD countries?

bloomberg.com/markets/rates-bonds

oecd.org

COST OF PREFERRED STOCK

The cost of preferred stock is similar to the cost of debt in that a constant annual payment is made, but it is dissimilar in that there is no maturity date on which a principal payment must be made. Thus, the determination of the yield on preferred stock is simpler than determining the yield on debt. However, one must examine the actual preferreds quite closely for the attached bells and whistles, as they may actually have maturity dates that make their valuation similar to bonds. Yield is determined by dividing the annual dividend by the current price (this process was discussed in Chapter 10).

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

The rate of return to preferred shareholders is also the annual cost to the corporation for a preferred stock issue, with a slight alteration to account for flotation costs. There is no downward tax adjustment $(1 - T)$ because a preferred stock dividend, unlike debt interest payments, is not a tax-deductible expense. The formula is, however, adjusted as we did with debt by dividing the preferred yield by $1 - F$, which is effectively the net proceeds of a new issue expressed as a percentage of gross proceeds. The cost of preferred stock is expressed as[3]

$$K_p = \frac{D_p/P_p}{(1 - F)} \quad \text{(11–2a)}$$

Where

K_p = Cost of preferred stock
D_p = Annual dividend on preferred stock
P_p = Price of preferred stock
F = Flotation, or selling, costs

For Baker Corporation, the annual dividend is $10.50, the preferred stock price is $100, and the flotation, or selling, costs are estimated at $4. The flotation costs of $4 received by the underwriter are 4 percent ($4/$100) of the price paid investors ($100). The firm nets $96 or 96 percent ($96/$100).

The calculation of preferred cost becomes

$$K_p = \frac{D_p/P_p}{1 - F} = \frac{\$10.50/\$100}{1 - 0.04} = \frac{0.1050}{0.96} = 0.1094 = 10.94\%$$

The same result will be obtained by dividing the dividend payment by the price or proceeds received by the firm after flotation costs $(P_n = P_p - F)$, because the valuation formula is a perpetuity. A new share of preferred stock with a selling cost (flotation cost) produces proceeds to the firm equal to the selling price in the market minus the flotation cost ($96). Therefore, the cost of preferred stock can also be presented as

$$K_p = \frac{D_p}{P_p - F} \quad \text{(11–2b)}$$

The effective cost of preferred shares becomes

$$K_p = \frac{D_p}{P - F} = \frac{\$10.50}{\$100 - \$4} = \frac{\$10.50}{\$96} = 0.1094 = 10.94\%$$

Carefully examine the similarity of these two formulas before referring back to Table 11–1, column 1, where we find that 10.94 percent is the cost of preferred stock in the Baker Corporation example.

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[3]Note that in Chapter 10, K_p was presented with no adjustment for flotation charges. Some may wish to formally change the formula with an additional subscript to indicate the flotation cost adjustment, K_{pn}.

COST OF COMMON EQUITY

Determining the cost of common equity in the capital structure is a more involved task than for debt or preferred shares. Those instruments are simpler because a stated coupon or dividend rate is in evidence. The required yields of investors in common equity are not as clear. Dividends may be paid but investors also have a claim on residual earnings (after expenses, debt costs, taxes, and preferred dividends). This may result in increased dividend payments and/or increases in share prices, which lead to capital gains.

Common stock costs cannot simply be based on the out-of-pocket cost cash dividend. This is the dividend yield, which is the current year's dividend divided by the market price.

$$\text{Dividend yield} = \frac{\text{Current dividend}}{\text{Market price}}$$

The "Dividend Yields" Finance in Action box shows common dividend yields of about 3 to 6 percent for better dividend-paying stocks and generally less than the preferred yields. If new common stock were thought to be so cheap, firms would have no need to issue other securities and could profitably finance projects that earned these meager returns. On the other hand, who would invest in a corporation with such inadequate yields?

Furthermore, though new financing capital raised by debt and preferreds will always come from the markets and, thus, incur flotation costs, this may not happen with common equity. This is because common equity comes from two sources. Internally generated funds are produced from the residual claim on earnings of common shares (recorded as retained earnings), and externally generated funds come from the issue of new shares (recorded as common shares). New shares issues will incur flotation expenses, raising the cost of common equity.

FINANCE IN ACTION

Dividend Yields

Dividend yields are often a focus of investor sentiment after the market has had gone through a period of upheaval. Cash flow by way of regular quarterly dividend payments—in other words, "A bird in the hand ..."—is somewhat reassuring to investors.

At the beginning of the past millennium, and again into early 2008, investors focused on the speculative potential of firms hoping for capital gains as share prices soared. Then they fell. With low interest rates at the banks and caution toward speculative investments, high-dividend-paying stocks increasingly become popular if backed by solid earnings power. Of course, to attract investors' monies, firms are required to offer healthy dividend yields. Preferreds generally have a higher dividend yield as, unlike common, they do not have a claim on future earnings growth. In April 2017 the following dividend yields were available to investors:

	Common Shares		Preferred Shares	
	Symbol	Yield	Symbol	Yield
BMO	BMO	3.55%	BMO.PR.Z	4.88%
BCE Inc	BCE	4.87	BCE.PR.A	5.06
TransAlta..............	TA	2.16	TA.PR.F	6.60

These yields can be found daily on the pages of *The Globe and Mail* or the *National Post.* They can also be found at the TSX website (tmx.com).

Q1 What are the current dividend yields required by the market for these companies?

Q2 Do any dividend yields on common shares exceed the preferred?