Chapter 13
Capital Structure and Distribution Policy

Learning Objectives

After reading this chapter, students should be able to:

◆ Differentiate among the following capital structure theories: Modigliani and Miller: No Taxes, Modigliani and Miller: The Effect of Corporate Taxes, and Miller: The Effect of Corporate and Personal Taxes.

◆ Briefly explain the trade-off, asymmetric information, and pecking order theories.

◆ Identify and briefly explain country-specific factors that impact a firm’s capital structure.

◆ Identify factors that support the conclusion that an MNE’s consolidated capital structure is of primary concern rather than its local capital structure.

◆ Briefly explain what is meant by target capital structure and optimal capital structure.

◆ Explain why capital structure policy involves a trade-off between risk and return, and list the five primary factors that influence capital structure decisions.

◆ Distinguish between a firm’s business risk and its financial risk.

◆ Define financial leverage and explain its effect on expected ROE, expected EPS, and the risk borne by stockholders.

◆ List a number of factors or practical considerations firms generally consider when making capital structure decisions.

◆ Identify the two distinct aspects of dividend policy in a global environment.

◆ Define target payout ratio and optimal dividend policy.

◆ Discuss the three theories of investors’ dividend preference: (1) the dividend irrelevance theory, (2) the “bird-in-the-hand” theory, and (3) the tax preference theory.

◆ Explain the information content, or signaling, hypothesis and the clientele effect.
◆ Explain the logic of the residual dividend policy, and state why firms are more likely to use this policy in setting a long-run target than as a strict determination of dividends in a given year.

◆ List a number of factors that influence dividend policy in practice.
13-1 The more stable the demand for a firm’s products, the lower its business risk. Companies operating in many countries can often offset weak sales in one country with strong sales in another, assuming there is no worldwide recession, so global diversification decreases demand variability.

If sales tend to fluctuate widely, then cash flows and the ability to service fixed charges will also vary. Consequently, there is a relatively large risk that the firm will be unable to meet its fixed charges. As a result, firms in unstable industries tend to use less debt than those whose sales are subject to only moderate fluctuations.

13-2 The tax benefits from debt increase linearly, which causes a continuous increase in the firm’s value and stock price. However, bankruptcy-related costs begin to be felt after some amount of debt has been employed, and these costs offset the benefits of debt.

13-3 An increase in the personal tax rate makes both stocks and bonds less attractive to investors because it raises the tax paid on dividend and interest income. Changes in personal tax rates will have differing effects, depending on what portion of an investment’s total return is expected in the form of interest or dividends versus capital gains. For example, a high personal tax rate has a greater impact on bondholders because more of their return will be taxed at the new higher rate. An increase in the personal tax rate will cause some investors to shift from bonds to stocks. This raises the cost of debt relative to equity. In addition, a lower corporate tax rate reduces the advantage of debt by reducing the benefit of a corporation’s interest deduction that discourages the use of debt. Consequently, the net result would be for firms to use more equity and less debt in their capital structures.

13-4 Capital structure has several important effects on the denominator of the valuation equation, r, which is the firm’s WACC. First, it determines the weights used to calculate the WACC. Second, it affects the riskiness and thus the cost of the firm’s debt and equity capital. Third, because interest is tax deductible, the more debt the firm uses, the lower its tax bill and thus the more of its operating income is available to its investors (bondholders and stockholders). Fourth, the higher the debt ratio, the greater the probability of bankruptcy, and if this threat becomes excessive, it will lower the cash flows in the numerator.
a. From the stockholders' point of view, an increase in the personal income tax rate would make it more desirable for a firm to retain and reinvest earnings. Consequently, an increase in personal tax rates should lower the aggregate payout ratio.

b. If the depreciation allowances were raised, cash flows would increase. With higher cash flows, payout ratios would tend to increase. On the other hand, the change in tax-allowed depreciation charges would increase rates of return on investment, other things being equal, and this might stimulate investment, and consequently reduce payout ratios. On balance, it is likely that aggregate payout ratios would rise, and this has in fact been the case.

c. If interest rates were to increase, the increase would make retained earnings a relatively attractive way of financing new investment. Consequently, the payout ratio might be expected to decline. On the other hand, higher interest rates would cause $k_d$, $k_s$, and firms' MCCs to rise—that would mean that fewer projects would qualify for capital budgeting and the residual would increase (other things constant), hence the payout ratio might increase.

d. A permanent increase in profits would probably lead to an increase in dividends, but not necessarily to an increase in the payout ratio. If the aggregate profit increase were a cyclical increase that could be expected to be followed by a decline, then the payout ratio might fall, because firms do not generally raise dividends in response to a short-run profit increase.

e. If investment opportunities for firms declined while cash inflows remained relatively constant, an increase would be expected in the payout ratio.

f. Dividends are currently paid out of after-tax dollars, and interest charges from before-tax dollars. Permission for firms to deduct dividends as they do interest charges would make dividends less costly to pay than before and would thus tend to increase the payout ratio.

While it is true that the cost of outside equity is higher than that of retained earnings, it is not necessarily irrational for a firm to pay dividends and sell stock in the same year. The reason is that if the firm has been paying a regular dividend, and then cuts it in order to obtain equity capital from retained earnings, there might be an unfavorable effect on the firm's stock price. If investors lived in the world of certainty and rationality postulated by Miller and Modigliani, then the statement would be true, but it is not necessarily true in an uncertain world.

Logic suggests that stockholders like stable dividends—many of them depend on dividend income, and if dividends were cut, this might cause serious hardship. If a firm's earnings are temporarily depressed or if it needs a substantial amount of funds for investment, then it might well maintain its regular dividend using borrowed funds to tide it over until things returned to normal. Of course, this
could not be done on a sustained basis—it would be appropriate only on relatively rare occasions.

13-8 It is true that executives’ salaries are more highly correlated with the size of the firm than with profitability. This being the case, it might be in management’s own best interest (assuming that management does not have a substantial ownership position in the firm) to see the size of the firm increase whether or not this is optimal from stockholders’ point of view. The larger the investment during any given year, the larger the firm will become. Accordingly, a firm whose management is interested in maximizing firm size rather than the value of the existing common stock might push investments down below the cost of capital. In other words, management might invest to a point where the marginal return on new investment is less than the cost of capital.

If the firm does invest to a point where the return on investment is less than the cost of capital, the stock price must fall below what it otherwise would have been. Stockholders would be given additional benefits from the higher retained earnings (due to the firm being larger), and this might well push up the stock price, but the increase in stock price would be less than the value of dividends received if the company had paid out a larger percentage of its earnings.

13-9 a. The residual dividend policy is based on the premise that, since new common stock is more costly than retained earnings, a firm should use all the retained earnings it can to satisfy its common equity requirement. Thus, the dividend payout under this policy is a function of the firm’s investment opportunities.

b. Yes. A shallower plot implies that changes from the optimal capital structure have little effect on the firm’s cost of capital, hence value. In this situation, dividend policy is less critical than if the plot were V-shaped.

13-10 a. False. The Tax Code, through the tax deductibility of interest, encourages firms to use debt and thus pay interest to investors rather than dividends, which are not tax deductible. In addition, due to a deferral on capital gains (until capital assets are sold), the Tax code encourages investors in high tax brackets to prefer firms who retain earnings rather than those that pay large dividends.

b. True. If a company’s clientele prefers large dividends, the firm is unlikely to adopt a residual dividend policy. A residual dividend policy could mean low or zero dividends in some years, which would upset the company’s developed clientele.

c. False. If a firm follows a residual dividend policy, all else constant, its dividend payout will tend to decline whenever the firm’s investment opportunities improve.
With no taxes, MM proved that a firm’s value will be unaffected by its capital structure. MM’s conclusions were based on some restrictive and unrealistic set of assumptions. By indicating the conditions under which capital structure would be irrelevant, MM provided clues as to what is required to make capital structure relevant and thus to affect a firm’s value. MM published a follow-up paper that introduced corporate taxes. They concluded that the value of a levered firm is the value of an unlevered firm plus the value of any side effects. This implied that the optimal capital structure is virtually 100 percent debt. In 1977 Miller introduced both corporate and personal taxes. Miller concluded that the deductibility of interest favors the use of debt financing, but the favorable tax treatment of stock income lowers the required rate of return and thus favors equity financing. Thus, the presence of personal taxes reduces, but does not completely eliminate, the advantage of debt financing.

The MM and Miller theories did not consider the possibility that firms may go bankrupt; hence, these theories did not bring in potential bankruptcy costs or the threat of bankruptcy. This led to the development of the trade-off theory. Trade-off theory states that firms trade-off the benefits of debt financing against higher interest rates and bankruptcy costs. A levered firm’s value is equal to the value of an unlevered firm plus the value of any side effects, including the benefits of the interest tax shield minus the costs associated with potential financial distress. Asymmetric information is the situation in which managers have different (better) information about firms’ prospects than do investors. Pecking order is the idea that firms have a preference order for raising capital, first using retained earnings, then debt, and new stock only as a last resort.

If we look at capital structures in firms around the world, greater differences are observed from country to country than among industries within a given country. This is due to country-specific factors that make the use of debt more or less useful in different countries. Some of these environmental factors include: cultural characteristics, corporate governance and agency costs, the breadth and depth of local equity markets, tax policy, and government policies and regulation. Depending on the mix of environmental factors, managerial risk aversion, and industry practices within its home country, a particular company might have a relatively high or low consolidated debt ratio.

Firms generally consider the following factors when making capital structure decisions: Business risk, asset structure, growth rate, profitability, taxes, control, management attitudes, lender and rating agency attitudes, market conditions, the firm’s internal condition, financial flexibility, and market values.

A firm with relatively little business risk can safely take on more debt and incur higher fixed charges than a company with more volatile operating income. Firms whose assets are suitable as security for loans tend to use debt rather heavily. Faster-growing firms must rely more heavily on external capital. Firms
with very high rates of return on investment use relatively little debt. The higher a firm's tax rate, the greater the advantage of using debt. The effect of debt versus stock on a management's control position can influence capital structure. Because no one can prove that one capital structure will lead to higher stock prices than another, management can exercise its own judgment about the firm's proper capital structure. In addition, lenders' and rating agencies' attitudes frequently influence capital structure decisions. Stock and bond market conditions undergo both long- and short-run changes that can have an important bearing on a firm's optimal capital structure. A firm's own internal condition can also have a bearing on its target capital structure. Firms with profitable investment opportunities need to be able to fund them. Finally, managers should maximize market values, not book values, so capital structure theory is developed only in a market value context.

13-15 In a global environment, dividend policy has two distinct aspects: internal payout policy within the corporate network, which merely transfers funds from subsidiaries to the parent to make them available for reallocation to other units or other purposes, and external payout policy from the firm to its shareholders. In global finance, payment blockages, capital and foreign exchange controls and political risk are encountered and these issues are critical. Once the internal policies have been established, based mainly on the strategic and operating realities of doing business in many countries, the parent company can turn its attention to the distribution of cash to its shareholders.

13-16 When deciding how much of its cash to distribute, financial managers must keep in mind that the firm's objective is to maximize shareholder value. Consequently, the target payout ratio should be based on investors' preferences for dividends versus capital gains. The firm's optimal dividend policy must strike a balance between current dividends and future growth that maximizes the stock price. The three theories of investor preference are: (1) the dividend irrelevance theory, (2) the “bird-in-the-hand” theory, and (3) the tax preference theory. The dividend irrelevance theory states that dividend policy has no effect on either a firm's stock price or its cost of capital, which means that it is essentially irrelevant. The bird-in-the-hand theory states that a firm's value will be maximized by setting a high dividend payout ratio. The tax preference theory suggests that there are tax-related reasons for investors preferring a low dividend payout to a high payout. Empirical studies have not been conclusive as to which theory explains dividend policy.

In addition to these theories, two other theories have been proposed to explain dividend policy. The information content, or signaling, hypothesis suggests that investors regard dividend changes as signals of management's earnings forecasts. Like most other aspects of dividend policy, empirical studies of signaling have had mixed results. Signaling effects should definitely be considered when a firm is contemplating a change in its dividend policy. Finally,
a clientele effect suggests that there is a tendency of a firm to attract a set of investors who like its dividend policy. This issue, like most others in the dividend arena, is still up in the air. Investors may or may not prefer dividends to capital gains; however, they almost certainly prefer predictable dividends.

When deciding how much cash to distribute to stockholders, two points should be kept in mind: (1) The overriding objective is to maximize shareholder value, and (2) the firm’s cash flows really belong to its shareholders, so management should refrain from retaining income unless they can reinvest it at higher rates of return than shareholders could earn themselves. The optimal payout ratio is a function of four factors: (1) investors’ preferences for dividends versus capital gains, (2) the firm’s investment opportunities, (3) its target capital structure, and (4) the availability and cost of external capital. In general, firms tend to estimate earnings and investment opportunities over some time horizon (next five or so years). Use this forecasted information to find the average residual model payout ratio and dollars of dividends during the planning period. Set a target payout ratio based on the average projected data. Thus, it makes sense for firms to use the residual policy to help set their long-run target payout ratios, but not as a guide to the payout in any one year.
Chapter 13: Capital Structure and Distribution Policy

Solutions to End-of-Chapter Problems

13-1  

a. In the 1958 MM paper under the original restrictive assumptions, the firm’s value with debt is equal to its value without debt of $800 million.

b. The firm’s value according to MM with corporate taxes is given by the following formula:

\[ V_L = V_U + TD \]
\[ V_L = 800,000,000 + (0.38)(320,000,000) \]
\[ V_L = 800,000,000 + 121,600,000 \]
\[ V_L = 921,600,000. \]

c. The firm’s value according to the Miller model with personal taxes included is given by the following formula:

\[ V_L = V_U + \left[ 1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_d)} \right] D \]
\[ V_L = 800,000,000 + \left[ 1 - \frac{(1 - 0.38)(1 - 0.15)}{(1 - 0.28)} \right] 320,000,000 \]
\[ V_L = 800,000,000 + \left[ 1 - \frac{0.62(0.85)}{(0.72)} \right] 320,000,000 \]
\[ V_L = 885,777,778. \]

13-2

NI = $2,500,000,000; Dividend payout = 15%; Common equity = 70%; and Debt = 30%.

The addition to retained earnings = 0.85 \times 2,500,000,000 = 2,125,000,000.

The forecasted capital budget is equal to the following:

\[ \text{Dividends} = \text{NI} - \text{[Target equity \% \times Total capital budget]} \]
\[ \text{Total capital budget} = \frac{\text{NI} - \text{Dividends}}{\text{Target equity \%}} \]
\[ = \frac{2,125,000,000}{0.70} \]
\[ = 3,035,714,286. \]
The capital budget is $1,250,000,000. Of that budget, 60 percent will be paid for with common equity to maintain the firm’s capital structure. The equity will come from additions to retained earnings (that is, net income).

$$0.60 \times $1,250,000,000 \text{ capital budget} = $750,000,000.$$

This leaves $950,000,000 - $750,000,000 = $200,000,000$ of net income to pay as dividends.

Payout ratio = $200,000,000/$950,000,000 = 21.05\%.

The firm’s value according to the Miller model with personal taxes included is given by the following formula:

$$V_L = V_U + \left[1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_d)}\right]D.$$

Substitute the known values into the equation above and solve for $D$ as follows:

$$\begin{align*}
803,427 &= 775,000 + \left[1 - \frac{(1 - 0.39)(1 - 0.12)}{(1 - 0.25)}\right]D \\
803,427 &= 775,000 + (0.284267)D \\
28,427 &= 0.284267D \\
100,000 &= D.
\end{align*}$$

The firm’s value according to the Miller model with personal taxes included is given by the following formula:

$$V_L = V_U + \left[1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_d)}\right]D.$$

Substitute the known values into the equation above and solve for the firm’s corporate tax rate, $T_c$. 
$10,000,000 = $9,691,666 + \left[ 1 - \frac{(1 - T_c)(1 - 0.12)}{(1 - 0.28)} \right] \times \$1,500,000$

$308,334 = \left[ 1 - \frac{(1 - T_c)(0.88)}{(0.72)} \right] \times \$1,500,000$

$308,334 = \$1,500,000 - \frac{\$1,500,000(1 - T_c)(0.88)}{0.72}$

$-1,191,666 = \frac{-\$1,320,000(1 - T_c)}{0.72}$

$1,191,666 = \$1,833,333(1 - T_c)$

$0.65 = 1 - T_c$

$T_c = 0.35 = 35\%.$

**13-6**

a. In the 1958 MM paper under the original restrictive assumptions, the firm’s value with debt is equal to its value without debt of $500 million.

b. The firm’s value according to MM with corporate taxes is given by the following formula.

$$V_L = V_U + TD$$

$$V_L = \$500,000,000 + (0.4)(\$100,000,000)$$

$$V_L = \$500,000,000 + \$40,000,000$$

$$V_L = \$540,000,000.$$

c. The firm’s value according to the Miller model with personal taxes included is given by the following formula:

$$V_L = V_U + \left[ 1 - \frac{(1 - T_c)(1 - T_s)}{(1 - T_d)} \right] D$$

$$V_L = \$500,000,000 + \left[ 1 - \frac{(0.6)(0.85)}{(0.65)} \right] \times \$100,000,000$$

$$V_L = \$500,000,000 + [0.215385]\times\$100,000,000$$

$$V_L = \$500,000,000 + \$21,538,462$$

$$V_L = \$521,538,462.$$

d. (1) All other things constant, if corporate tax rates increase according to the Miller model the firm’s value increases.

(2) All other things constant, if tax rates on stock income decrease according to the Miller model the firm’s value decreases.

(3) All other things constant, if personal tax rates on interest income decline according to the Miller model the firm’s value increases.
NI = $4,500,000,000; Dividend payout = 35%; Common equity = 45%; and Debt = 55%.

The addition to retained earnings = 0.65 × $4,500,000,000 = $2,925,000,000.

The forecasted capital budget is equal to the following:

\[
\text{Total capital budget} = \frac{\text{NI} - \text{Dividends}}{\text{Target equity \%}} = \frac{2,925,000,000}{0.45} = $6,500,000,000.
\]