Highlights of Chapters 19, 16, 33, and 25

Chapter 19 - Interaction of Investment and Financing Decisions

Consider a firm that is planning to invest in a project that is just as risky as the firm's existing assets. Assume the firm is correctly valued (in equilibrium) in an efficient market. Using the Chapter 17 "perfect-capital market" assumptions:

\[ \text{WACC} = r_D \left( \frac{D}{TA} \right) + r_E \left( \frac{E}{TA} \right) \]

However, from Chapter 18, we noted that interest payments provide a tax deduction for a corporation. The after-(corporate) tax WACC is:

\[ \text{WACC} = r_D \left( 1 - T_C \right) \left( \frac{D}{TA} \right) + r_E \left( \frac{E}{TA} \right) \]

Notice that the second calculation of the WACC is less than the first. In other words, the after-tax WACC takes into account the corporate tax advantage of debt.

Example: Refer back to the levered firm, Firm L, (from Chapters 17 and 18) with an existing assets that produce the following perpetual cash flows:

<table>
<thead>
<tr>
<th>Probability</th>
<th>Pessimistic</th>
<th>Middle</th>
<th>Optimistic</th>
<th>Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Flow from Assets</td>
<td>$30</td>
<td>$45</td>
<td>$225</td>
<td>$100</td>
</tr>
<tr>
<td>Interest ($600, 5%)</td>
<td>-$30</td>
<td>-$30</td>
<td>-$30</td>
<td>-$30</td>
</tr>
<tr>
<td>Taxable Income</td>
<td>$0</td>
<td>$15</td>
<td>$195</td>
<td>$70</td>
</tr>
<tr>
<td>Tax (34%)</td>
<td>-$0</td>
<td>-$5.1</td>
<td>-$66.3</td>
<td>-$23.80</td>
</tr>
<tr>
<td>After-tax cash flow</td>
<td>$0</td>
<td>$9.9</td>
<td>$128.7</td>
<td>$46.20</td>
</tr>
<tr>
<td>Dividends paid</td>
<td>$0</td>
<td>$9.9</td>
<td>$128.7</td>
<td>$46.20</td>
</tr>
</tbody>
</table>

Using \( r_D = 5\% \) and \( r_E = 17.5\% \) (see Chapter 17 for calculations), what is the market value of the debt and equity?

\[ \text{Levered Firm Value} = V_U + T_C D = $660 + (0.34) ($600) = $864 \]
\[ \text{Debt} = $30 / 0.05 = $600 \]
\[ \text{Equity} = $46.2 / 0.175 = $264 \]

Calculate the after-tax WACC using the above information.

\[ \text{After-tax WACC} = 5\% \left( 1 - 0.34 \right) \left( \frac{$600}{$864} \right) + 17.50\% \left( \frac{$264}{$864} \right) = 7.6388889\% \]

Use the after-tax WACC to value the levered firm using the expected unlevered after-tax cash flows (i.e., the cash flows assuming the firm had no debt).

<table>
<thead>
<tr>
<th>Probability</th>
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<td>$45</td>
<td>$225</td>
<td>$100</td>
</tr>
<tr>
<td>Interest ($0, 5%)</td>
<td>-$0</td>
<td>-$0</td>
<td>-$0</td>
<td>-$0</td>
</tr>
<tr>
<td>Taxable Income</td>
<td>$30</td>
<td>$45</td>
<td>$225</td>
<td>$100</td>
</tr>
<tr>
<td>Tax (34%)</td>
<td>-$10.2</td>
<td>-$15.3</td>
<td>-$76.5</td>
<td>-$34</td>
</tr>
<tr>
<td>Unlevered after-tax cash flow</td>
<td>$19.8</td>
<td>$29.7</td>
<td>$148.5</td>
<td>$66</td>
</tr>
</tbody>
</table>

Expected unlevered after-tax cash flows = $66 per year. \( \text{Firm Value} = $66 / 0.076388889 = $864 \)
Using the after-tax WACC to value a new project. If the firm is considering a project just as risky as the firm's existing assets and the firm plans to keep the same debt / equity ratio, then the firm can value the new project at the after-tax WACC.

Example: Project cash flows: -$100 at t = 0, and a perpetuity of $12.50 expected positive cash flows (taxable income) starting at time one. 34% tax rate results in $4.25 of expected taxes per year.

After-tax expected cash flows = $12.50 - $4.25 = $8.25

The project NPV using the after-tax WACC = - $100 + $8.25 / 0.076388889 = $8.

Projects of different risk - If the project under consideration is more (or less) risky than the firm's existing assets, then calculate an "industry" WACC for the project's industry.

Note: We didn’t take into account bankruptcy costs, agency costs, personal taxes, etc. in this analysis. See Chapter 19 for more details.

Adjusted NPV. As an alternative to adjusting the discount rate (downward) for the tax benefits of debt, the NPV of the project can be adjusted (upward) to account for these same benefits. The adjusted-NPV method can also be adapted to adjust for other financing effects (such as security issue costs).

Adjusted NPV = NPV (base case) + NPV of tax benefits of the debt financing + NPV of other financing effects associated with the project.

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Chapter 16 - Dividend Policy

Dividends are payments (or distributions) to the corporation's preferred or common stockholders.

Forms of common stock dividends.

- Regular cash dividends (typically paid quarterly)
- Special (extra) cash dividends (no regular pattern)
- Stock dividends (e.g., five shares for every 100 shares owned)

John Lintner's observations about cash dividends (gathered through interviews)

- Managers are reluctant to cut dividends.
- Managers are reluctant to increase dividends if they think they might have to be cut in the future.
- Dividend streams tend to be much smoother than earnings streams.
- Mature firms (with stable earnings) have higher dividend payout ratios than start-up growth firms.
- Managers carefully evaluate absolute dividend changes.

Big deal
Year 0  $1 per share dividend (EPS = $5 per share, payout = 20%)
Year 1  $1.2 per share dividend (EPS = $6 per share, payout = 20%)

Not as important
Year 0  $1 per share dividend (EPS = $5 per share, payout = 20%)
Year 1  $1 per share dividend (EPS = $4.5 per share, payout = 22.2%)

Can a Manager Affect Firm Value by Changing its Dividend Policy?

Perfect capital markets. Similar to "capital-structure irrelevance," Miller and Modigliani (1961) show that dividend policy is irrelevant under certain (perfect capital market) assumptions. They argue that if a firm's investment and borrowing policy is fixed, then higher dividends must be offset with a stock issue.
What about the real world? For example, there is a tax disadvantage to dividends (i.e., stockholders pay more tax on dividend income than capital gain income). So, it would seem that firms should pay low dividends (i.e., retain their earnings in the firm) to cause stock prices to increase.

Reasons for dividends in the real world

1. Clienteles. The supply of low and high dividend stocks exactly matches the size of the particular clienteles. High tax bracket investors are attracted to low dividend paying stocks. Low (or zero) tax bracket investors are attracted to high dividend paying stocks.

2. Avoid the accumulated earnings tax (a tax on unreasonable accumulations of earnings). This is put in place by congress to prevent corporations from giving its investors a tax break by not paying dividends.

3. Cash flow needs. Accommodate investors who prefer quarterly payments from the firm. However, investors could simply sell some stock as they need cash, but transaction costs might be too high.

4. Signaling. Firms may use dividend increases to signal an increase in future cash flows. However, the good news will eventually get out. Therefore, at best, the good news is reflected in the stock price earlier. What about dividend decreases?

5. Transfer wealth from bondholders. (See Chapter 18). Higher dividends (lower retaining earnings) increase the default risk of bonds. With increased risk, bond values are lower. Stockholders benefit – they get the dividend, plus the decrease in bond values translate to an increase in stock values (holding firm value constant).

Chapter 33 - Mergers

The evaluation techniques for analyzing projects also apply to mergers. Therefore, a firm should consider:

- The cost of the merger (initial investment)
- The expected gains from the merger (expected future cash flows)
- Adjust for the NPV of financing effects

The Value of Merging Two Companies - There is an economic gain to a merger if the two firms are worth more together than apart.

\[ \text{Gain} = \text{Present value of the combined firm less the present value of the two separate firms.} \]

\[ \text{NPV} = \text{Gain} - \text{Cost} \]

The Gains from Merging - Possible reasons for the increased value of the combined firm over the separate firms:

- Elimination of duplicate staff and facilities
- Economies of scale
- Use of wasted tax deductions
- Use of surplus funds (financial slack)
• Diversification of assets

In most cases, diversification is not a good reason for a merger. Owners of a corporation's bonds and stock can diversify their investments by buying a large portfolio of stocks and bonds. A corporation should not sell at a premium if it simply does what its investors can easily do by themselves. Exceptions: Bill Gates and Microsoft, banks.

• Adjustment - Dis-economies of scale may occur if the firm becomes too large to manage effectively and/or the firm loses its corporate focus.

The Cost of the Merger – The premium paid for the target firm (price paid over its pre-merger value) is one of the major costs of the merger. Other costs include transaction costs, research, and time spent on merger.)

Example: the gain from the merger equals $50 million, the purchase price for the target is $400 million (we assume that there is a cash payment for the target - it doesn't need to be), and the current (pre-merger announcement) market value of the target is $360 million, then:

\[
\text{NPV} = 50 - (400 - 360) = 50 - 40 = 10
\]

Total gain = $50 million
Bidding firm's portion = $40
Target firm's portion = $10

See Chapter 33 for other important merger topics such as:

• How do you determine the costs of the merger when the payment is in stock of the bidding firm (rather than cash)?
• How is a merger conducted?
• Are mergers good or bad for the economy?

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Chapter 25 - Leasing

Until now, we have assumed that a firm purchases the assets necessary to start up a new project. This could require the firm to raise a significant amount of money to finance this initial investment.

Instead of purchasing these assets, a firm can lease (or rent) the assets.

Examples:
• Hickory Farms leases space in a mall for the months of November and December for a Christmas gift store.
• Eastern Airlines leases 10 new Boeing 727s for five years.
• Exxon rents land using a 20-year lease for a new gas station.

Why would a corporation lease an asset rather than buy an asset?
• Corporation doesn't need the asset for most of the year (Hickory Farms example).
• Corporation doesn't need tax benefits associated with owning the asset, e.g., tax depreciation (Eastern Airlines example).
• Asset is not available for sale (Exxon example).
• Others - See Chapter 25.

Other topics in Chapter 25:
• Details of leasing.
• Tax effects of leasing.
• What is the market value of a lease?
• What is the evaluation process for determining whether it is better to lease rather than buy an asset?