
CORPORATE FINANCE

Study Sessions 8 & 9

Topic Weight on Exam	5–15%
Study Notes Reference	Book 2, Pages 103–123
Video CD Reference	CDs 4 & 5
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CAPITAL BUDGETING

Cross-Reference to CFA Institute Assigned Reading #35

Know the definitions of cash flow and the basic computations for expansion and replacement projects. For either type of project, we need to calculate the initial outlay (at $t = 0$), the annual incremental after-tax operating cash flows ($t = 1, \dots, n$), and any additional terminal year cash flows ($t = n$).

Cash Flow Estimation for Expansion Projects

For an *expansion project*, the components of these cash flows are:

Initial outlay. May include purchase price plus transportation and installation costs, additional costs such as training, and any required increase in net working capital.

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Operating cash flow (OCF). Calculated as either of the following:

$$\text{OCF} = (\text{increase in revenues} - \text{increase in costs including depreciation}) \times (1 - \text{tax rate}) + \text{increase in depreciation}$$

or

$$\text{OCF} = (\text{increase in revenues} - \text{increase in cash costs}) \times (1 - \text{tax rate}) + (\text{increase in depreciation} \times \text{tax rate})$$

Terminal year cash flows. Add the after-tax salvage value of the assets and any recapture of net working capital to the final year's after-tax operating cash flow.

Cash Flow Estimation for Replacement Projects

For a *replacement project*, the process is similar, but:

- You must reduce the initial outlay by the after-tax proceeds of the sale of the existing asset.
- You must use only the *change* in depreciation that results from replacement.

If the new equipment has an expected life equal to the remaining life of the equipment to be replaced, then a positive NPV or $\text{IRR} > \text{project cost of capital}$ is sufficient to decide to replace the existing assets.

Be aware that the tax implications of the sale of assets can increase or decrease cash flow. If the sale price is greater than the carrying cost (book value) of the asset, tax must be paid on the gain; this decreases the after-tax sale proceeds. If the sale price is less than the book value, then taxes are reduced (and cash flow increased) by the tax rate times the amount of the loss.

Some points to remember in estimating incremental after-tax cash flows:

- Ignore sunk costs (any costs that are unaffected by the accept/reject decision).
- Ignore any financing costs associated with asset purchase (financing costs are included in the project cost of capital or WACC).
- Include any effects on the cash flows for other firm products (externalities).
- Include the opportunity cost (actual cash flows lost) of using any existing firm assets for the project.
- Shipping and installation costs are included in the initial cost used to calculate the annual depreciation for new assets.

Mutually Exclusive Projects With Unequal Lives

For *mutually exclusive projects with unequal lives*, the fact that the longer-lived project has a higher NPV is not sufficient to justify its acceptance.

There are two approaches to put the projects on an equal basis timewise:

The replacement chain approach. Assume that the shorter project will be repeated until the total number of years is equal to the years for the longer project. If we are comparing a 3-year and a 6-year project, we would project the cash flows as if we repeated the 3-year project at the end of year 3 and sum the cash flows to create a 6-year project for comparison.

We can then directly compare the NPV of the repeated project to the project with an expected life of six years and accept the one with the greater NPV (as long as the NPV is positive).

The equivalent annual annuity (EAA) approach. An alternative to the replacement chain approach is to convert the NPV for each project into an equivalent annual payment and select the project with the greater (positive) equivalent annual payment.

For a 3-year project with a net present value of NPV(3), the steps are:

$PV = 0$; $FV = NPV(3)$; $N = 3$; $I/Y = WACC$ or project cost of capital; and compute PMT, which is the EAA of the 3-year project.

For a 6-year project with a net present value of NPV(6), the steps are:

$PV = 0$; $FV = NPV(6)$; $N = 6$; $I/Y = WACC$ or project cost of capital; and compute PMT, which is the EAA of the 6-year project.

Project Risk Analysis

There are three techniques for estimating the stand-alone risk of a capital investment/project:

- *Sensitivity analysis.* Involves changing a variable such as sales volume, sales price, input cost, or the assumed cost of capital, and recalculating the NPV. The project with the greater percentage change in NPV for a given variable change is the riskier project.

- *Scenario analysis.* Calculate the NPV for “base-case,” worst-case (low sales, low price, etc.), and a best-case scenario and assign probabilities to each of these outcomes. Then calculate the standard deviation of the NPV as you would with any probability model.
- *Monte Carlo simulation.* Use assumed probability distributions for the key variables in the NPV calculation, draw random values for these variables and calculate NPV (thousands of times), and use the distribution of NPVs to estimate the expected NPV and the standard deviation of NPV as a measure of stand-alone risk.

Capital Rationing

Ideally, firms will continue to invest in positive return NPV projects until the marginal returns equal the marginal cost of capital. If a firm has insufficient capital to do this, it must ration its capital (allocate its funds) among the best possible combination of acceptable projects.

Capital rationing is the allocation of a fixed amount of capital among the set of available projects that will maximize shareholder wealth. A firm with less capital than profitable (i.e., positive NPV) projects should choose the combination of projects it can afford to fund that has the greatest total NPV. Remember, the goal with capital rationing is to maximize the overall NPV within the capital budget, not necessarily to select the individual projects with the highest NPV.

Using CAPM to Determine the Discount Rate

The CAPM can be used to determine the appropriate discount rate for a project based on risk. The project beta, β_{project} , is used as a measure of the systematic risk of the project, and the security market line (SML) estimates the project's required return as:

$$R_{\text{project}} = R_f + \beta_{\text{project}} [E(R_M) - R_f]$$

Real Options

Real options are similar to financial call and put options in that they give the option holder the right, but not the obligation, to make a decision. The difference is that real options are based on real assets rather than financial assets and are contingent on future events. Real options offer managers flexibility that can increase the NPV of individual projects.

Types of real options include:

- Timing options.
- Abandonment options.
- Expansion options.
- Flexibility options (price-setting and production-flexibility options).
- Fundamental options.

Approaches to Evaluating the Profitability of Real Options

- *Determine the NPV of the project without the option.* If the NPV of the project without the option is positive, the analyst knows that the project with the option must be even more valuable, and determining a specific value for the option is unnecessary.
- *Calculate the project NPV without the option and add the estimated value of the real option.*
- *Use decision trees.*
- *Use option pricing models.* Option pricing models are discussed in Study Session 17.

Accounting Income and Economic Income

Economic income is equal to the after-tax cash flow plus the change in the investment's market value. Interest is ignored and is instead included as a component of the discount rate.

$$\text{economic income} = \text{after-tax cash flow} - \text{economic depreciation}$$

where:

$$\text{economic depreciation} = (\text{beginning market value} - \text{ending market value})$$

The economic income rate of return for each year (economic income/beginning market value) is equal to the project's required rate of return. This makes sense because the required return is the discount rate used to determine the value of the investment.

Accounting income is the reported net income on a company's financial statements that results from an investment in a project.

There are two key factors that account for the *differences between economic and accounting income*:

1. Accounting depreciation is based on the original cost of the investment, while economic depreciation is based on the change in market value of the investment.
2. The after-tax cost of debt (interest expense) is subtracted from net income, while financing costs for determining economic income are reflected in the discount rate.

Other Valuation Models

Alternative forms of determining income should theoretically lead to the same calculated NPV if applied correctly.

- *Economic profit* is calculated as NOPAT – \$WACC. Economic profit reflects the income earned by all capital holders and is therefore discounted at the WACC to determine the market value added (MVA), or NPV, of the investment.
- *Residual income* is focused on returns to equity holders and is calculated as net income less an equity charge. Residual income reflects the income to equity holders only and is discounted at the required return on equity to determine NPV.
- *Claims valuation* separates cash flows based on the claims that equity holders and debt holders have on the asset. Cash flows to debt holders are discounted at the cost of debt, and cash flows to equity holders are discounted at the cost of equity. The present value of each set of cash flows is added together to determine the NPV of the project.

Economic profit models and residual income models are discussed in more detail in Study Session 13.

COST OF CAPITAL

Cross-Reference to CFA Institute Assigned Reading #36

Application of the Pure-Play Method

The pure-play method for estimating beta uses the beta from a comparable publicly-traded company that has similar business risk and adjusts that beta for differences in financial leverage. There are four steps to the pure-play method:

1. Find a comparable company.
2. Estimate the beta of the comparable company.

3. Unlever the beta of the comparable company to determine an asset beta, which is a pure measure of business risk:

$$\beta_{U, \text{comparable}} = \frac{\beta_{L, \text{comparable}}}{\left[1 + \left((1 - \tau_{\text{comparable}}) \frac{D_{\text{comparable}}}{E_{\text{comparable}}} \right) \right]}$$

4. Relever the asset beta to reflect the risk of the project being analyzed:

$$\beta_{L, \text{project}} = \beta_{U, \text{comparable}} \left[1 + \left((1 - \tau_{\text{project}}) \frac{D_{\text{project}}}{E_{\text{project}}} \right) \right]$$

Country Risk Premium

A country risk premium can be added to the market risk premium in the capital asset pricing model to account for the additional risk of investing in a developing country.

$$\text{CRP} = \text{sovereign yield spread} \left(\frac{\text{Annualized standard deviation of equity index of developing country}}{\text{Annualized standard deviation of sovereign bond market in terms of the developed market currency}} \right)$$

Flotation Costs

When new equity is issued, the correct method to account for flotation costs is to adjust the initial cash outflow in the computation of a project's NPV for the dollar amount of the flotation cost attributable to the project. Do NOT adjust the cost of external equity and the weighted average cost of capital (WACC) to reflect the impact of flotation costs on the project NPV.

CORPORATE GOVERNANCE

Cross-Reference to CFA Institute Assigned Reading #37

Corporate governance is defined by McEnally and Kim as the “system of principles, policies, procedures, and clearly defined responsibilities and accountabilities used by stakeholders to overcome conflicts of interest inherent in the corporate form.” Note that conflicts of interest are most severe in

corporations because of the separation of ownership and management (versus sole proprietorship or partnership), so the focus is on corporate governance in corporations.

An *agency relationship* occurs when an individual, who is referred to as the “agent,” acts on behalf of another individual, who is referred to as the “principal.” Such a relationship creates the potential for a principal-agent problem where the agent may act for his own well being rather than that of the principal. Corporate governance systems are primarily concerned with potential principal-agent problems in two areas: (1) between managers and shareholders and (2) between directors and shareholders.

Examples of ways that management may act for its own interests rather than those of shareholders include:

- Using funds to expand the size of the firm.
- Granting excessive compensation and perquisites.
- Investing in risky ventures.
- Not taking enough risk.

The following are guidelines for corporate governance best practices to remember for the exam:

- 75% of board members are independent.
- CEO and chairman are separate positions.
- Directors are knowledgeable and experienced and serve on only two or three boards.
- The board holds annual elections (not staggered elections).
- The board is annually evaluated and assessed.
- Board members meet annually without management present.
- The finance committee includes only independent directors with finance expertise, and the committee meets annually with auditors.
- Only independent directors serve on the nominating committee.
- Most of senior management’s compensation is tied to performance.
- The board uses independent and outside counsel.
- The board is required to approve any related-party transactions.

The key is to remember the link between valuation and corporate governance. Empirical studies show that:

- Strong corporate governance increases profitability and shareholder returns.
- Weak corporate governance decreases company value by increasing risk to shareholders.

CAPITAL STRUCTURE AND LEVERAGE

Cross-Reference to CFA Institute Assigned Reading #38

Capital Structure Theory

Under the MM assumptions of no taxes, transaction costs, or bankruptcy costs, the value of the firm is unaffected by leverage changes. *MM Proposition I* says capital structure is irrelevant. *MM Proposition II* concerning the cost of equity and leverage says that increasing the use of cheaper debt financing serves to increase the cost of equity, resulting in a zero net change in the company's WACC. Again, the implication is that capital structure is irrelevant.

Costs and Their Potential Effect on the Capital Structure

Costs of financial distress are the increased costs companies face when earnings decline and the company has trouble paying its interest costs. The expected costs of financial distress for a firm have two components:

1. Direct and indirect costs of financial distress and bankruptcy.
2. Probability of financial distress.

In general, higher amounts of leverage result in greater expected costs of financial distress and a higher probability of financial distress.

The *net agency costs* of equity are the costs associated with the conflict of interest between a company's managers and owners, and consist of three components:

1. Monitoring costs.
2. Bonding costs.
3. Residual losses.

Costs of *asymmetric information* result from managers having more information about a firm than investors.

The Capital Structure Decision

With regard to management's decisions regarding capital structure:

- *MM's propositions* imply that capital structure decisions are irrelevant.

- *Pecking order theory* states that managers prefer financing choices that send the least visible signal to investors, with internal capital being most preferred, debt being next, and raising equity externally the least preferred method of financing.
- *Static trade-off theory* states that managers will try to balance the benefits of debt with the costs of financial distress. The static trade-off theory seeks to balance the costs of financial distress with the tax shield benefits from using debt, and states there is an optimal capital structure that has an optimal proportion of debt.

Expanding the Modigliani and Miller Theory

If MM's assumption regarding no taxes is relaxed, the tax deductibility of interest payments creates a tax shield that adds value to the firm, and the optimal capital structure is achieved with 100% debt. Under the tax code of most countries, interest payments are a pre-tax expense and are therefore tax deductible, while dividends are paid on an after-tax basis. The differential tax treatment encourages firms to use debt financing because debt provides a tax shield that adds to the value of the firm.

The tax shield is equal to the marginal tax rate times the amount of debt in the capital structure. In other words, the value of a levered firm is equal to the value of an unlevered firm plus the tax shield:

$$V_L = V_U + (t \times d)$$

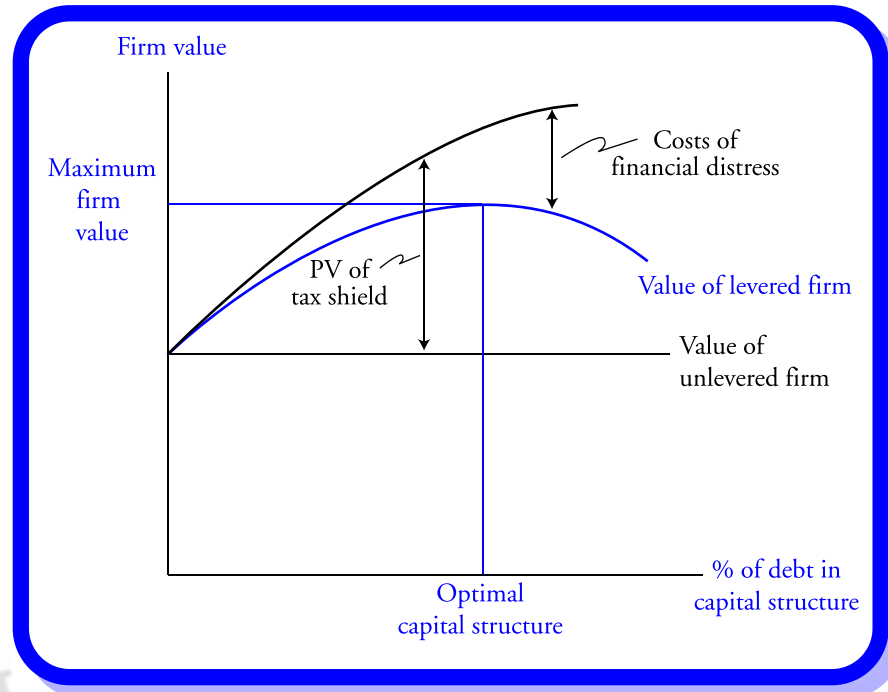
If we maintain MM's other assumptions (i.e., no cost of bankruptcy), then the WACC decreases and the value of the company increases with increasing levels of debt, and the optimal capital structure is 100% debt.

If we remove the assumption that there are no costs of financial distress, there comes a point where the additional value added by the tax shield from borrowing another dollar is exceeded by the value-reducing expected costs of financial distress from the additional borrowing. This point represents the optimal capital structure for a firm where the WACC is minimized and the value of the firm is maximized. Accounting for the costs of financial distress, the expression for the value of a levered firm becomes:

$$V_L = V_U + (t \times d) - PV(\text{costs of financial distress})$$

Note that the previous equation and Figure 1 represent the static trade-off theory just discussed.

Figure 1: Static Trade-Off Theory: Firm Value vs. Capital Structure



Factors to Consider for Analysis

Factors an analyst should consider when evaluating a firm's capital structure include:

- Changes in the firm's capital structure over time.
- Capital structure of competitors with similar business risk.
- Factors affecting agency costs such as the quality of corporate governance.

International Differences

Major factors that influence *international differences* in financial leverage include:

- Institutional, legal, and taxation factors.
- Financial market and banking system factors.
- Macroeconomic factors.

Figure 2: Impact of Country-Specific Factors on Capital Structure

<i>Country Specific Factor</i>	<i>Use of Total Debt</i>	<i>Maturity of Debt</i>
<i>Institutional and Legal Factors</i>		
Strong legal system	Lower	Longer
Less information asymmetry	Lower	Longer
Favorable tax rates on dividends	Lower	N/A
<i>Financial Market Factors</i>		
More liquid stock and bond markets	N/A	Longer
Greater reliance on banking system	Higher	N/A
Greater institutional investor presence	Lower	Longer
<i>Macroeconomic Factors</i>		
Higher inflation	Lower	Shorter
Higher GDP growth	N/A	Longer

DIVIDENDS AND DIVIDEND POLICY

Cross-Reference to CFA Institute Assigned Reading #39

There are four different approaches a firm can use to set dividend policy:

1. A *residual dividend policy*, in which the firm identifies the optimal capital budget (the positive NPV projects) and finances the capital expenditure using the optimal target structure. The firm uses internally generated retained earnings for equity financing and borrows the rest; the earnings remaining after financing the capital budget are paid out as a (residual) dividend. The disadvantage of the residual dividend approach is that the dividend payment stream is volatile.
2. A *long-term residual dividend policy*, in which the firm forecasts a capital budget over the long term and pays out the excess earnings as dividends evenly over the period to reduce dividend volatility.

3. A *dividend stability policy*, in which the firm increases the dividend at a constant rate over the long term, and the dividend payout ratio fluctuates from year to year.
4. A *target payout ratio policy*, in which the firm pays out a target percentage of earnings as dividends over the long term.

Rationales for Share Repurchases

Share repurchases can be a substitute for cash dividends. Rationales for share repurchases include management's ability to:

- Prevent EPS dilution that comes from exercising options.
- Supplement a regular cash dividend.
- Exploit the perceived underpricing of its stock in the secondary market.
- Send a signal to investors that the outlook for the company is positive.
- Change the company's capital structure.

Dividend Policy Theories

Theories about dividend/payout policy can be placed into three categories: investors don't care, investors prefer higher payouts, and investors prefer lower payouts.

Dividend irrelevance theory. MM demonstrate that if markets are "perfect" or frictionless, a firm's dividend policy has no effect on the firm's weighted average cost of capital or the value of the firm. The intuition for this result is that with perfect markets, shareholders can effectively create their own "homemade" dividend policy, either buying shares with "excess" dividends or selling shares to generate "dividend" income.

Bird-in-the-hand theory. This theory is based on the idea that dividends (in the hand) are more valuable to investors than future capital gains (in the bush), which are less certain. The implication is that an *increase* in the payout ratio increases the value of equity, which decreases the cost of equity capital and increases firm value.

Tax aversion theory. Under this theory, lower payout ratios are preferred because dividends are taxed as received and at a higher rate than capital gains, which are only taxed when shares are eventually sold. The implication is that a *decrease* in the payout ratio increases the value of equity, which decreases the cost of equity capital and increases firm value.

MERGERS

Cross-Reference to CFA Institute Assigned Reading #40

Merger Motivations

Mergers represent business combinations that, in theory, should increase the efficiency of the new enterprise. Managers often cite a variety of reasons for mergers and acquisitions. Some of these explanations make economic sense and some do not.

Reasons that make sense:

- *Economies of scale.* This is the strategy behind a pure horizontal merger, in which two businesses that operate in the same industry merge.
- *Vertical integration.* Vertical integration seeks increased efficiencies moving forward toward the final product or backward toward the inputs.
- *Complementary resources.* This is the classic case where the sum is greater than the individual parts.
- *Surplus cash.* Firms with large stockpiles of cash and limited growth opportunities may undertake cash-financed mergers.
- *Eliminating operating inefficiencies.* Another motive for merging is simply to increase the efficiency of the target firm by replacing the current management team.
- *Industry consolidation.* By merging, firms can cut costs by reducing capacity.

Reasons that do not make sense:

- *Diversification.* It is much easier and cheaper for the shareholders to diversify simply by investing in the shares of unrelated companies themselves rather than having management go through the long, expensive process of acquiring and merging the two firms' assets and cultures.
- *Lower financing costs.* The combined firm can offer lower yields because it is issuing less risky debt. The bondholders now have stronger protection as the assets of the two previously separate firms back the debt. In contrast, as separate entities, a default by one firm's debt could not be paid off with the assets from the other firm. This is not the case after merging. However, there is no net gain to the merger because the lower interest cost incurred by each set of shareholders is offset by the incremental risk of guaranteeing the other company's debt.
- *Bootstrapping.* A high-growth firm acquires a low-growth firm in a stock exchange. The total earnings of the combined firm are unchanged, but the total shares outstanding are less than the two separate entities. The result is higher reported earnings per share, even though there are no economic gains.

Net Present Value of a Merger

In any merger that makes economic sense, the combined firm will be worth more than the sum of the two separate firms; this difference is the “gain.” The gains are then split between the bidder (B) and the target (T). If the bidder “overpays,” the target receives most of the gains. Similarly, if the bidder “underpays,” the bidder receives most of the gains.

Payment in cash. The NPV (from the bidder’s perspective) is calculated as:

$$\begin{aligned} \text{NPV} &= \text{gain} - \text{cost} \\ \text{gain} &= \text{value of combined} - (\text{value of bidder} + \text{value of target}) \\ \text{cost} &= \text{cash price} - \text{value of target} \end{aligned}$$

Payment in stock. In a stock-financed merger, the target firm receives shares of the new firm rather than cash. Accordingly, we adjust the cost of the merger formula above.

$$\begin{aligned} \text{cost of a stock financed merger} \\ &= (\# \text{ of shares issued} \times \text{share price of combined}) - \text{value of target} \end{aligned}$$

If cash is the method used in the merger, the distribution of the gains is unaffected by the post-merger share price of the combined firm. The target firm’s shareholders take the cash and walk away. If shares are issued to the target firm’s shareholders, the distribution of the gains will depend on the post-merger share price. Managers with favorable private information prefer cash mergers, and managers with unfavorable private information prefer stock mergers.

Other Merger Concepts

There are three methods for the bidder to gain control of the target’s assets:

1. *Merger.* Two companies combine assets and liabilities to form one company.
2. *Acquisition of stock.* Bidder buys shares directly from shareholders.
3. *Acquisition of assets.* Bidder buys assets from target; target retains control of equity.

If management of the target doesn't want to sell its interest, the bidder has two options:

1. *Proxy fight*. The bidder collects and votes the shares of the current shareholders via proxy.
2. *Tender offer*. The bidder purchases shares of the target in the open market.

CORPORATE RESTRUCTURING

Cross-Reference to CFA Institute Assigned Reading #41

Types of Restructuring

- *Divestitures* involve a direct sale of a division to an outside party in exchange for cash.
- *Equity carve-outs* create a new independent company by giving a proportionate equity interest in a subsidiary to outside shareholders through a public offering of stock.
- *Spin-offs* create a new independent company by distributing shares to existing shareholders of the parent company.
- *Split-offs* allow shareholders to receive new shares of a division of the parent company by exchanging a portion of their parent company shares.
- *Split-ups* break an entire firm into pieces through a series of spin-offs. After the split-up occurs, the firm is no longer a going concern.

Voluntary Divestitures

Reasons a firm makes a voluntary divestiture include:

- Division is no longer a strategic fit for the parent company.
- Reverse synergy—the parts of the company individually are worth more than the whole.
- Division is no longer profitable.
- Focus provides greater access to capital markets.
- Provides an infusion of cash.
- Firm may wish to exit a core business with limited growth prospects.