Chapter 13: The Cost of Capital

A first look

Capital is the firm's sources of financing: the debt, equity and other securities that it has outstanding. The capital structure is the relative proportions of debt, equity and other securities that a firm has outstanding. Financial managers use the capital structure to determine the overall cost of capital. Investors of each type of capital have a required return. Providing this return is the cost a company bears to obtain capital from investors: cost of capital.

We calculate the firm's overall cost of capitals as the *weighted average cost of capital* (WACC): the average of a firm's equity and debt costs of capital, weighted by the fractions of the firm's value that correspond to equity and debt, respectively. The weights used in the WACC are the proportions of debt and equity, used in the capital structure. Important: use the market values of the proportions, not the book values mentioned at the balance sheet. The market-value balance sheet is similar to an accounting balance sheet, but all values are current market values rather than historical costs.

A firm that does not have debt outstanding is called unlevered. A firm that has debt outstanding is called levered. The leverage is the relative amount of debt on a firm's balance sheet.

Unlevered firm: In this case, the cash flows to equity holders are the same as the cash flows from the assets. According to the Valuation Principle, the market value, risk and the cost of capital for the firm's equity must equal the corresponding amounts for its assets. The equity cost of capital in this firm can be estimated using the Capital Asset Pricing Model (CAPM).

Levered firm: If the firm has got debt, the weighted average cost of capital (pre-tax) are:

r wacc = (fraction of firm value financed by equity) x (equity cost of capital) + (fraction of firm value financed by debt) x (debt cost of capital)

r wacc = asset cost of capital.

Cost of debt and equity capital

The interest a firm would have to pay to refinance the existing debt is the firm's cost of debt. This interest rate isn't the same as the coupon rate; the coupon rate is the interest rate the firm had to offer at the time the debt was issued. The yield to maturity can be used to estimate the firm's current cost of debt: it is the yield that investors demand to hold the firm's debt. Because the interest paid on debt is a tax deductible expense, the return paid to debt holders isn't the same as the cost of debt to the firm. A firm's net cost of interest on its debt after accounting for the interest tax deduction is called the effective cost of the debt. Tax deductibility of interest lowers the effective cost of the debt: the effective after-tax borrowing rate is: $r_D (1-T_c)$.

Cost of preferred stock capital

Holders of preferred stock get a fixed dividend, this dividend must be paid 'in preference to' any dividends paid to common stockholders.

$$Cost\ of\ preferred\ stock\ capital = \frac{Preferred\ Dividend}{Preferred\ Stock\ price} = \frac{Div\ pfd}{P\ pfd}$$

Cost of common stock capital:
Method 1: Capital Asset Pricing Model:

$$Cost\ of\ equity = risk - free\ rate + equity\ beta\ x\ market\ risk\ premium$$

Method 2: Constant Dividend Growth Model:

$$Cost\ of\ equity = \frac{Dividend\ (in\ 1\ year)}{Current\ price} + dividend\ growth\ rate = \frac{Div1}{Pe} + g$$

The CAPM model is more popular than the CDGM model, because the latter has got many difficulties.

Weighted average cost of capital

The final formula of the WACC:

r wacc = rE x E% + r pfd x P%+ rD (1-Tc) x D%

A weighted average costs of capital can vary widely across industries and companies, because it's driven by the risk and the leverage.

The net debt is de total debt outstanding minus any cash balances.

Valuing a project

The levered value is the value of an investment, including the benefit of the interest tax deduction, given the firm's leverage policy. We can calculate the levered value with the WACC method: discounting future incremental free cash flows using the firm's WACC. The intuition for the WACC method is that the firm's WACC represents the average return a firm must pay to its investors (debt and equity holders) on an after-tax basis.

The levered value of an investment can be calculated with this formula:

$$V0L = \frac{FCF1}{1 + r\ wacc} + \frac{FCF2}{(1 + r\ wacc)^2} + \frac{FCF3}{(1 + r\ wacc)^3} + \ ...$$

It's important to keep in mind the underlying assumptions, when using the WACC as the discount rate in capital budgeting.

1. The market risk of the project equals the average market risk of the firm's investments.

2. The debt-equity ratio is constant, so the firm adjusts its leverage continuously.

3. The effect of leverage on valuation is limited: the main effect follows from the interest tax deduction.

Key steps in the WACC valuation method:

1. Determine the incremental free cash flow.

2. Compute the WACC

3. Discount the incremental free cash flow using the WACC to compute the value of the investment, including the tax benefit of leverage.

We assumed that the market risk of the project equals the average market risk of the firm's investments. This assumption isn't always correct.

If the risk of the project differs from the average market risk, the WACC isn't the appropriate discount rate for the project. In this case, you have to estimate the WACC from the WACC of other firms operating in the same line of business as the new project.

The calculation of the WACC doesn't take into account the direct costs of raising external financing. You have to subtract the present value of these costs from the NPV of the project.