Cost of Capital/Weighted Average Cost of Capital

Cost of Capital

A company's *cost of capital* is the opportunity cost of all funds—debt and equity—invested in the business. In other words, the cost of capital is the expected rate of return the business could have earned if it invested its funds in a different investment with similar risk. The cost of capital concept recognizes that resources are scarce, and that by using money for one purpose you give up the opportunity to use it for a different purpose.

Businesses use cost of capital for many purposes, such as to determine whether or not to make a specific investment, pursue a particular project, or acquire a company. For example, if the expected return from a proposed acquisition is less than the cost of capital to make the acquisition, it is probably not a good deal for shareholders. The calculation of cost of capital requires making a number of assumptions, but typically involves 1) calculating the cost of debt, taking into account interest rates, tax rates, and the deductibility of interest, and 2) calculating the cost of equity, which is somewhat more speculative and complicated and usually involves the calculation of an appropriate capital asset pricing model (CAPM).

Weighted Average Cost of Capital

To account for a company's specific capital structure, the cost of capital is converted into the *weighted average cost of capital* (WACC). The WACC is weighted based on the percentage of debt versus equity in the capital structure:

WACC = (after-tax cost of debt x % of debt) + (cost of equity x % of equity)

This weighing approach more accurately reflects the composite cost of capital for the company.

Cost of Equity for WACC Calculation: Capital Asset Pricing Model (CAPM)

You might wonder how to determine a company's cost of equity for purposes of calculating WACC. Typically, an investment banker will look to a formula called the *capital asset pricing model*, or CAPM. The calculation for cost of equity using CAPM is:

Cost of Equity = Risk-free rate of return + (Beta x Market Risk Premium)

The *risk-free rate of return* is the expected rate of return of investing in U.S. Treasuries or other so-called risk-free investments. *Beta*, as we will discuss shortly, is a measure of a stock's volatility relative to the overall market. The *market risk premium* is the difference between the risk-free rate of return and the expected market return. An example of CAPM is in order.

Example: Assume the risk-free rate of return is 1%, and that the company's equity has a beta of 1.1 (i.e.,

somewhat more volatile than the market as a whole). The expected market rate of return is 8%. In this example, the market risk premium is 7% (the difference between the market return and the risk-free rate of return). The market risk premium is multiplied by the beta (7 x 1.1), giving a result of 7.7. We then add this to the risk-free rate of return (1%), for a total cost of equity of 8.7%.

Let's use these two acronyms—WACC and CAPM—together in an example.

Example question: The capital structure of Very Hypothetical, Inc. is 70% debt, 30% equity. VHI's after-tax cost of debt is 6%. Very Hypothetical's stock has a beta of 1.2. The expected market rate of return is 9%, and the risk-free rate of return is 1.3%. What is Very Hypothetical's weighted average cost of capital?

Answer: Approximately 7.4%. The weighted average cost of capital (WACC) = (after-tax cost of debt x % of debt) + (cost of equity x percentage of equity). The question provides the after-tax cost of debt, but not the cost of equity. To derive the cost of equity, we will use the capital asset pricing model (CAPM).

Under CAPM, cost of equity = risk-free rate of return + (beta x market risk premium). The market risk premium is 7.7%, the difference between the expected market rate of return (9%) and the risk-free rate of return (1.3%). We multiply this number by the beta (1.2) and get 9.24%. We add the risk-free rate of return (1.3%), and get a cost of equity of 10.54%.

Now we can plug the cost of equity figure, and the figures originally provided, into the WACC equation: (.06 x 70) + (.1054 x 30). The result is 4.2 + 3.162, or a total WACC of roughly 7.4%.