Cost of Capital[1]
Quick Sheet[2]

Concepts & Terms

Cost of Capital: the opportunity cost of money, also referred to as a discount rate (r). In some cases opportunity cost is an expense and in others it's theoretical. Here's an example: common stock is one of the capital components of most firms and there is a cost to the firm for this capital. However, when a firm sells stock to investors the firm is under no obligation to ever pay those investors. It never need incur an expense for dividends and need not buy back the stock at any point unless it chooses to do so. So how is it that there's a cost of common equity? In theory the firm could have chosen to borrow rather than find equity investment, in which case the firm's founders would have benefited from the cash flows and capital gains associated with the firm's future success. But if they sold stock, they've sold some of their future opportunity for cash flows and gains: they incur an opportunity cost.

Cost and Return: these are two sides of the same coin and the terms are often used interchangeably. One person's cost is another person's return. If I borrow money at an interest rate of 10%, then my **cost** is 10%, but the **return** my creditor receives is also 10%. The variable **k** is often used to represent either, but so is **R**.

Costs of Capital used in the WACC equation	Capital Components used in the WACC equation
R_E: the opportunity cost of a firm's common equity	**E**: the value of a firm's common equity
R_P: the opportunity cost of a firm's preferred equity	**P**: the value of a firm's preferred equity
R_D: the opportunity cost of a firm's debt capital	**D:** the value of a firm's debt capital
	V: the total value of the firm's capital components (E, P &D)

Current Yield: the current cost of borrowing for a firm. This is influenced by a firm's credit rating, debt-to-equity ratio, loan-to-value on collateralized assets, amount borrowed, and duration of debt.

Debt Capital: funds borrowed from investors whose express intent is to invest in the firm. Long-term debt, notes payable, credit lines, mortgages, bank loans, private loans and bonds are examples of debt capital – each are offered to the firm as investments. Current Liabilities, accounts payable, wages payable, accrued liabilities are not debt capital: each are offered to the firm to motivate operating transactions.

Discount Rate: the opportunity cost of money, also referred to as cost of capital, and is most often represented generically by the variable **r**. The value of **r** is informed by the perspective of the entity for whom the cost of capital is being considered.

Equity Capital: funds provided to the firm in exchange for a proportional interest in the firm's future cash flows and ownership of the firm. Paid-in-Capital and Accumulated Retained Earnings for Common and Preferred equity shares, listed on the balance sheet under Owners Equity, represent the book value of a firm's equity capital. The market value of a firm's Common and Preferred equity shares represent the market value of firm's equity capital.

Hurdle Rate: a rate of return that must be achieved to overcome a cost of capital for any particular investment decision.

Opportunity Cost: the potential or expected benefit one misses out on when choosing one alternative over another.

r : a generic variable label representing a discount rate, or the opportunity cost of money for the individual or entity from whose perspective cost of capital is being considered. Various forms of **r** may include but are not limited to inflation, interest rate, required investor return, hurdle rate and WACC.

Weighted Average Cost of Capital (WACC)

WACC: a firm's weighted average cost of capital. This may be calculated from a Book Value perspective, a Market Value perspective, or some combination of the two. In finance, we strive to look at WACC from a purely Market Based perspective if at all possible. WACC is the firm's opportunity cost of capital and is the discount rate (r) we use when considering the firm's perspective.

There are several components to the WACC equation: 1) the weights of a firm's capital components, or the percentage of a firm's total capital components represented by any one component, 2) the costs (returns) of each of the given capital components, and 3) the tax rate applied to the firm's taxable income.

WACC = Weighted Average Cost of Capital $= \left(\frac{E}{V} \times R_E\right) + \left(\frac{P}{V} \times R_P\right) + \left(\frac{D}{V} \times R_D\right)(1 - T_C)$

Calculating the weights: The firm's capital components, E, P & D can be summed as V (E + P + D = V). In the WACC equation the terms $\frac{E}{V}, \frac{P}{V}, \frac{D}{V}$ represent the proportion component represents of their summed total — these terms are the weights and together should equal 1.0 or 100% as $\frac{E+P+D}{V} = \frac{V}{V} = 1$

Calculating R_E, R_P and R_D: The costs of capital used in the WACC equation (R_E, R_P & R_D) can be found in a variety of ways, amongst which are acceptable, better and best ways of measuring each. Depending on the type of WACC you want to consider (market based, book based, or hybrid) you might choose different ways of calculating the capital costs. We'll consider the market based calculation to be preferable and use the "best" information available to calculate it as follows:

	R_E	R_P	R_D
Best	CAPM calculation $R_E = R_F + \beta(R_M - R_F)$	$\frac{Preferred\ Dividends\ Paid_1}{Market\ Value\ of\ Preferred\ Equity}$	Current Yield
Better	RE via M&M Method $R_E = \frac{D_1}{P_0} + g$	$\frac{Preferred\ Dividends\ Paid_1}{Book\ Value\ of\ Preferred\ Equity}$	$\frac{Interest\ Paid_1}{Market\ Value\ of\ Debt_0}$
Acceptable	WAG	Stated dividend rate (%) on preferred stock as detailed in the firm's prospectus	$\frac{Interest\ Paid_1}{Book\ Value\ of\ Debt_0}$

CAPM Method (Capital Asset Pricing Model): includes the use of R_F, R_M and β (beta) in the following equation: $R_E = R_F + \beta(R_M - R_F)$ - this is the CAPM equation for calculating R_E and is the preferred method if data is available.

> **R_F:** the risk free rate of return commonly thought of as the current yield on 2 -10 US Treasury instruments
> **R_M:** the average rate of return for common stock in a given industry
> **β (beta):** a measure of a particular firm's common equity price volatility compared to the price volatility of common equity for firms in the same industry. It is statistical calculation, $\beta = \frac{Covariance}{Variance}$, in which the covariance is a measure of the stock's return relative to that of the market and variance is a measure of how the market moves relative to its mean.

Modigliani & Miller (M&M) Method for calculating R_E: $R_E = \frac{D_1}{P_0} + g$, this stems from the use of the Gordon Growth Model $\left(P_o = \frac{D_1}{r-g}\right)$ applied to stock valuation for which Nobel laureates Modigliani & Miller state that when D_1 is the expected dividend to be paid on a common stock in the next period (time = 1), then P_0 is the current price of that stock at time = 0 based on the stock's expected return (R_E) and long run growth rate of the dividend (g) resulting in R_E being the opportunity cost of the common stock.