Formula Sheet

Perpetuity

The value of a perpetuity of $1 per year is:

$$PV = \frac{1}{r}$$

Where,
PV is the present value, and r the discount rate

Annuity

The value of an annuity of $1 per period for t years (t-year annuity factor) is:

$$PV = \frac{1}{r} - \frac{1}{r(1+r)^t}$$

Where,
PV is the present value, r the discount rate and t the number of periods

Growing Perpetuity

If the first period's cash flow is $1 at year 1 and if cash flows thereafter grow at a constant rate of g in perpetuity

$$PV = \frac{1}{r-g}$$

Where,
PV is the present value, , r the discount rate and g the constant growth rate

Beta of stock i

$$\beta_i = \frac{Cov_{i,M}}{\sigma_M^2} = \frac{\rho_{i,M}\sigma_i\sigma_M}{\sigma_M^2}$$

Where, β is the Beta of stock i, $Cov_{i,M}$ is the covariance between the stock i and market returns, σ_M^2 is the variance of market returns, $\rho_{i,M}$ is the correlation between the stock i and market returns, σ_i is the standard deviation of stock i returns and σ_M standard deviation of market returns.

Capital Asset Pricing Model

The expected return on a risky investment is:

$$E_{R_i} = R_F + \beta\left(E_{R_M} - RF\right)$$

Where, E_{R_i} is the expected return for stock i, R_F is the risk free rate, β is the Beta of stock I and E_{R_M} is the expected market return.

Weighted Average Cost of Capital

$$WACC = r_D \times (1 - T_C)\frac{D}{V} + r_E \times \frac{E}{V}$$

Where, r_D and r_E are the expected returns on debt and equity, T_C is the marginal rate of corporate tax, D and E are the market values of debt and equity with $V = D + E$

Net Present Value

Formula used to determine the present value of an investment by the discounted sum of all cash flows received from the project.

$$NPV = -C_0 + \frac{C_1}{1+r} + \frac{C_2}{(1+r)^2} + \cdots + \frac{C_T}{(1+r)^T}$$

Where,$-C_0$ is the initial investment, C_1 to C_T cash flows, r is the discount rate and T is the number of periods (e.g. years)