Formula Sheet

B3MIN1051 - Financial Decision Making

Present value (general formula):

$$PV = \sum_{t=1}^{T} \frac{CF_t}{(1+r)^t}$$

Future value (general formula):

$$FV_t = CF_0(1+r)^T$$

Net present value:

$$NPV = -I_0 + \sum_{t=1}^{T} \frac{CF_t}{(1+wacc)^t}$$

Perpetuity:

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

Annuity:

$$PV = \frac{CF}{r} \times \left[1 - \frac{1}{(1+r)^T}\right] = CF \times \frac{1 - \frac{1}{(1+r)^T}}{r}$$

$$FV = CF \times \frac{(1+r)^T - 1}{r}$$

Growing perpetuity:

$$PV = \frac{CF_1}{r-g}$$

Growing annuity:

$$PV = \frac{CF_1}{r-g} \times \left[1 - \left(\frac{1+g}{1+r}\right)^T\right]$$

Effective annual rate:

$$EAR = \left(1 + \frac{r}{m}\right)^m - 1$$

Average return (arithmetic):

$$\bar{r} = \frac{1}{T}\sum_{i=1}^{T} r_i$$

Average return (geometric):

$$r = \left(\frac{P_T}{P_0}\right)^{1/T} - 1$$

Variance:

$$\sigma^2 = \frac{1}{T-1}\sum_{i=1}^{T}(r_i - \bar{r})^2$$

Covariance:

$$\mathrm{Cov}(a,b) = \sigma_a \cdot \sigma_b \cdot \rho_{ab}$$

, where ρ_{ab} is the correlation between a and b

Expected return portfolio (2 assets):

$$r_{portfolio} = w_a r_a + w_b r_b$$

Variance of portfolio (2 assets):

$$\sigma^2_{portfolio} = w_a^2\sigma_a^2 + w_b^2\sigma_b^2 + 2w_a w_b \rho_{ab}\sigma_a\sigma_b$$

Equity beta:

$$\beta_e = \frac{\mathrm{COV}(E(r_e), E(r_m))}{\sigma^2(E(r_m))}$$

$$\beta_e = \beta_{asset} \times \left(1 + \frac{D}{E}\right)$$

Capital asset pricing model:

$$r = r_f + \beta(r_m - r_f)$$

WACC:

$$r_{wacc} = (1-\tau)\frac{D}{D+E}r_d + \frac{E}{D+E}r_e$$

Quadratic formula:

Solution to a quadrativ equation of the form:

$$ax^2 + bx + c = 0$$

is given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$