CPWP Module 1 Formula Sheet

Disclaimer: This document serves as an aid for the exam only, and it is not an exhaustive listing of formulas that may be applied to the exam.

Macaulay duration = $\left[\frac{1C_1}{(1+i)^1}+\frac{2C_2}{(1+i)^2}+\frac{3C_3}{(1+i)^3}+...+\frac{nC_n}{(1+i)^n}+\frac{nM_n}{(1+i)^n}\right] x \frac{1}{P}$

Modified duration = Macaulay duration / (1 + i/n),

Put-call parity: $C_0 + K \times e^{-rT} = P_0 + S_0$ (without any interim cash outflow)

$C_0 + K \times e^{-rT} = P_0 + S_0 - PV(CF_t)$ (with interim cash outflow)

Cost of carry: futures price = spot price × (1+interest rate) + storage, insurance and transport costs – convenience yield

Roll yield $= \frac{\text{current spot price - specified futures price}}{\text{current spot price}}$

Earnings per share = $\frac{(\text{profit after tax - preferred dividends})}{\text{weighted average number of shares outstanding}}$

Dividend discount model: $P = D1 / (1+r)^1 + D2 / (1+r)^2 + D3 / (1+r)^3 + \ldots.. + D\infty / (1+r)^\infty$

Constant growth dividend discount model: $P = D_0 (1 + g) / (r–g)$ or $P = D_1 / (r–g)$

Interest rate parity: $\frac{F_{\text{Currency A / Currency B},t}}{S_{\text{Currency A / Currency B},0}} = \frac{1+i_{\text{Currency B}} \times \frac{t}{360}}{1+i_{\text{Currency A}} \times \frac{t}{360}}$

Total expense ratio = $\frac{\text{fund expense}}{\text{fund asset}}$

Information ratio $= \frac{\alpha}{\sigma_e}$

Periodic TE $= \sqrt{\frac{\sum_{t=1}^{T}\left(\alpha_t - \overline{\alpha}\right)^2}{T-1}}$

Annualized TE = periodic TE $* \sqrt{M}$

Variance of a 2-asset portfolio $= w_a{}^2 \times \sigma_a{}^2 + w_b{}^2 \times \sigma_b{}^2 + 2 \times w_a \times w_b \times \rho_{ab} \times \sigma_a \times \sigma_b$

Standard deviation of a portfolio $= \sqrt{\sigma_p^2}$

Expected utility of a portfolio $= E(r_p) - \frac{1}{2} \times A \times \sigma_p^2$

Capital allocation line: $E(r_p) = r_f + \frac{[E(r_k) - r_f]}{\sigma_k} \times \sigma_p$

Sharpe ratio: $S_p = \frac{r_p - r_f}{\sigma_p}$

Treynor ratio: $T_p = \frac{r_p - r_f}{\beta_p}$