ENCLOSURE NO. 1 - FORMULAE

Future value

$$FV = C_0(1+i)^n$$

Future value of cash flows

$$FV = C_O(1+i)^n + C_1(1+i)^{n-1} + C_2(1+i)^{n-2} + ... + C_{n-1}(1+i) + C_n$$

Present value

$$PV = \frac{C_n}{(1+i)^n}$$

Present value of cash flows

$$PV = C_0 + \frac{C_1}{1+i} + \frac{C_2}{(1+i)^2} + ... + \frac{C_n}{(1+i)^n}$$

Discount factor

$$(P/C_n, r, n) = \frac{1}{(1+i)^n}$$

FV of an ordinary annuity

$$FV = A\frac{(1+i)^n - 1}{i}$$

PV of an ordinary annuity

$$PV = A\frac{(1+i)^n - 1}{i(1+i)^n}$$

Annuity from FV

$$A = FV\frac{i}{(1+i)^n - 1}$$

Annuity from PV

$$A = PV\frac{(1+i)^n i}{(1+i)^n - 1}$$

FV of a growing annuity

$$FV = A\frac{(1+i)^n - (1+g)^n}{i-g}$$

PV of a growing annuity

$$PV = A\frac{1}{i-g}\left[1 - \frac{(1+g)^n}{(1+i)^n}\right]$$

PV of an ordinary perpetuity

$$PV = \frac{C}{i}$$

Present value of a growing perpetuity

$$PV = \frac{C}{i-g}$$

FV with multiple compounding

$$FV = C_0(1+\frac{i}{m})^{nm}$$

Effective annual interest rate

$$EAIR = \left[1+\frac{i}{m}\right]^m - 1$$

FV, continuous compounding

$$FV = C_0(e^{in})$$

PV, continuous compounding

$$PV = C_n(e^{-in})$$

Real cash flow

$$C_r = \frac{C_n}{(1+\pi)^n}$$

Nominal interest rate

$$i = (1+r)(1+\pi) - 1$$

Real interest rate

$$r = \frac{(1+i)}{(1+\pi)} - 1$$

Net present value

$$NPV = C_0 + \sum \frac{C_n}{(1+i)^n}$$

Internal rate of return

$$0 = C_0 + \sum \frac{C_n}{(1+IRR)^n}$$

Profitability Index Method

$$PI = \frac{PV\ project}{C_0}$$

Expected rate of profit

$$R = \sum_{i=1}^{n} P_i R_i$$

Variance

$$\sigma^2 = \sum_{i=1}^{n} P_i (R_i - R)^2$$

Variation coefficient

$$CV = \frac{\sigma}{R}$$

Expected rate of portfolio profit

$$R_p = XR_A + (1-X)R_B$$

Variance of portfolio

$$\sigma_p{}^2 = X^2 \sigma_A{}^2 + (1-X)^2 \sigma_B{}^2 + 2X(1-X)\operatorname{cov}(R_A, R_B)$$

Covariance

$$cov(R_A, R_B) = \sum_{i=1}^{n} P_i (R_{iA} - R_A)(R_{iB} - R_B)$$

$$cov(R_A, R_B) = k_{AB} \sigma_A \sigma_B$$

Correlation coefficient

$$k_{AB} = \frac{cov(R_A, R_B)}{\sigma_A \sigma_B}$$