Expected return of the portfolio: $\bar{R}_p = \sum_{i=1}^{n} x_i \bar{R}_i$

Variance of the portfolio: $\sigma_p^2 = \sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j \sigma_{ij}$ **or** $\sigma_p^2 = \sum_{i=1}^{n} x_i^2 \sigma_i^2 + \sum_{i=1}^{n}\sum_{j=1}^{n} x_i x_j \sigma_{ij} \quad (i \neq j)$

with $\sigma_{ij} = \rho_{ij}\sigma_i\sigma_j$; $\rho_{ij} \in [-1;1]$

Particular cases with n = 2 (hypotheses: $R_2 \rangle R_1$ e $\sigma_2^2 \rangle \sigma_1^2$)

$$\rho_{12} = 1 : \bar{R}_p = \frac{\bar{R}_1 - \bar{R}_2}{\sigma_1 - \sigma_2}\sigma_p + \frac{\bar{R}_2\sigma_1 - \bar{R}_1\sigma_2}{\sigma_1 - \sigma_2}; \qquad x_1 = \frac{\sigma_p - \sigma_2}{\sigma_1 - \sigma_2}.$$

$$\rho_{12} = -1 : \bar{R}_p = \frac{\bar{R}_1 - \bar{R}_2}{\sigma_1 + \sigma_2}\sigma_p + \frac{\bar{R}_2\sigma_1 + \bar{R}_1\sigma_2}{\sigma_1 + \sigma_2} \quad \text{or} \quad \bar{R}_p = \frac{\bar{R}_2 - \bar{R}_1}{\sigma_1 + \sigma_2}\sigma_p + \frac{\bar{R}_2\sigma_1 + \bar{R}_1\sigma_2}{\sigma_1 + \sigma_2}$$

$$x_1 = \frac{\sigma_p + \sigma_2}{\sigma_1 + \sigma_2} \qquad x_1 = \frac{-\sigma_p + \sigma_2}{\sigma_1 + \sigma_2}$$

$$\rho_{ij} = 0: \quad \left(\bar{R}_1 - \bar{R}_2\right)^2 \sigma_p^2 - a\left(\bar{R}_p - b\right)^2 = \bar{R}_2^2\sigma_1^2 + \bar{R}_1^2\sigma_2^2 - ab^2$$

$$a = \left(\sigma_1^2 + \sigma_2^2\right) \qquad b = \frac{\bar{R}_2\sigma_1^2 + \bar{R}_1\sigma_2^2}{\sigma_1^2 + \sigma_2^2}$$

Capital Market Line:

$$\bar{R}_p = R_F + \frac{\bar{R}_m - R_F}{\sigma_m}\sigma_p; \quad x_F = \frac{\sigma_m - \sigma_p}{\sigma_m}$$

Bonds: $P = \frac{C}{1+i} + \frac{C}{(1+i)^2} + \frac{C}{(1+i)^3} + \ldots + \frac{C}{(1+i)^n} + \frac{F}{(1+i)^n}$

Current rate of return: $i_c = \frac{C}{P}$

Actualised rate of return: $i_{db} = \frac{F-P}{F} \times \frac{360}{days\ to\ maturity}$

Rate of return on bond investment: $RET = \frac{C + P_{t+1} - P_t}{P_t} = i_C + g$

Interest rate for a bond of maturity n, according to

Expectations theory $i_{nt} = (i_t + i_{t+1}^e + i_{t+2}^e + \ldots + i_{t+(n-1)}^e)/n$

Liquidity premium theory $i_{nt} = (i_t + i_{t+1}^e + i_{t+2}^e + \ldots + i_{t+(n-1)}^e)/n + l_{nt}$

Stock evaluation:

$$P_0 = \frac{D_1}{(1+k_e)^1} + \frac{D_2}{(1+k_e)^2} + \ldots + \frac{D_n}{(1+k_e)^n} + \frac{P_n}{(1+k_e)^n}$$

Gordon's model $$P_0 = \frac{D_0 \times (1+g)}{(k_e - g)} = \frac{D_1}{(k_e - g)}$$

Exchange rate market

$$R^D = i^D$$

$$R^F = i^F - \frac{E_{t+1}^e - E_t}{E_t}$$

Money supply, monetary multipliers:

$$m = \frac{1+c}{c+r} = \frac{1+c}{c + r_L + r_C}$$

$$m = \frac{1}{b + r - rb}$$

Money demand:

$$M^d = k \times PY$$

$$M^d = L_1(Y) + L_2(i)$$

$$M^d = \sqrt{\frac{b\,T_0}{2\,i}}$$

$$\frac{M^d}{P} = f\left(Y_p, (r_b - r_m), (r_e - r_m), (\pi^e - r_m)\right)$$

Note: variables as used in the classes.