Q2) We want to compare the risk of portfolio such that $W_1 = 40\%$ and $w_2 = 60\%$ with the risks of its components as measured by the variance. Direct computations give

$$\sigma_1^2 \cong 0.0184 \quad \sigma_2^2 \cong 0.0024 \quad \rho_{12} \cong -0.96309$$

By (5.8)

$$\sigma_V^2 \cong (0.4)^2 (0.0184) + (0.6)^2 (0.0024) + 2 (0.4)(0.6) (-0.96309) \sqrt{0.0184}\sqrt{0.0024}$$

$$\cong 0.000736 = 7.36 \times 10^{-4}$$

Observe the variance σ_V^2 is smaller than σ_1^2 and σ_2^2.

Considering another portfolio $W_1 = 80\%$ and weight $2 (w_2) = 20\%$. All other things being the same then

$$\sigma_V^2 \cong (0.8)^2 (0.0184) + (0.2)^2 (0.0024) + 2 (0.8)(0.2) (-0.96309) \sqrt{0.0184}\sqrt{0.0024}$$
$$= 0.009824$$

which is approximately σ_1^2 and σ_2^2

The variance σ_V^2 of a portfolio cannot exceed the greater of the variances σ_1^2 and σ_2^2 of the components.

$$\sigma_V^2 \leq \max\{\sigma_1^2, \sigma_2^2\}$$

If shortsales aren't allowed

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