

Mean-Variance Analysis and the Pricing of Risk (Review 5/9/2011)

EE431/438

Copeland, Thomas E. and J. Fred Weston, Financial Theory and Corporate Policy (4th ed), Addison-Wesley, 2005: Ch5 (pp 101 -141)

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- Returns of a single asset: $E(R_i) = \sum_{i=1}^n p_i R_i$
- Variance of a single asset: $\sigma^2 = E[(R_i - E(R_i))^2]$, S.D = $\sigma = \sqrt{E[(R_i - E(R_i))^2]}$
- $E(R_p) = E[aX + bY] = aE(X) + bE(Y)$
- $VAR_p = a^2 VAR(X) + b^2 VAR(Y) + 2abCOV(X, Y)$
- $r_{x,y} = \frac{COV(X, Y)}{\sigma_x \sigma_y}$
- $VAR_p = a^2 VAR(X) + b^2 VAR(Y) + 2abr_{xy}\sigma_x\sigma_y$
- Benefits of diversification
- minimum variance portfolio: $a^* = \frac{\sigma_y^2 - r_{x,y}\sigma_x\sigma_y}{\sigma_x^2 + \sigma_y^2 - 2r_{x,y}\sigma_x\sigma_y}$