

# Portfolio Theory Class Problem

Finance 4335

Consider a market with only two securities, numbered 1 and 2. Expected returns are  $E(r_1) = 12\%$  and  $E(r_2) = 8\%$ , standard deviations are  $\sigma_1 = 10\%$  and  $\sigma_2 = 4\%$ , and  $\rho_{12} = -1$ ; i.e., returns are perfectly negatively correlated.

- A. Let  $w_1 \geq 0$  be the proportion of wealth invested in security 1 and  $w_2 \geq 0$  be the proportion of wealth invested in security 2, where  $w_1 + w_2 = 1$ . Given these portfolio allocation constraints, what is the range of expected portfolio returns for all possible portfolio combinations consisting of these two securities (including cases where  $w_1 = 0$  or  $w_2 = 0$ )?
  
  
  
  
  
  
  
  
  
  
- B. What is the range of standard deviations for all possible portfolio combinations considered in Part A of this problem (including cases where  $w_1 = 0$  or  $w_2 = 0$ )?
  
  
  
  
  
  
  
  
  
  
- C. What is the expected return and standard deviation for the minimum risk combination of securities 1 and 2?
  
  
  
  
  
  
  
  
  
  
- D. Suppose the riskless lending and borrowing rate is 10%. Describe a trading strategy involving security 1, security 2, and the riskless asset which would enable you to earn riskless arbitrage profits without investing any of your own money.
  
  
  
  
  
  
  
  
  
  
- E. Describe how and why competition amongst investors will cause the returns on these three assets to adjust, such that the opportunity for riskless arbitrage ceases to exist.