**HOMEWORK 6**

*This homework is due on April 17th. It must be handwritten and handed in at the beginning of our lecture. No late homeworks will be accepted. Please show all your work to receive partial credit.*

**1)** Suppose a risk-free asset has a 5 percent return and a second asset has an expected return of 13 percent with a standard deviation of 23 percent. Calculate the expected portfolio return and standard deviation of a portfolio consisting 10 percent of the risk-free asset and 90 percent of the second asset.

**2)** For this question, assume that each stock has the same variance of return (σ2), the correlation between all pairs of stocks is the same (ρ) and stocks are equally weighted. Suppose the average variance of return of all stocks in a portfolio is 625% and the correlation between the returns of any two stocks is 0.3. Calculate the variance of return of an equally weighted portfolio of 24 stocks. Then state that variance as a percent of the portfolio variance achievable given an unlimited number of stocks, holding stock variance and correlation constant.

**3)** Suppose that the risk-free rate is 6 percent and the expected return on the investor’s tangency portfolio is 14 percent, with a standard deviation of 24 percent.

a. Calculate the investor’s expected risk premium per unit of risk.

b. Calculate the portfolio’s expected return if the portfolio’s standard deviation of return is 20 percent.

**4)** Suppose that the risk-free rate is 5 percent and the expected return on the tangency portfolio of risky assets is 13 percent. An investor with $1 million to invest wants to achieve a 17 percent rate of return on a portfolio combining a risk-free asset and the tangency portfolio of risky assets. Calculate how much this investor would need to borrow at the risk-free rate in order to establish this target expected return.

**5)** An investor is evaluating the following investments:

Portfolio A: E(RA) = 12 percent, σ(RA) = 15

Portfolio B: E(RB) = 10 percent, σ(RB) = 8

Portfolio C: E(RC) = 10 percent, σ(RC) = 9

a. Explain the choice among Portfolios A, B, and C using the Markowitz decision rule.

b. Explain the choice among Portfolios A, B, and C assuming that borrowing and lending at a risk-free rate of RF = 2 percent is possible.