University of Texas at Austin

Quiz # 3

Diversification. Efficient portfolio.

**Problem 3.1.** An efficient portfolio contains only systematic risk. *True or false?*

**Problem 3.2.** A portfolio consists of investments indexed by \( i = 1, \ldots, n \) whose weights are denoted by \( x_i, i = 1, \ldots, n \) and whose volatilities are denoted by \( \sigma_i, i = 1, \ldots, n \). Let the return of this portfolio be denoted by \( R_P \) and let its volatility be denoted by \( \sigma_P \). Then,

\[
\sigma_P \leq \sum_{i=1}^{n} x_i \sigma_i
\]

*True or false?*

**Problem 3.3.** Portfolio \( P \) has expected return 0.08 and volatility equal to 12%. Portfolio \( Q \) has expected return 0.10 and volatility equal to 12.5%. Then, we can say with certainty that portfolio \( P \) is not efficient. *True or false?*

**Problem 3.4.** Consider a market-model with two perfectly positively correlated investments. Then, the feasible set is represented by a straight line. *True or false?*

**Problem 3.5.** The Sharpe ratio of any portfolio consisting only of an investment \( I \) and the risk-free investment is the same. *True or false?*

**Problem 3.6.** (5 points) You are an optimist and you model the state of the economy to be twice as likely to be *good* as it is to be *bad*. There are no other states of the economy in your model. You build an equally weighted portfolio out of two stocks \( S \) and \( Q \). According to your model, if the economy is *good*, the return of stock \( S \) will be 0.08 and the return of stock \( Q \) will be 0.10. Also, if the economy is *bad*, the return of stock \( S \) will be \(-0.02\) and the return of stock \( Q \) will be \(-0.04\). What is the volatility of your portfolio?

- (a) 2.1%
- (b) 5.65%
- (c) 7.61%
- (d) 10.21%
- (e) None of the above.

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