

UNIVERSITY OF TEXAS AT AUSTIN

Quiz #19Expected returns. Volatility.

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Provide your complete solution to the following problems:

**Problem 19.1.** (10 points) Your model for the economy at the end of your period has three different states *good*, *so-so* and *bad*. You think that the probability that the economy will be in the *so-so* state is twice the probability that it will be in the *good* state. You also think that the probability that the economy will be in the *good* state is twice the probability that it will be in the *bad* state.

There are two assets in your market model called  $S$  and  $Q$ . Their returns, depending on the state of the economy are modeled as follows:

Asset	<i>good</i>	<i>so-so</i>	<i>bad</i>
$S$	10%	2%	-5%
$Q$	8%	-1%	-4%

Your portfolio is equally weighted between assets  $S$  and  $Q$ . What is the volatility of this total portfolio?

**Problem 19.2.** (5 points) According to your model, the economy over the next year could be *good* or *bad*. You believe that *bad* and *good* are equally likely.

Consider two assets,  $X$  and  $Y$ , existing in this market. If the economy is *good* the return on asset  $X$  is 0.12, and the return on asset  $Y$  is 0.08. If the economy is *bad* the return on asset  $X$  is  $-0.04$  and the return on asset  $Y$  is  $-0.02$ .

You construct a portfolio  $P$  using assets  $X$  and  $Y$  so that the portfolio's expected return equals 0.0325. Calculate the volatility of this portfolio's return.