Problem.

Suppose that the percentage annual return you obtain when you invest a dollar in gold or the stock market is dependent on the general state of the national economy as indicated below. For example, the probability that the economy will be in "boom" state is 0.15. In this case, if you invest in the stock market your return is assumed to be 25%; on the other hand if you invest in gold when the economy is in a "boom" state your return will be minus 30%. Likewise for the other possible states of the economy. Note that the sum of the probabilities has to be 1--and is.

State of economy Probability Market Return Gold Return
Boom 0.15 25% (-30%)
Moderate Growth 0.35 20% (-9%)
Week Growth 0.25 5% 35%
No Growth 0.25 (-14%) 50%

Based on the expected return, would you rather invest your money in the stock market or in gold? Why?

Solution:

The expected return from market equals

$$E_m = 0.15 \cdot 25 + 0.35 \cdot 20 + 0.25 \cdot 5 + 0.25 \cdot (-14) = 8.5.$$

The expected return from gold equals

$$E_g = 0.15 \cdot (-30) + 0.35 \cdot (-9) + 0.25 \cdot 35 + 0.25 \cdot 50 = 13.6.$$

$E_g > E_m$, so it is better to invest in gold.