HOMEWORK 8. For class Monday April 10.

1. (7% of second core exam 2003.) Asset A and asset B exist for one period and their returns have identical covariances with the market return. The rate return of asset B has a variance that is twice as large as the variance of the rate of return of asset A. Which asset will—if the CAPM holds—have the highest expected rate of return?

2. Assume that the return on the market (R_M) is 10% and that a safe asset exists with a return of 6%. Assume that the standard CAPM is true.
a) Let X is an asset whose payout is determined by you flipping a coin and paying 1\$ each heads and nothing if tails. What is the return (R_X) to an investment in X?
b) Now let the return (R_i) to an asset be $R_i = .5\,R_M + .5\,R_X$. What is the expected value $E(R_i)$.
c) If the asset X now paid out 100\$, rather than just 1\$, in the case of heads, and still nothing in the case of tails. What would now be the answer to b)?

3. Assume that IBM stock has a mean return of 3% and a variance of 4, and that GM stock has a mean return of 8% and a variance of 9. Also assume that the covariance between IBM and GM stock is 1. Calculate the mean and standard deviation for portfolios that consist of IBM and GM stocks: do this for 0, 25%, 50%, 75%, and 100% invested in IBM. Sketch (by hand) the efficient frontier when these are the only assets available.

4. (This is a question from a final exam I gave at Binghamton.) Consider the Consumption-CAPM (C-CAPM). Assume that there are two states of the economy next year, "good" and "bad", the good state happens with probability 0.5 (and the bad state with probability 0.5). In the good state aggregate consumption grows 4% and in the bad state it grows 0%. Now consider assets D and E. For these we know the pay-outs. For D the payout is 20 in the bad state and 10 in the good state, while for E the payout is 5 in the bad state and 5 in the good state. Use the C-CAPM as it was derived in the handout. The safe rate of return is 1%.
What would be the price of asset D and asset E?