Econ 134 - Financial Economics

Nehring November 13, 2008

The Investment Exercise - Part 2

Due: Tuesday, November 18. Maximal Score: 130.

Cash in your portfolio on Monday, November 17, at the closing prices of Friday, November 14. For the following analysis, you will compute sample estimates of the expected return and risk of the stocks you picked and of your portfolio. To do so, simply treat each week as one of six possible states with probability 1/7 each, and compute "expected" values (=sample averages) accordingly; Hee Yeul will review this in the discussion section. Of course, the estimation errors will be huge given the small sample size and the volatility of financial markets.

1. (40) First compute the average weekly returns $\widehat{\mu}_X$ and *weekly* volatilities $\widehat{\sigma}_X$. *(For this computation, enter weekly returns with one digit precision to save time (such as +5.1% or -17.4%); the computation of the standard deviations is somewhat tedious, but it shouldn't take more than 2 minutes each. If you know Excel or the like, you can simply use the spreadsheet function.*

	Stock 1	Stock 2	Stock 3	Portf. S	Portf. T	S&P 500
$\widehat{\mu}_X$						
$\widehat{\sigma}_X$						

2. (15) Compare the volatility of your own portfolio S to that of the S&P 500; which one is larger? How would you account for this?

3. (15) To get a feel for the volatility numbers, obtain an estimate of *yearly* volatlities by multiplication with $\sqrt{52}(= 7.2)$ for your computations); there is some neat statistics behind this.

	Stock 1	Stock 2	Stock 3	Portf. S	Portf. T	S&P 500
$\widehat{\sigma}_X \cdot \sqrt{52}$						

4. (20) i) Assume the "true" expected return on your portfolio P to be 8%, and that the volatility of your portfolio of stocks P is as estimated above, i.e. equal to $\widehat{\sigma}_P \cdot \sqrt{52}$. Assuming furthermore that you would hold your portfolio of stocks and cash for 1 year and that the returns on your portfolio P are normally distributed, what is the chance that you would have lost more than 10% *on stocks* (on S) over the com ing year?

ii) Assume also that the return on cash is 2% p.a., and the volatility of your total portfolio T is estimated above, i.e. equal to $\widehat{\sigma}_T \cdot \sqrt{52}$.

What is the chance that you would have lost more than 10% *overall* (on T) over the coming year?

5. (20) i) Compute the (initial) weight w_i of each of your stocks in your portfolio of stocks.

ii) Compute the average volatility of the stocks you own: $\sum_i w_i \widehat{\sigma}_{X_i} = \boxed{\qquad \%}$.

The ratio $\frac{\widehat{\sigma}_P}{\sum_i w_i \widehat{\sigma}_{X_i}} = \boxed{\qquad |}$ can be viewed as a measure of how much your selection of stocks diversified away portfolio risk over the past 8 weeks, a low number indicating substantial diversification; a number below 0.8 would be very low, since you were restricted to investing in only 3 stocks. Your number cannot exceed 1 (whatever stocks you might have picked), except for rounding errors.

6. (20) Compute the sample covariance between your portfolio of stocks S and the S&P500 M, $\widehat{\sigma}_{PM} = \boxed{\qquad |}$, as well as their correlation coefficient $\rho_{PM} = \boxed{\qquad |}$. Use this to obtain an estimate of the beta of S, $\widehat{\beta}_P = \boxed{\qquad |} = \frac{\widehat{\sigma}_{PM}}{(\widehat{\sigma}_M)^2}$. Assuming your sample estimate $\widehat{\beta}_P$ to be equal to the true beta of P, and assuming the CAPM to be valid, your portfolio's true expected return would be greater/less than the expected return on the S&P500 if $\widehat{\beta}_P$ is greater/less than 1. .