

Assignment #7

This assignment is due in class next Tuesday, April 6, 1999. For this assignment, we will go back to individual deliverables. Each of you has to do it. As before, I hope that you will have discussions about this material with classmates, but expect you to submit your own work.

This assignment concerns investing in two assets: the US S&P 500 and the Japanese Nikkei index. The data file IntlInvest.jmp (on the class web page) has the monthly values for these two indices from January 1990 through February, 1999. The data file includes currency exchange rates between Yen and US dollars as well. We will do the analysis using “mark-to-market.” (The data file also includes some data for the German DAX and Brazilian Bovespa index, but the currency data for the latter is a mess and incomplete, so we’ll work with just the other two.)

(1) Compute the returns of the three stock indices and perform an initial descriptive analysis.

- (a) Compute the dollar value of the Nikkei by multiplying by the appropriate exchange rate. You need to multiply the Nikkei by the \$/Yen exchange rate to convert it to dollars (or equivalently divide by the Yen/\$).
- (b) Compute the excess returns (return – US risk-free rate) for the SP500 and Nikkei (in dollars), and describe the marginal distribution of each series.
 - i) Are there significant time trends in the returns?
 - ii) Are the distributions of the returns normally distributed? If not, describe how.
 - iii) Which series has done the best over this 10-year horizon in terms of average return?
 - iv) How do the variances of the three return series compare? Why is this important?
- (c) How would your results for “b” differ if you had not converted the Nikkei into dollars before computing the returns? If they are different, which is the right analysis?

(2) Consider the relationship between the two series.

- (a) Are the two series of excess returns (SP500, Nikkei) correlated? Is the correlation significantly large or different from zero?
- (b) Does a plot of one series on the other suggest any problems using the correlation as a measure of the dependence between the two series?
- (c) Explain briefly why this correlation is/is not important in the analysis of how much of these assets should be bought by an investor in the US.

(3) Consider the situation of an investor who can hold either the US S&P 500 or the Nikkei.

- (a) Using the SP500 excess returns as a baseline, construct a new instrument by removing the SP500 excess returns from the excess returns from the Nikkei. How much of the resulting two uncorrelated investments does an investor (with $k=wealth$) want to hold?
- (b) Now use the Nikkei excess returns as the baseline and again construct two different uncorrelated investments. How much of these two does the investor want to purchase?
- (c) Compare the purchases of the investor in “a” and “b”. Are they really so different? Should they differ at all?

(4) If you were going to repeat the analysis of #3 for an investor in Japan, what other crucial piece of information would you need?