

Assignment #5

Due Thursday 6/17/10 by 6 p.m. in the Econ 300/QAC201 slot in the Economics Alcove

Please show the calculations used to arrive at your answers. Round final answers to the second decimal place if necessary.

A. Use of data in an Excel worksheet and Stata.

- 1) Read your Excel worksheet from Assignment #4 into Stata.
- 2) Compute the median, the average, and the standard deviation of your data series using the correct commands. Print out a page showing your data and the median, average, and standard deviation. Turn in this page as part of your assignment write-up.

B. Use of stock market data and a statistics program to study risk-return relationships.

- 1) The worksheet stocks.xls contains five series of monthly returns from January 1998 through December 2007 for 4 companies and the market. The series are in the following order:

- 1) return on Apple (AAPL) stock
- 2) return on Cisco (CSCO) stock
- 3) return on Intel (INTC) stock
- 4) return on IBM stock
- 5) return on all stocks (actually the S&P 500)

Download this dataset from the course webpage and read it into Stata.

- 2) Calculate means, standard deviations, and correlations between the five returns. Which stock has the highest average return? Which has the lowest? Which stock is the safest? Which stock is the riskiest? How do the individual returns compare to the market return? Are the stock returns highly correlated or not? Why might these stocks be positively correlated? Are the stock returns highly correlated with the overall market? Why might this be?
- 3) Assume these means and standard deviations will be true in the future as well. Create a portfolio out of these four stocks (i.e., indicate what proportion of your investment dollars you would put into each stock if these were the only four you had to choose from) which has the ideal risk-return relationship for you, and explain your choices. If you had the option of also investing in an index fund which promised a return equal to the market return, would you do that, and if so, how would you reallocate your investment dollars?
- 4) One thing many investors want to do is to predict future stock returns. One way to try to do this is to use lagged values of the stock to predict current value. Create lagged values for the four stocks and the overall market. Then for each pair of returns and lagged values calculate the correlation between them. Are any of the return series highly correlated with its lagged series? Would a strategy of investing in stocks after they have a positive return make more or less money than a strategy of investing in stocks after they have a negative return, or do the strategies work about equally well (or badly) over this time period?

- C. Note: Everyone's numbers should be different on this problem.
- 1) Do Problem 6-28 in Chapter 6.
 - 2) Repeat the sampling experiment in Problem 6-28a two more times. Add these to your graph from Problem 6-28b. If this sampling experiment were repeated millions of times, would the millions of values of \bar{X} fall into any sort of pattern? If so, what is the pattern?
- D. The SAT scores of the population of Wesleyan students in the school year 2009-2010 were approximately normally distributed around a mean of 1355 with a standard deviation of 95.
- 1) For a student drawn at random from this population, what is the probability of a score above 1400?
 - 2) The registrar of Wesleyan University does not know the mean score of the population, so she estimates it with the mean \bar{X} of a random sample of 25 scores. She hopes \bar{X} will be no more than 15 points off. What is the probability of this?
- E. On January 1, 2010, the PAC at Wesleyan installs 250 desktop computers in its brand new data lab annex. The manufacturer, Lemon Computers, specifies that the length of time before each computer breaks down is normally distributed around a mean of 3 years, with a standard deviation of 2 years.
- 1) What is the expected number that will still be working by January 1, 2014 (4 years later)?
 - 2) What is the probability that fewer than 100 will have to be replaced by January 1, 2014?
- F. When a fair coin is flipped 12 times, what is the probability of getting 7 or more heads?
- 1) Answer this exactly, using the binomial distribution.
 - 2) Answer this approximately, using the normal distribution.
 - 3) Answer this approximately, using the normal approximation with continuity correction. Comment.
- G. Approximately 10% of the U.S. male population has one of the three most commonly-occurring first names: James, John, and Robert. [<http://www.census.gov/genealogy/www/freqnames.html>]. For a random sample of 500 U.S. males, what is the probability that its proportion of these three surnames would accurately reflect the population proportion within 2 percentage points?