Homework Assignment 2

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Problem 1

I am interested in building a portfolio of stocks and bonds... a very convenient way is to invest in two ETFs (Exchange Traded Funds). Let's we choose VTI and VGLT as the ETFs. Build the efficient frontier combining these two ETFs. What allocation gives you the best Sharpe Ratio? If you decide on a 50-50 allocation, what is the probability you will get a return larger than 1% next month? (To make things a little easier, use monthly returns in the last 5 years.)

Problem 2

Assume my current retirement account has $100,000 invested in the the S&P500. You are my financial advisor and I need you to estimate a plausible range for my investment by the end of my working life (say 20 years from now). What if I save an extra 20k a year and invest it in the market as well?

How does the answer changes if I hold a 50-50 portfolio of stocks (S&P500) and bonds (say U.S. treasuries).

(Hint: I dont know, you are my financial advisor, so go figure it out!! :) Now seriously, using Excel to simulate future possible scenarios is the way to go here.)

Problem 3

In a recent episode of Mythbusters, Jamie and Adam (the show's hosts) wanted to determine whether women are better multitaskers than men. To test this theory, they had 10 men and 10 women perform a set of tasks that required multitasking in order to have sufficient time to complete all of the tasks. They use a scoring system that produces scores between 0 and 100.

The women ended up with an average of 72 with a standard deviation of 5, while the men averaged 64 with a standard deviation of 9. In the show, The Mythbusters concluded that this 8 point difference confirms the myth that women are better multitaskers. Based on the results from the experiment, do you agree with their conclusion? Why?

Problem 4

During a recent breakout of the flu, 850 out 6,224 people diagnosed with the virus presented severe symptoms. During the same flu season, a experimental anti-virus drug was being tested. The drug was given to 238 people with the flu and only 6 of them developed severe symptoms. Based only on this information, can you conclude, for sure, that the drug is a success?

Now, it turns out that the people who received this drug were all MBA students. Can you infer any causal connection between the the drug and the lack of severe symptoms? What are some potential confounding variables that may influence whether someone develop severe symptoms or not?

Problem 5

Time to revisit the slides... rework the following examples:

- Oracle vs. SAP

- Gender gap in the Chicago banking industry

- Google's new search algorithm

Make sure you understand the computation of the standard errors and that you can answer the questions in the slides, including slide 53!

Problem 6

In 1960, census results indicated that the age at which American men first married had a mean of 23.3 years. It is widely suspected that young people today are waiting longer to get married. We want to find out if the mean age at first marriage has increased during the past 50 years. We plan to test our hypothesis by selecting a random sample of 40 men who married for the first time last year. The men in our sample married at an average age of 24.2 years, with a standard deviation of 5.3 years.

1. Based on a 99% confidence interval, what do you conclude?

2. Now, use a t-stat... explain your conclusion

Problem 7

A SurveyUSA poll conducted on March 1, 2011 asked randomly sampled Los Angeles residents about their views on American vs. foreign-made products. One of the questions on the survey was "If an American-made product cost slightly more than a foreign-made product, which would you be more likely to buy?"

81 out of the 166 respondents between the ages of 18 and 34, and 248 out of the 334 respondents 35 years and older said they would prefer the American-made product. We are interested to see if younger people are less likely to choose American-made products. Test this hypothesis at the 5% level.

Problem 8

Your dad claims that he shoots better than 50% from the three point line. You bet him $100 that doesn't, based on a challenge where he attempts 10 shots. He makes 7 of his shots and says that you owe him $100. You say that you do not, because you cannot reject the null hypothesis that he shoots exactly 50%. Who is right, here?