ECN 410: Topics in Financial Economics
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Spring 2021
Problem Set #5
Due April 6th before class

Question 1

Warren Buffett is one of the most famous and successful investors in history. The firm he controls, Berkshire Hathaway, invests either directly in other firms (or owns the firms outright) or invests in the stock of other firms. The performance of Berkshire Hathaway over time has been extraordinary. If you invested $10,000 in Berkshire Hathaway stock (ticker brk.a) in January 1986, it would be worth about $1,476,032 today. If instead you had invested that $10,000 in a S&P 500 index mutual fund (ticker VFINX) in January 1986, it would only be worth about $379,035 today.

What drives Buffett's superior performance? The standard story is that he has been a great stock picker; he has consistently invested in high positive α stocks. But more recently, people have asked whether instead he has invested in stocks with high exposure to factors. In this alternative story, he has chosen stocks with characteristics that tend to perform well in general, not just the stocks with these characteristics that Buffett bought.

Let's see which story is more consistent with the empirical evidence. Given that Berkshire Hathaway is a publicly traded firm, we can track the performance of Buffett's investments over time by examining the performance of Berkshire Hathaway's stock.

a) Let's again use the Portfolio Visualizer website (`https://www.portfoliovisualizer.com/`). We are going to use it to look at historical estimates of the CAPM (and other multifactor models) for Berkshire Hathaway. On the main page of the website, click on the "Factor Regression" link. On this webpage, put the ticker symbol for Berkshire Hathaway (brk.a) in the window labeled "Tickers". In the window labeled "Equity Factor Model", choose CAPM. Click on the "Factor Analysis" button. This will give you the results of the CAPM regression. You will see that the estimated α is quite high (about 7.9% per year). What is Berkshire Hathaway's β?

b) So CAPM suggests that Buffett is choosing high α investments. Let's see what happens when we allow there to be additional factors. We'll start with the Three-Factor Model. Now in the "Equity Factor Model" window, choose the Three-Factor Model instead of CAPM. Again, click on the "Factor Analysis" button. What happens to the estimated α when we add these two additional factors? Based on the estimated loadings on SMB and HML, exposure to which of these factors helps explain some of Buffett's extraordinary performance?

c) Now run the Four-Factor Model and answer the same questions from part b. That is, explain which factor exposures help explain Berkshire Hathaway's performance.

d) Now run the Five-Factor Model. What happens to the estimated α? Based on these results, which factor exposures help explain Buffett's performance?

Question 2

Which of the following phenomena would be either consistent with or a violation of the Efficient Market Hypothesis? Explain.

a) Nearly half of all professionally managed stock mutual funds are able to outperform the S&P 500 in a typical year.

b) Money managers who outperform the market (on a risk-adjusted basis) in one year are likely to outperform in the following year.

c) Stock prices tend to be predictably more volatile in January than in other months.

Question 3

Suppose that as the economy moves through a business cycle, market risk premiums also change. For example, in a recession when people are concerned about their jobs, risk tolerance might be lower and market risk premiums might be higher. In a booming economy, tolerance for risk might be higher and market risk premiums might fall.

a) Would a predictably shifting market risk premium such as described here be a violation of the efficient market hypothesis?

b) How might a cycle of increasing and decreasing risk premiums create an appearance that stock prices "overreact," first falling excessively during the recession and then seeming to recover?

Question 4

Shares of small firms with thinly traded stocks tend to show positive CAPM alphas. Is this a violation of the Efficient Market Hypothesis? Describe a scenario where this would not be a violation. Then describe a scenario where it is.

Question 5

Firm XYZ just announced an increase in its quarterly earnings, but its stock price fell substantially. Is there a rational explanation for this phenomenon? That is, why might the market react negatively to something that on the surface looks like the release of good news?