University of Chicago
Booth School of Business
41000: Business Statistics, Autumn 2021: Homework Assignment 3. Due in Week 8

Problem 1: Warren Buffett vs John Maynard Keynes

The datasets `buffett.txt` and `keynes.txt` contain the investments records of two famous investors: Warren Buffett and John Maynard Keynes. They both had very different investments styles which both turned out to be very successful. Your job is to use regression analysis to quantify their styles and assess their investment records.

The market model of asset returns assumes that returns of an investors portfolio are linearly related to those on the market, i.e. $Y = \alpha + \beta X + \epsilon$.

Here Y is the return of Buffett's or Keynes' portfolio and X is the return on the market (S&P500 for Buffett and FTSE100 for Keynes). The error term, ϵ, corresponds to idiosyncratic risk of the portfolio.

(a) Build the market model for Warren Buffett and Keynes

(b) Interpret the regression coefficients *alpha* and *beta* for both investors

What do they tell you about their investment styles?

(c) Provide a prediction of returns to their portfolios in the two scenarios for the market returns, first $+10\%$ and then -10%. Explain clearly your findings.

Aside: Keynes managed for King's College of Cambridge University in the 1930s. A full discussion of the data is given in the paper by Chua and Woodward in *Journal of Finance*. The Table of returns are given by:

Year	Keynes	Market
1928	-3.4	7.9
1929	0.8	6.6
1930	-32.4	-20.3
1931	-24.6	-25.0
1932	44.8	-5.8
1933	35.1	21.5
1934	33.1	-0.7
1935	44.3	5.3
1936	56.0	10.2
1937	8.5	-0.5
1938	-40.1	-16.1
1939	12.9	-7.2
1940	-15.6	-12.9
1941	33.5	12.5
1942	-0.9	0.8
1943	53.9	15.6
1944	14.5	5.4
1945	14.6	0.8

Problem 2: Diamond Ring Pricing.

The price of diamond jewelry in depends on the four C's: caratage, cut, color, and clarity of the diamond stone. The dataset `diamond.txt` provides prices and carats for a sample of diamond rings. It contains two variables

`Price` in Singapore dollars of a diamond ring

`Carats` weight in carats

Use this dataset to address the following:

(a) Build a linear regression between price and carat

(b) Is it reasonable to assume that the relationship between prices and carats is linear?

(c) What's you plug-in prediction for a 0.25 carat ring? How about a 1 carat ring?

Problem 3: NFL Salaries.

The dataset `NFLsalary.txt` contains the following variables

`Conf` conference (NFC or AFC)

`Team` name of team

`QB` quarterback starting salary

`Salary` team salary in thousands of dollars

(a) Plot a boxplot to compare salaries of the NFC to AFC.

(b) Use a dummy variable regression to assess the difference in salaries between NFC and AFC

(c) Run a regression with the controlling factors, `Conf` and `QB`. What do you learn?