SIMON FRASER UNIVERSITY
Department of Economics

Econ 815   Prof. Kasa
Financial Economics I   Fall 2024

PROBLEM SET 1
(Due October 21)

1. (30 points). This question asks you to estimate and test the CAPM. On the course webpage, I've posted two excel files: Fama-French-factors.xls and Fama-French-ports.xls. They contain monthly stock return data from the USA for the period 1926-2019. Column B in Fama-French-factors contains a time-series of market excess returns (Mkt-RF). Columns B-Z of Fama-French-ports contains time-series data on the returns of 25 portfolios sorted by size and book-to-market. (There are 5 categories of size and book-to-market ratios, and Fama & French form 25 portfolios by interacting them with each other).

    (a) Plot the market excess return. What is its mean? What is the Sharpe ratio? (Note: Use whatever software you want).

    (b) Compute the mean returns for the 25 Fama-French portfolios. Which have the highest average return? Which have the lowest?

    (c) Compute (full-sample) β's for the 25 portfolios, by running 25 separate bivariate time-series regressions of portfolio returns on the market excess return. (Be sure to include an intercept). Save the 25 β estimates you get.

    (d) Now do a single cross-sectional regression of the (average) returns of the 25 portfolios onto their β's. (Again, include an intercept). Plot the actual vs. fitted regression line. What is the R^2 (ie, what proportion of the variation in mean returns on $size \times book/market$ sorted portfolios can be explained by the CAPM? Is the estimated slope (approximately) equal to the market excess return? (Note: You don't need to compute a formal test statistic).

2. (20 points). Consider a world with just two 'states' - War or Peace. There are two firms in the economy - Apple and Samsung. The share price of Apple is $21 and the share price of Samsung is $20. Assume their state-contingent profits are as follows:

	War	Peace
Apple	3	5
Samsung	1	6

    (a) What are the (implicit) state-contingent claims prices (ie, the price of $1 if and only if a given state occurs)?

    (b) Given your answer to part (a), what must be the price of a risk-free asset?