

Lecture 5 Homework:

(due by Lecture 6 in Chalk FINM331 Assignments submenu)

- You must show your work, code and/or worksheet for full credit.
- Justifying each non-trivial step with a reason is part of showing your work.
- There are 10 or more points per question if correct and best answer.
- Report numerical values in at least 4 significant digits (e.g., for errors use format like `%8.3e`).

1. (40 points) **How much is the price of a stock driven by the market?** Choose a stock in S&P500 and get the adjusted closing prices over the same date range as for your 2009 S&P500 index (stand-in for the market) in Homework 3 – Problem 1.

- Use the full MATLAB function `regress` or equivalent to find how much of a linear response of the stock price log-returns is due to the index log-returns. Report the estimated parameter coefficients, observation residuals with CI, R^2 statistics, F statistics with p -value, error variance estimate, standard error (SE) and covariance matrix of the parameters. Plot the scatter of the responses versus predictors, with the estimate linear response on the same graph.
- Test the validity of the `regress` results of part (a), assuming the errors are normally distributed, using the estimated parameters and error standard deviation of (a), then reuse `regress` with the corresponding normal simulation of the responses from a uniform simulation of the predictors over the predictor log-return range. Find how close the estimated parameters from the simulation compares to the parameter results of part (a), reporting the relative difference in the two parameter sets and whether the difference is within the standard confidence interval of 95%. Also, report the same statistical data as for part (a).
- Repeat part (a) for a quadratic response model, i.e., add a second predictor variable $x_2 = x^2$ to the linear response model, where x is the prior predictor variable. Report the same statistical data as for part (a).
- Discuss the significance of the results, including model validity, advantages, disadvantages and any other criticism.