Financial Econometrics

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Exercise 1 Consider the following APT-style model:

$$r_A = \beta_0 + \beta_1 r_M + \beta_2 \pi + u$$

where r_A and r_M are excess returns on, respectively, an asset A and a market index, and π is the inflation rate.

You are interested in testing for heteroskedasticity. Describe the White procedure, with particular respect to:

- the construction of the test
- the final decision rule

Exercise 2 Consider a stock A and the market portfolio M. You have observed a sample of 47 data points and estimated a CAPM model of the excess returns r_A:

$$r_A = \alpha + \beta r_M + \varepsilon$$

resulting in $\hat{\alpha} = 0.4$, $\hat{\beta} = 1.5$ with standard errors, respectively, 0.6 and 0.2.

- You are given the table of critical values for the t distribution. Construct the 95% confidence interval for α and β.
- Comment on the results in the light of the CAPM theory, with particular respect to the proposition: "A is a defensive stock".

Exercise 3 Consider the linear model

$$y = X\beta + \varepsilon$$

- Describe the consequences of serial correlation in ε on the ordinary least squares estimator $\hat{\beta}_{OLS}$
- Consider the null hypothesis of no serial correlation. Formalize some possible alternatives $H_A^{(1)}, H_A^{(2)}, \ldots$ and discuss in which empirical settings might they become relevant.