Financial Econometrics

June 15th 2015

Exercise 1 Consider a stock A and the market portfolio M. You have observed a sample of weekly data over two years and estimated a CAPM-style model of the excess returns r_A:

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

You have estimated the standard OLS model and obtained estimates $\hat{\alpha}, \hat{\beta}$ for the unknown parameters α, β.

The history of your sample, nevertheless, comprehends a big stockmarket crash, happened in the 40th week: one of those events after which, according to newspapers, "the world will not be the same as before".

- How would you test for parameter stability in the estimated model?

Exercise 2 Consider the linear model

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

- Describe the consequences of heteroskedasticity in ε on the ordinary least squares estimator $\hat{\beta}_{OLS}$
- Consider the null hypothesis of homoskedasticity. Formalize possible alternative hypotheses $H_A^{(i)}$ and discuss the available testing procedures.
- Discuss alternative estimation strategies under heteroskedasticity.

Exercise 3 Consider a stock A and the market portfolio M. Unlike Exercise 1, this time you have observed a sample *without* exceptional events and estimated a CAPM-style model of the excess returns r_A:

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

Suppose that your model be statistically admissible in that it passed the "usual" tests for the OLS hypotheses. Let the resulting parameters be $\hat{\alpha} = -0.3$, $\hat{\beta} = 1.2$ with standard errors, respectively, 0.10 and 0.25. The number of observations is 100.

- What can you say about the model intercept, seen as *Jensen's* α?

Please refer to the table of critical values for the t distribution you have been given; alternatively, you can use a Normal approximation, provided you motivate your choice.