Financial Econometrics

July 2nd 2015

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 have observed a sample of 88 data points and estimated the β vector by OLS, resulting in: $\hat{\alpha} = 0.4$, $\hat{\beta}_1 = 1.5$ and $\hat{\beta}_2 = 0.8$, with standard errors, respectively, 0.6, 0.2 and 0.5.

You want to compare this model with the standard CAPM model (with intercept). Based on the information you have now,

- decide which of the two models is the best description of the data

Exercise 2 Consider the model from Exercise 1. You have now done a residual serial correlation test following the Breusch-Godfrey procedure, and the test rejected at the 0.001 confidence level.

- Discuss the consequences of this new evidence on the properties of the $\hat{\beta}_{OLS}$ estimator
- What now? Discuss the strategies you, the econometrician, might adopt in the light of your answer to the previous question.

Exercise 3 Consider the simple bivariate linear model

$$y_i = \alpha + \beta x_i + \varepsilon_i$$

- Answer the following question: if you write the model in matrix form, as $y = X\beta + \varepsilon$, who is X?
- Write the formula for the ordinary least squares estimator $\hat{\beta}_{OLS}$ using both summations and matrix notation
- Derive the ordinary least squares estimator $\hat{\beta}_{OLS}$ from the first-order conditions *(You have the choice between using either summations or linear algebra)*