Financial Econometrics

January 24th 2018

Exercise 1 (3/10) Consider the sovereign spread y and the sovereign rating z of a country A, and three macroeconomic factors x_1, x_2 and x_3 (e.g., *growth*, *external balance* and *external debt*). You have observed a sample of quarterly data over 20 years and estimated a model (a) of the spread following Cantor and Packer (1996):

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + \beta_3 x_{3t} + \varepsilon_t$$

obtaining OLS estimates $\hat{\beta}$ for the unknown parameters, residuals $\hat{\varepsilon}$, standard errors $SE(\hat{\beta})$ etc.. In order to assess the informative power of the sovereign rating, you have also estimated the augmented model (b):

$$y_t = \gamma_0 + \gamma_1 x_{1t} + \gamma_2 x_{2t} + \gamma_3 x_{3t} + \gamma_4 z_t + \eta_t$$

which includes the sovereign rating next to the macroeconomic factors. You have obtained $\hat{\gamma}$, $\hat{\eta}$ and standard errors $SE(\hat{\gamma})$ as above.

- How would you assess whether the rating gives more accurate information than that embodied by the macroeconomic factors alone?

Exercise 2 (3/10) Consider the linear model

$$y = X\beta + \epsilon$$

- Consider the null hypothesis of homoskedasticity. Formalize possible alternative hypotheses $H_A^{(i)}$ and discuss the available testing procedures.

Exercise 3 (4/10) Consider model (a) from Exercise 1 in matrix form

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

1. Show how the design matrix X is formed.

2. Derive the Ordinary Least Squares estimator $\hat{\beta}_{OLS}$ from the first order conditions

3. Show that $\hat{\beta}_{OLS}$ is unbiased