Homework # 4

Note: In empirical problems you are also asked to provide the description of hypothesis, test statistics, and regressions you plan to use and run. Also include as an attached printout the Stata log file containing the program code and estimation output.

1. *Short essay questions*

   (a) Explain in your own words why the assumption of strict exogeneity was not explicitly stated in the cross-sectional case, which is not true in the time series case. *[0.5]*

   (b) Does defining a dynamic model with a lagged dependent variable on RHS (in addition to the included exogenous variables and their lags) create any problem? *[0.5]*

   (c) Assume you are given time series with linear trend. Discuss possible pro's and con's of including a linear trend, first differencing, and detrending. *[0.5]*

   (d) What would it imply to say that two time series are cointegrated of order 1? *[0.5]*

2. *[1.5]* Assume you are given the following model:

$$\begin{aligned} y_t &= \beta y_{t-1} + u_t & t = 1, \ldots, n, \\ u_t &= \rho u_{t-1} + \varepsilon_t & \varepsilon_t \sim iid(0, \sigma^2) \end{aligned}$$

   Under the stationarity conditions of $|\beta| < 1$ and $|\rho| < 1$ show that

$$p\lim \hat{\beta}_{OLS} = \frac{\beta + \rho}{1 + \beta\rho} \neq \beta.$$

3. Problem 12.14, Wooldridge *[2.0]*

4. Problem 12.4, Wooldridge *[1.0]*

5. Problem 18.3, Wooldridge *[1.0]*

6. Problem 18.4, Wooldridge *[1.0]*

7. Problem 18.11, Wooldridge *[1.5]*