Assignment 3

Any Group

Abstract

Estimating a (time series) model and critically assessing the results; subsetting a `data.frame`, plotting and using diagnostic functions with R

Keywords: regression, testing, heteroskedasticity, serial correlation, R.

You have been given the `Parity` dataset from the **plm** package ("`data(Parity, package='plm')`"). This is a panel dataset of 17 OECD countries observed over quarters 1973Q1 to 1998Q4, so that $N = 17$ and $T = 104$.

The model of interest (taken from Coakley et al., Computational Statistics and Data Analysis, 2006) is the purchasing power parity (PPP) regression:

$$\Delta s_{it} = \beta_0 + \beta_1(\Delta p - \Delta p^*)_{it} + u_{it}$$

where s_{it} is the relative exchange rate against USD and $(\Delta p - \Delta p^*)_{it}$ is the inflation differential between the country and the US.

The hypothesis of interest is $\beta_1 = 1$, i.e. that the PPP theory holds in its strict form (international price differentials are promptly reflected in the exchange rate). Before drawing inferences on your theory, however, you must assess the statistical qualities of your estimated model.

You are required to:

1. extract the data for the country with the index I equal to your group's number (must be a single time series with $T = 104$)
2. estimate the PPP regression on levels as $ls = \beta_0 + \beta_1 ld + u$, where ls is the log of the spot exchange rate vs. USD and ld is the log of the price differential of the given country vs. the United States.
3. estimate the model (on levels) by OLS
4. visualize the residuals and comment on what obvious features you can (or cannot) see
5. perform formal misspecification testing on the residuals of the estimated model
6. consider the first differences specification $\Delta ls = \gamma_0 + \gamma_1 \Delta ld + e$ (*hint: use the* `diff()` *function*) and repeat steps 3-5: what has changed?
7. briefly assess the original hypothesis in the light of your findings.

Please provide the results under form of a readable document in free format, with a reasonable amount of comments where appropriate.

The deadline for this assignment is Wednesday, December 16th.

Affiliation:

Giovanni Millo
DEAMS, University of Trieste
Piazzale Europa 1
Trieste (Italy)
E-mail: giovanni.millo@deams.units.it