Erasmus School of Economics

MOOC Econometrics

Training Exercise 6.4

Notes:

- This exercise uses the datafile `TrainExer64` and requires a computer.
- The dataset `TrainExer64` is available on the website.

Questions

The datafile TrainExer64 contains the Revenue Passenger Kilometer (RPK) data of two airline companies that were considered in Lecture 6.4. In this exercise, you are asked to perform a set of regressions to check the main results presented in the lecture. For ease of notation, we denote the log of RPK by X_1 for company 1 and by X_2 for company 2. The first differences ΔX_1 and ΔX_2 are the yearly growth rates of RPK.

(a) Perform two F-tests, one for the Granger causality of ΔX_2 for ΔX_1 and the other for the Granger causality of ΔX_1 for ΔX_2. Include a constant and two lags of both variables in the test equations. Report the degrees of freedom and the numerical values of the two F-tests, and draw your conclusion. The relevant 5% critical value is 3.3.

(b) (i) Perform the Augmented Dickey-Fuller (ADF) test for X_1. In the ADF test equation, include (among others) a constant (α), a deterministic trend term (βt), and a single lag of ΔX_1. Report the coefficient of $X_{1,t-1}$ and its standard error and t-value, and draw your conclusion.

(ii) Perform a similar ADF test for X_2.

Note that the 5% critical value differs from the usual one, as explained in the lecture.

(c) Perform the two-step Engle-Granger test for cointegration of the time series X_1 and X_2. The second-step regression is of the type $e_t = \alpha + \rho e_{t-1} + \beta \Delta e_{t-1} + \omega_t$, where e_t are the residuals of step 1. Check that step 1 gives $X_{2t} = 0.01 + 0.92 X_{1t}$. Further, report the regression equation of step 2, perform the test, and draw your conclusion.
Note that the 5% critical value differs from the usual one, as explained in the lecture.

(d) Finally, estimate an error correction model (ECM) for X_1 and also one for X_2. In each ECM, include a constant term, a single own lagged term, and the error correction term $X_{2,t-1} - 0.92 X_{1,t-1}$ obtained from the first step of Engle-Granger in part (c). Provide an interpretation of the results in terms of mechanisms that correct for disequilibrium.