Ejercicios propuestos C. Alexander II.5 – Time series. Cointegration

1. Is the process $X_t = 0.03 + 0.75X_{t-1} - 0.25X_{t-2} + \varepsilon_t + 0.5\varepsilon_{t-1}$ stationary?

2. Calculate the impulse response function for the model considered in the previous exercise. How long does it take for one half of the impact to be incorporated into X_t, and what is the mean lag?

3. Estimate the parameters of a second order autoregression for the data in the spreadsheet.

4. Construct a 95% confidence interval for the ARMA(2,1) process in exercise 1 when ε_t is normal and identically distributed with variance 0.05.

5. Do the FTSE 100 ad S&P 500 indices have unit roots? Does the sterling-US dollar exchange rate have a unit root? Apply augmented Dickey-Fuller tests to daily data on these three variables between 1996 and 2007, using the daily closing prices contained in the spreadsheet.

6. Are UK interest rates generated by an integrate process? Base your answer on the Bank of England's 2-year interest rate data in the spreadsheet.

7. Are credit spreads stationary? Base your answer on the iTraxx Europe index data in the spreadsheet for this exercise.

8. Use a Dickey-Fuller and an augmented Dickey-Fuller test to test whether the data on volatility index futures' Vdax and Vstoxx in the spreadsheet are integrated processes.

9. Are the S&P 500 and the FSTE 100 indices cointegrated? Are the DAX 30 and CAC 40 indices cointegrated?

10. How many cointegrating vectors are there in UK short spot rates of maturities 1 month, 2 months, 3 months, 6 months, 9 months and 12 months? What are the cointegrating vectors?

11. Build a simple ECM for the log returns on the spot and futures on the Hang Seng index based on daily data over the period from April 1991 to April 2006.

12. Use the ECM of the previous exercise to investigate whether Hang Seng futures prices lead spot prices, or conversely or indeed both, because there may be bivariate causality.