Time Series Econometrics: Home work assignment 5

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Abstract

Please write your report in LaTeX. The report should be clearly written such that it is easy to understand what is done and why. Please attach any computer code in an appendix.

1 Problem 1

Assume the model

$$\Delta \mathbf{y}_t = \boldsymbol{\zeta}_0 \mathbf{y}_{t-1} + \boldsymbol{\epsilon}_t$$

where

$$\mathbf{y}_t = \begin{pmatrix} i_t^{1W} \\ i_t^{10Y} \end{pmatrix},$$

i.e. a 2×1 vector with one-week and ten-year interest rates. The error terms $\boldsymbol{\epsilon}_t$ are iid $N(\mathbf{0}, \boldsymbol{\Omega})$, $t = 1, 2, \ldots, T$. The data to be used can be obtained at `https://www.riksbank.se/en-gb/` under *Search interest & exchange rates*. Download the STIBOR one-week interest rate and the 10 year rate for Swedish government bonds (in Swedish Market (based) rates). Use monthly data and as long a sample as possible.

1. Plot the series. Could these potentially be cointegrated?
2. Estimate the cointegrating rank of the system by a sequence of tests.

3. Assume that the cointegrating rank is 1 and, using Johansen's approach, test that $i_t^{1W} - i_t^{10Y}$ is a cointegrating relation, i.e. that the spread between the two interest rates is stationary.

4. Test the same null hypothesis using a simple unit root test.