NG and ADF test (excess return)

Shuofan Zhang

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Data

Data: 131-8=123 series in total.

The "spread" series (difference between two I(1) series) are removed.

log() is done.

ADF test

Step 1, ADF test to the 146 original series.

Step 2, mark "I(0)" variables as "I(0)".

Step 3, ADF test to the first-differenced 146 series.

Step 4, check for contradictions, found "PCED_RecServices" in AIC.

Step 5, mark "I(1)" variable as "I(2)" (including "PCED_RecServices").

Step 6, mark the rest as "I(1)".

Step 7, repeat the above 6 steps for both "AIC" and "BIC".

Lasso 1

I(2) is first differenced, others are original.

$$\begin{aligned} y_t = & I(0)_{t-1} + I(0)_{t-2} + I(0)_{t-3} + I(0)_{t-4} \\ & + I(1)_{t-1} + I(1)_{t-2} + I(1)_{t-3} + I(1)_{t-4} \\ & + \Delta I(2)_{t-1} + \Delta I(2)_{t-2} + \Delta I(2)_{t-3} + \Delta I(2)_{t-4} \end{aligned}$$

Lasso 2

All stationary.

$$\begin{aligned} y_t = & I(0)_{t-1} + I(0)_{t-2} + I(0)_{t-3} + I(0)_{t-4} \\ & + \Delta I(1)_{t-1} + \Delta I(1)_{t-2} + \Delta I(1)_{t-3} + \Delta I(1)_{t-4} \\ & + \Delta^2 I(2)_{t-1} + \Delta^2 I(2)_{t-2} + \Delta^2 I(2)_{t-3} + \Delta^2 I(2)_{t-4} \end{aligned}$$

Lasso 3

Combination of Lasso 1 and 2.

$$
\begin{aligned}
y_t = & I(0)_{t-1} + I(0)_{t-2} + I(0)_{t-3} + I(0)_{t-4} \\
& + \Delta I(1)_{t-1} + \Delta I(1)_{t-2} + \Delta I(1)_{t-3} + \Delta I(1)_{t-4} \\
& + \Delta^2 I(2)_{t-1} + \Delta^2 I(2)_{t-2} + \Delta^2 I(2)_{t-3} + \Delta^2 I(2)_{t-4} \\
& + I(1)_{t-1} + \Delta I(2)_{t-1}
\end{aligned}
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