

SW and ADF test (GDP)

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Data

Data: $145+1-5=141$ series in total.

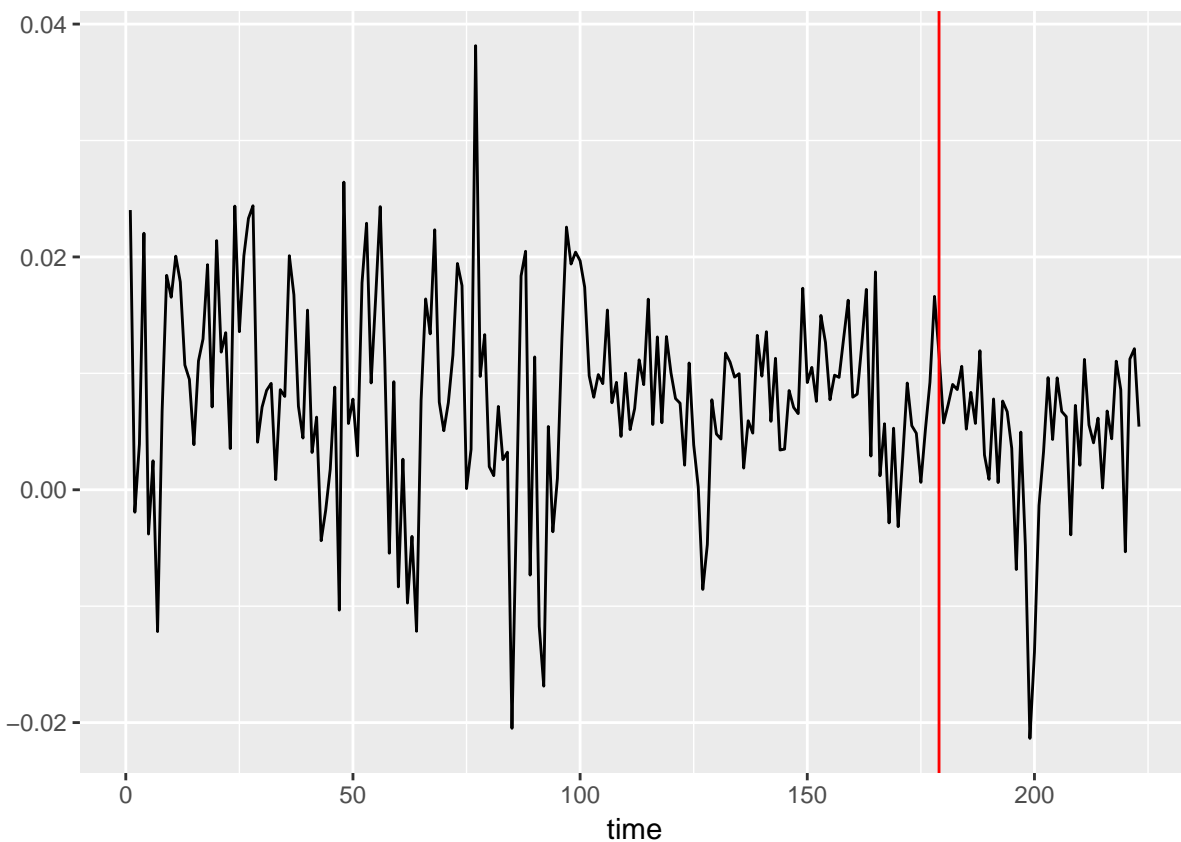
The “spread” series (difference between two $I(1)$ series) are removed.

One of the $I(1)$, “CP3FM” (short name: “Com Paper”) was omitted in the original data set, now is added.

$\log()$ is done.

y is GDP.

The earliest 80% of data were used to estimate the coefficients, the rest 20% were used to calculate the out-of-sample MSE.



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”.

AR(p) model

- The estimation method is OLS; lags are chosen by AIC.

Lasso 1

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

Lasso 2

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

Lasso 3

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

Table 1: out-of-sample MSE, when the dependent variable is inflation

	SW	AIC	BIC
LASSO 1	0.7607	0.726	0.7059
LASSO 2	0.4971	0.4971	0.4993
LASSO 3	0.4981	0.4981	0.5002

- AIC chooses 2 lags for the GDP growth.
- The out-of-sample MSE of AR(2) is 0.89.

- The estimated AR(1) coefficient is 0.3078.

