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" was omitted in the original data set, now is added.

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

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

Table 1: Lasso 1, non-zero coefficients

I(1)	S & W	AIC	BIC	NA
	Ch. Inv/GDP.lag1	-0.00082	-0.00082	-0.00082
	NAPM:ORD.lag1	0.2272	0.2272	0.2272
AIC, BIC	Cons. Expectations.lag1	0.1515	0.1515	0.1515
SW, AIC	Urate_ST.lag2	0.01723	0.01723	0.01723
	NAPM com price.lag2	-0.01208	-0.01208	-0.01208
SW, AIC	Urate_ST.lag3	0.01164	0.01164	0.01164

Lasso 2

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

Table 2: Lasso 2, non-zero coefficients

I(1)	S & W	AIC	BIC
NAPM:ORD.lag1	0.03295	0.03742	0.03742
Cons. Expectations.lag1	0.03649	NA	NA
D.Cons:Svc.lag1	0.1925	0.207	0.207
D.FixedInv:Res.lag1	0.195	0.1949	0.1949
D.IP: Nondur gds materials.lag1	0.07359	0.07647	0.07647
D.Emp:SlackWk.lag1	-0.02158	-0.0262	-0.0262
D.S&P 500.lag1	0.03021	0.03089	0.03089
D.PCED_OtherServices.lag3	NA	NA	-0.001005

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 3: Lasso 3, non-zero coefficients

I(1)	S & W	AIC	BIC	NA
AIC, BIC	NAPM:ORD.lag1	0.03281	0.03289	0.03289
	Cons. Expectations.lag1	0.03553	0.03613	0.03613
	D.Cons:Svc.lag1	0.1916	0.1915	0.1915
	D.FixedInv:Res.lag1	0.1945	0.1944	0.1944
	D.IP: Nondur gds materials.lag1	0.0728	0.07267	0.07267
	D.Emp:SlackWk.lag1	-0.0209	-0.0209	-0.0209
	D.S&P 500.lag1	0.02865	0.02866	0.02866