```
      name:  <unnamed>
       log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
> mcl
  log type:  smcl
 opened on:  10 Nov 2020, 17:11:47

1 . clear

2 .  import excel "/Users/nicolaszhang/Downloads/InflationvReservesForStatawGDP.
> xlsx", sheet("InflationvReservesForStata") firstrow
(13 vars, 479 obs)

3 .  gen monthly_date = mofd(date )
(2 missing values generated)

4 .     format monthly_date %tm

5 . tset monthly_date
        time variable:  monthly_date, 1980m9 to 2020m5
                delta:  1 month

6 .
7 .  dfuller  ChinaReserveChangeInPercent, lags(2) trend regress

Augmented Dickey-Fuller test for unit root         Number of obs   =       474

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -9.673            -3.981            -3.421           -3.130
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

------------------------------+-----------------------------------------------
> ---------------
D.                            |
ChinaReserveChangeInPercent |      Coef.   Std. Err.      t    P>|t|     [95%
> Con
>    f. Interval]
------------------------------+-----------------------------------------------
> ---------------
ChinaReserveChangeInPercent |
                        L1. |  -.6237217   .0644816    -9.67   0.000    -.7504
> 303
>       -.4970131
                        LD. |  -.2150738   .0584794    -3.68   0.000    -.3299
> 879
```

```
>       -.1001597
                      L2D. |  -.0854132   .0454791    -1.88   0.061    -.1747
> 812
>        .0039548
                           |
                    _trend |  -.0030458   .0015532    -1.96   0.050    -.0060
> 978
>        6.24e-06
                     _cons |   1.715847   .4525058     3.79   0.000     .8266
> 575
>        2.605037
-----------------------------+------------------------------------------------
> ---------------
```

8 . dfuller ChinaReserveChangeInPercent if inrange(monthly_date, tm(2012m1), tm
> (2015m12)), lags(2) trend regress

Augmented Dickey-Fuller test for unit root Number of obs = **48**

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	**-2.920**	**-4.168**	**-3.508**	**-3.185**

MacKinnon approximate p-value for Z(t) = **0.1559**

```
-----------------------------+------------------------------------------------
> ---------------
D.
ChinaReserveChangeInPercent |      Coef.   Std. Err.      t    P>|t|     [95%
> Con
>    f. Interval]
-----------------------------+------------------------------------------------
> ---------------
ChinaReserveChangeInPercent |
                         L1. |  -.6482965   .2220463    -2.92   0.006    -1.096
> 095
>       -.2004976
                         LD. |  -.2259096   .1918897    -1.18   0.246    -.6128
> 919
>        .1610728
                        L2D. |  -.1740738   .1444444    -1.21   0.235    -.4653
> 737
>        .1172261
                           |
                      _trend |  -.0385664   .0150792    -2.56   0.014    -.0689
> 766
>       -.0081562
```

```
                       _cons |   .9465636   .4153077     2.28   0.028     .1090
> 159
>        1.784111
-----------------------------+------------------------------------------------
> ----------------

9 . dfuller  ChinaReserveChangeInPercent if inrange(monthly_date, tm(2002m1), tm
> (2005m12)), lags(2) trend regress

Augmented Dickey-Fuller test for unit root         Number of obs   =        48

                                 ---------- Interpolated Dickey-Fuller ---------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.362           -4.168            -3.508           -3.185
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0025

-----------------------------+------------------------------------------------
> ----------------
D.                           |
ChinaReserveChangeInPercent |      Coef.   Std. Err.      t    P>|t|     [95%
> Con
>    f. Interval]
-----------------------------+------------------------------------------------
> ----------------
ChinaReserveChangeInPercent |
                         L1. |  -1.046083   .2398264    -4.36   0.000    -1.529
> 739
>       -.5624268
                         LD. |   .153836   .2040717     0.75   0.455    -.2577
> 137
>        .5653858
                        L2D. |   .2134729   .1506416     1.42   0.164    -.0903
> 248
>        .5172706
                             |
                      _trend |   .0064706    .017014     0.38   0.706    -.0278
> 414
>        .0407825
                       _cons |   2.827211   .7715037     3.66   0.001     1.271
> 326
>        4.383097
-----------------------------+------------------------------------------------
> ----------------
```

```
10 . dfuller  ChinaReserveChangeInPercent if inrange(monthly_date, tm(2018m1), tm
> (2020m12)), lags(2) trend regress

Augmented Dickey-Fuller test for unit root         Number of obs   =        29

                                     ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)           -4.028            -4.343            -3.584           -3.230
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0080

——————————————————————————————————————————————————————————————————————————
> ————————————
D.
ChinaReserveChangeInPercent │      Coef.   Std. Err.      t    P>|t|     [95%
> Con
>    f. Interval]
————————————————————————————┼—————————————————————————————————————————————
> ————————————
ChinaReserveChangeInPercent │
                        L1. │  -1.503031   .3731904    -4.03   0.000    -2.273
> 258
>        -.732804
                        LD. │   .3882008    .299918     1.29   0.208    -.2307
> 995
>        1.007201
                       L2D. │   .2970535   .2346998     1.27   0.218    -.1873
> 431
>        .7814501
                            │
                     _trend │   .0076729   .0130048     0.59   0.561    -.0191
> 677
>        .0345135
                      _cons │  -.1550399   .2104266    -0.74   0.468    -.5893
> 391
>        .2792593
————————————————————————————┼—————————————————————————————————————————————
> ————————————
```

```
11 . * So only the period 2012-2015 exhibits a root unit ! (2002-2005 was to cont
   > rast using a period of the exact same length)

12 . * We now cross-check with a Kwiatkowski, Phillips,Schmidt and Shin (J. Econo
   > metrics, 1992) test

13 . log off
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
    paused on:  10 Nov 2020, 17:17:21
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
   resumed on:  10 Nov 2020, 17:24:28

14 . findit kpss

15 . log off
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
    paused on:  10 Nov 2020, 17:25:00
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
   resumed on:  10 Nov 2020, 17:33:19

16 .  kpss ChinaReserveChangeInPercent if  inrange(monthly_date, tm(2012m1), tm(2
   > 015m12)), maxlag(3)

   KPSS test for ChinaReserveChangeInPercent

   Maxlag = 3
   Autocovariances weighted by Bartlett kernel

   Critical values for H0: ChinaReserveChangeInPercent is trend stationary

   10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

   Lag order    Test statistic
```

```
        0           .298
        1           .251
        2           .219
        3           .195

17 .  kpss ChinaReserveChangeInPercent if  inrange(monthly_date, tm(2002m1), tm(2
  > 005m12)), maxlag(3)

  KPSS test for ChinaReserveChangeInPercent

  Maxlag = 3
  Autocovariances weighted by Bartlett kernel

  Critical values for H0: ChinaReserveChangeInPercent is trend stationary

  10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

  Lag order    Test statistic
        0          .0733
        1          .0664
        2          .0626
        3          .0664

18 .  kpss ChinaReserveChangeInPercent if  inrange(monthly_date, tm(2018m1), tm(2
  > 020m12)), maxlag(3)

  KPSS test for ChinaReserveChangeInPercent

  Maxlag = 3
  Autocovariances weighted by Bartlett kernel

  Critical values for H0: ChinaReserveChangeInPercent is trend stationary

  10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

  Lag order    Test statistic
        0          .0396
        1          .0481
        2          .0552
        3          .0719
```

```
19 . * again we find here that there's an unit root only for the 2012-2015 period
   >  (here the null hypothesis is stationary, whereas in ADF the null hypothesis
   >  was non-stationarity)

20 . * let us now test other timeseries :*

21 . log off
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
    paused on:  10 Nov 2020, 17:34:58
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
   resumed on:  10 Nov 2020, 17:35:47

22 .  kpss InflationMOMLessFoodEnergy

   KPSS test for InflationMOMLessFoodEnergy

   Maxlag = 17 chosen by Schwert criterion
   Autocovariances weighted by Bartlett kernel

   Critical values for H0: InflationMOMLessFoodEnergy is trend stationary

   10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

   Lag order    Test statistic
       0          .00276
       1          .00487
       2          .00621
       3          .00722
       4          .00942
       5           .0114
       6           .0134
       7           .0168
       8           .0207
       9             .02
      10           .0208
      11           .0206
      12           .0212
      13           .0212
      14           .0223
      15           .0229
      16           .0266
```

```
      17           .028

23 .  kpss InflationMOMLessFoodEnergy if  inrange(monthly_date, tm(2012m1), tm(20
> 15m12))

KPSS test for InflationMOMLessFoodEnergy

Maxlag = 9 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: InflationMOMLessFoodEnergy is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0          .0185
    1          .0225
    2          .0311
    3          .0454
    4          .0641
    5          .0864
    6          .0792
    7          .0915
    8            .11
    9           .128

24 .  kpss ChinaReserveChangeInPercent  if  inrange(monthly_date, tm(2012m1), tm(
> 2015m12))

KPSS test for ChinaReserveChangeInPercent

Maxlag = 9 chosen by Schwert criterion
Autocovariances weighted by Bartlett kernel

Critical values for H0: ChinaReserveChangeInPercent is trend stationary

10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

Lag order    Test statistic
    0           .298
    1           .251
    2           .219
    3           .195
    4            .18
    5           .167
    6           .155
    7           .147
    8           .142
    9           .138
```

```
25 . dfuller InflationMOMLessFoodEnergy

Dickey-Fuller test for unit root                   Number of obs   =       476

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -34.842           -3.442            -2.871           -2.570
------------------------------------------------------------------------------

MacKinnon approximate p-value for Z(t) = 0.0000

26 . * So no unit root for US monthly inflation change

27 . log off
      name:  <unnamed>
       log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
> mcl
  log type:  smcl
 paused on:  10 Nov 2020, 17:37:08
-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
      name:  <unnamed>
       log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
> mcl
  log type:  smcl
resumed on:  10 Nov 2020, 17:43:34

28 .  dfuller MonthtomonthchangeinEnergy

Dickey-Fuller test for unit root                   Number of obs   =       476

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -25.717           -3.442            -2.871           -2.570
------------------------------------------------------------------------------

MacKinnon approximate p-value for Z(t) = 0.0000
```

```
29 .
30 .
31 .  kpss MonthtomonthchangeinEnergy

   KPSS test for MonthtomonthchangeinEnergy

   Maxlag = 17 chosen by Schwert criterion
   Autocovariances weighted by Bartlett kernel

   Critical values for H0: MonthtomonthchangeinEnergy is trend stationary

   10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

   Lag order    Test statistic
       0          .00179
       1          .00216
       2          .00318
       3          .00451
       4          .00538
       5          .00625
       6          .00759
       7          .00858
       8          .00987
       9           .0123
      10           .0138
      11           .0119
      12           .0125
      13           .0153
      14           .0181
      15           .0186
      16           .0199
      17           .0211

32 .
33 . * So MonthtomonthchangeinEnergy is stationary

34 .  kpss MonthOnMUSgdpChange

   KPSS test for MonthOnMUSgdpChange

   Maxlag = 17 chosen by Schwert criterion
   Autocovariances weighted by Bartlett kernel

   Critical values for H0: MonthOnMUSgdpChange is trend stationary

   10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

   Lag order    Test statistic
       0             .292
```

```
      1            .18
      2          .143
      3          .126
      4          .115
      5          .108
      6          .103
      7         .0986
      8         .0955
      9          .093
     10         .0911
     11         .0897
     12         .0886
     13         .0879
     14         .0874
     15         .0872
     16         .0871
     17         .0872

35 .
36 .
37 .  dfuller MonthOnMUSgdpChange if inrange(monthly_date, tm(1990m1),tm(2018m12)
   > )

Dickey-Fuller test for unit root                   Number of obs   =       348

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -2.257            -3.452            -2.876            -2.570
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.1861

38 .  dfuller MonthOnMUSgdpChange if inrange(monthly_date, tm(1990m1),tm(2020m12)
   > )

Dickey-Fuller test for unit root                   Number of obs   =       365

                                 ---------- Interpolated Dickey-Fuller ---------
                    Test         1% Critical       5% Critical      10% Critical
                Statistic             Value             Value             Value
------------------------------------------------------------------------------
 Z(t)             -8.616            -3.451            -2.875            -2.570
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000
```

```
39 .  dfuller MonthOnMUSgdpChange if inrange(monthly_date, tm(2018m1),tm(2020m12)
> )

Dickey-Fuller test for unit root                   Number of obs   =        29

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -2.712           -3.723            -2.989           -2.625
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.0721

40 .  dfuller MonthOnMUSgdpChange if inrange(monthly_date, tm(1990m1),tm(2018m12)
> ), trend regress

Dickey-Fuller test for unit root                   Number of obs   =       348

                                 ———— Interpolated Dickey-Fuller ————
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————
 Z(t)            -2.258           -3.986            -3.426           -3.130
——————————————————————————————————————————————————————————————————————————

MacKinnon approximate p-value for Z(t) = 0.4575

——————————————————————————————————————————————————————————————————————————
> ————————
D.
MonthOnMUSgdpChange │      Coef.   Std. Err.      t    P>|t|     [95% Conf. In
> terval]
————————————————————┼—————————————————————————————————————————————————————
> ————————
MonthOnMUSgdpChange │
               L1. │  -.0291683     .01292    -2.26   0.025    -.0545803   -.
> 0037564
                   │
             _trend │   .0000215   .0001667     0.13   0.897    -.0003064    .
> 0003495
             _cons │  -.0065094   .0334443    -0.19   0.846    -.0722898
> .059271
————————————————————┴—————————————————————————————————————————————————————
> ————————
```

```
41 . * So MonthOnMUSgdpChange mostly has an unit root (consistently with theory)
   > - except for the period 2018-2020

42 . log off
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
    paused on:  10 Nov 2020, 17:48:54
   ------------------------------------------------------------------------------
   ------------------------------------------------------------------------------
         name:  <unnamed>
          log:  /Users/nicolaszhang/Downloads/Stata Rec 6/IntegrationOrderTests.s
   > mcl
     log type:  smcl
   resumed on:  10 Nov 2020, 17:58:15

43 . kpss InflationExpectationMICH

   KPSS test for InflationExpectationMICH

   Maxlag = 17 chosen by Schwert criterion
   Autocovariances weighted by Bartlett kernel

   Critical values for H0: InflationExpectationMICH is trend stationary

   10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

   Lag order    Test statistic
       0          .0391
       1          .0458
       2          .0531
       3          .0561
       4           .059
       5          .0631
       6          .0671
       7          .0706
       8          .0734
       9          .0764
      10          .0784
      11          .0804
      12          .0811
      13          .0826
      14          .0832
      15          .0836
      16          .0859
      17          .0884
```

```
44 .    dfuller InflationExpectationMICH

   Dickey-Fuller test for unit root                  Number of obs   =       476

                                    ---------- Interpolated Dickey-Fuller ----------
                  Test         1% Critical       5% Critical      10% Critical
                 Statistic         Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -25.135          -3.442            -2.871           -2.570
------------------------------------------------------------------------------
   MacKinnon approximate p-value for Z(t) = 0.0000

45 .  kpss MonthtomonthchangeinEnergy

   KPSS test for MonthtomonthchangeinEnergy

   Maxlag = 17 chosen by Schwert criterion
   Autocovariances weighted by Bartlett kernel

   Critical values for H0: MonthtomonthchangeinEnergy is trend stationary

   10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

   Lag order    Test statistic
       0          .00179
       1          .00216
       2          .00318
       3          .00451
       4          .00538
       5          .00625
       6          .00759
       7          .00858
       8          .00987
       9           .0123
      10           .0138
      11           .0119
      12           .0125
      13           .0153
      14           .0181
      15           .0186
      16           .0199
      17           .0211
```

```
46 .   dfuller MonthtomonthchangeinEnergy

   Dickey-Fuller test for unit root                   Number of obs   =       476

                                    ———— Interpolated Dickey-Fuller ————
                  Test         1% Critical       5% Critical      10% Critical
                Statistic           Value             Value            Value
——————————————————————————————————————————————————————————————————————————————
 Z(t)           -25.717            -3.442            -2.871           -2.570
——————————————————————————————————————————————————————————————————————————————

   MacKinnon approximate p-value for Z(t) = 0.0000

47 .  kpss ChangesInEffectiveFedFundRates

   KPSS test for ChangesInEffectiveFedFundRates

   Maxlag = 17 chosen by Schwert criterion
   Autocovariances weighted by Bartlett kernel

   Critical values for H0: ChangesInEffectiveFedFundRates is trend stationary

   10%: 0.119  5% : 0.146  2.5%: 0.176  1% : 0.216

   Lag order    Test statistic
       0           .0492
       1           .0322
       2           .0282
       3           .0278
       4           .0286
       5           .0292
       6            .029
       7           .0283
       8           .0272
       9           .0261
      10           .0253
      11           .0249
      12           .0249
      13            .025
      14           .0251
      15           .0252
      16           .0252
      17            .025
```

```
48 . dfuller ChangesInEffectiveFedFundRates

Dickey-Fuller test for unit root                   Number of obs   =       476

                                 ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)           -12.258           -3.442            -2.871           -2.570
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0000

49 . * So all these are stationary as well
```