Matlab: R2014a IRIS: 20140315

Produce Unconditional and Conditional Forecasts

`produce_forecasts.m`

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Summary

Use the estimated VAR to produce unconditional and conditional forecasts. One forecast is conditioned upon a path for one endogenous variable. Another forecast is conditioned upon a path for a so-called instrument. Forecast conditioning instruments can be defined as linear combinations of endogenous variables and their lags, and added to VAR objects.

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1 Clear Workspace

```
clear;
close all;
clc;
%#ok<*NOPTS>
```

2 Load Data, Estimated VAR, and Dates

Load the historical data and dates prepared in `read_data`. Load the VAR object estimated in `estimate_simple_VAR`.

```
load read_data.mat d g2 startHist endHist;
load estimate_simple_VAR.mat v;
```

3 Define Dates

Run the forecast for 8 quarters after the end of the historical sample.

```
startFcast = endHist + 1;
endFcast = endHist + 8;
```

4 Run Unconditional Forecast

Run the function `forecast` to produce an unconditional forecast [1]: unconditional in the sense it only uses information up until time t-1. Unless you modify some of the options, `forecast` returns a database with `.mean` and `.std` fields, with the point forecasts and the std deviations. Use the function `dboverlay` to combine the historical data and the forecast paths [2] (the output database only includes data for the forecast periods and the necessary pre-sample initial conditions); this is for reporting purposes only.

```
u = forecast(v,g2,startFcast:endFcast); [1]

u
u.mean
u.std

u.mean = dboverlay(g2,u.mean); [2]
```

```
u = 
    mean: [1x1 struct]
     std: [1x1 struct]
```

```
ans =
         r: [10x1 tseries]
        pp: [10x1 tseries]
        yy: [10x1 tseries]
        mm: [10x1 tseries]
     res_r: [8x1 tseries]
    res_pp: [8x1 tseries]
    res_yy: [8x1 tseries]
    res_mm: [8x1 tseries]
ans =
     r: [10x1 tseries]
    pp: [10x1 tseries]
    yy: [10x1 tseries]
    mm: [10x1 tseries]
```

5 Run Forecact Conditional Upon Endogenous Variable

Run a forecast conditional upon the interest rate, r, being fixed at its last observed value for 2 quarters, startFcast and startFcast+1. To do that, create a conditioning database, j1, 3 and pass the database as the 4th input argument into the function forecast 4. Verify that the interest rate forecast complies with the conditions imposed ?.

```
j1 = struct();
j1.r = tseries();
j1.r(startFcast:startFcast+1) = g2.r(endHist); 3

c1 = forecast(v,g2,startFcast:endFcast,j1); 4

c1.mean.r %?verify1%

c1.mean = dboverlay(g2,c1.mean);
```

```
ans =
        tseries object: 10-by-1
        2011Q3:   -0.8639
        2011Q4:   -0.8739
        2012Q1:   -0.8739
        2012Q2:   -0.8739
        2012Q3:  -0.75823
        2012Q4:  -0.63348
        2013Q1:  -0.48959
        2013Q2:  -0.36247
        2013Q3:  -0.25145
        2013Q4:  -0.16207
        'r'
        user data: empty
```

6 Define Forecast Conditioning Instrument

A forecast conditioning instrument is simply a linear combination of endogenous variables (and/or their lags). The instrument can be then used to condition a forecast upon a particular path for it. You can define any number of instruments within a VAR object, and use them selectively in forecasting.

```
v = instrument(v,'nn := pp + yy');

get(v,'iList')
get(v,'iEqtn')
```

```
ans =
    'nn'
ans =
    'nn:=pp+yy;'
```

7 Run Forecast Conditional Upon Instrument

Run another conditional forecast, this time using the instrument. Define a conditioning database, `j2`, with a desired path for the conditioning instrument `nn`. Impose an assumption of zero growth rate in nominal output throughout the entire forecast here $\boxed{5}$. Verify that the forecast complies with the conditions imposed on the instrument $\boxed{?}$.

```
j2 = struct();
j2.nn = tseries();
j2.nn(startFcast:endFcast) = 0; 5

c2 = forecast(v,g2,startFcast:endFcast,j2);

c2.mean.pp + c2.mean.yy %?verify2%

c2.mean = dboverlay(g2,c2.mean);
```

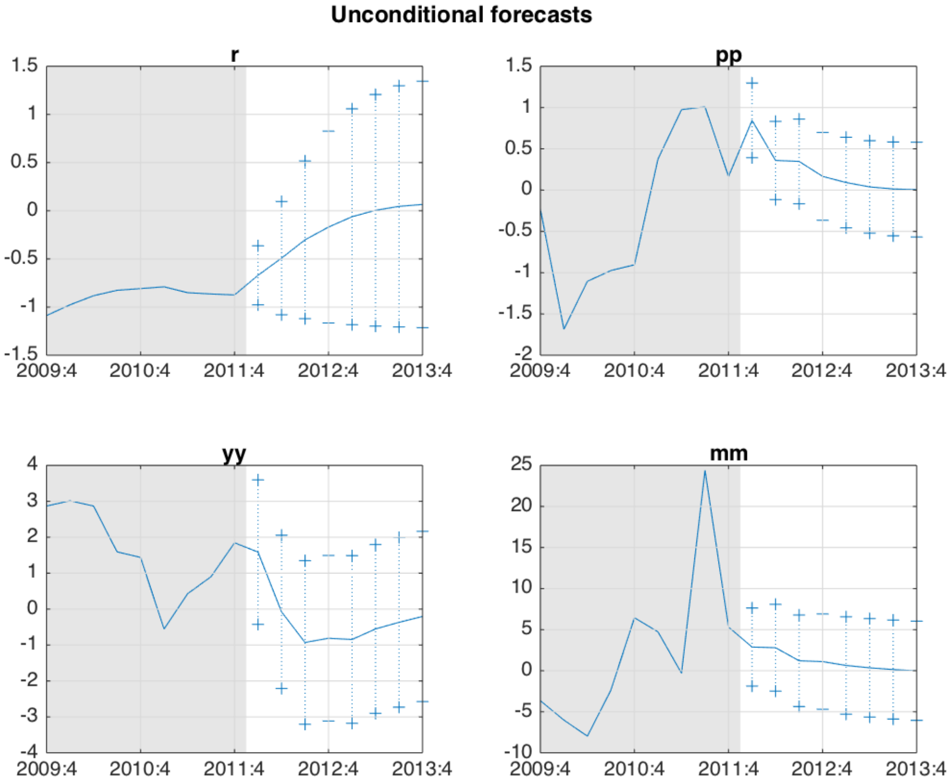
```
ans =
        tseries object: 10-by-1
        2011Q3:       1.9102
        2011Q4:       2.0102
        2012Q1:   2.2204e-16
        2012Q2:            0
        2012Q3:   1.1102e-16
        2012Q4:  -1.3878e-17
        2013Q1:  -3.4694e-17
        2013Q2:   2.0817e-17
        2013Q3:  -2.0817e-17
        2013Q4:  -1.0408e-17
        ''
        user data: empty
```

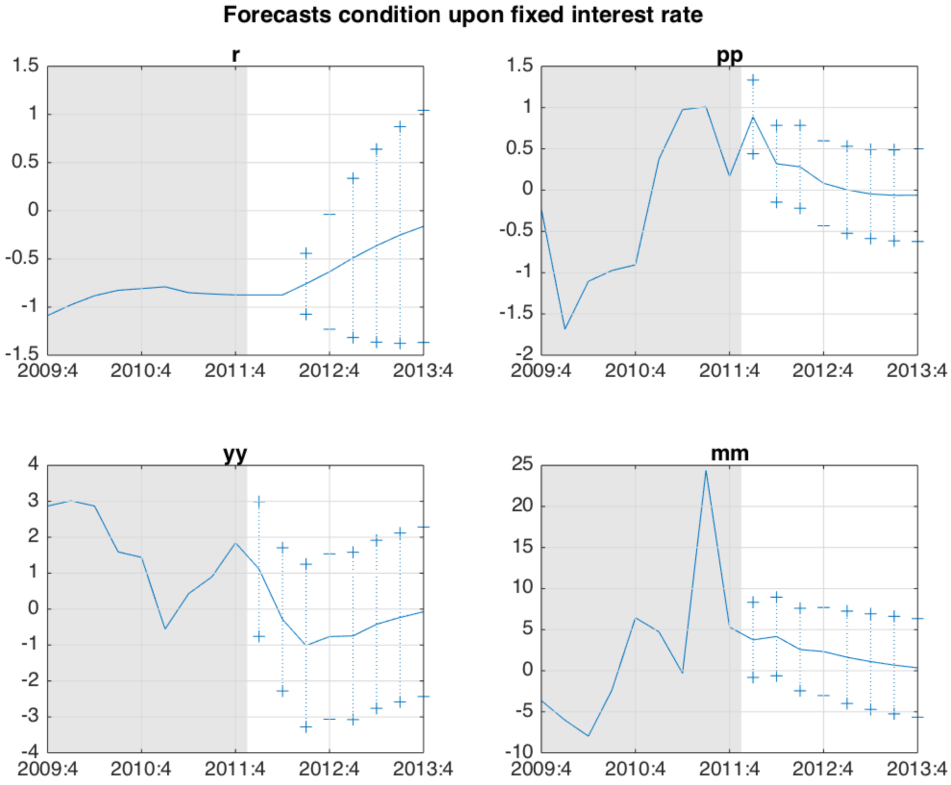
8 Report Forecasts

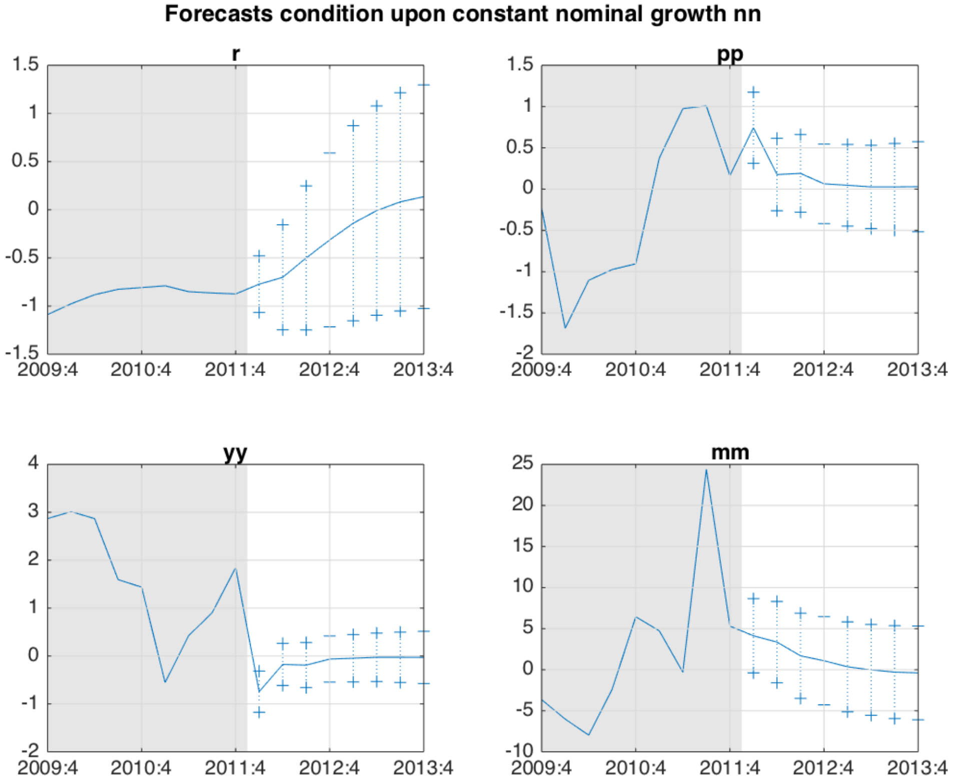
Use the function dbplot to plot the four variables for each type of the forecast: unconditional [7], conditional upon an endogenous variable [8], and conditional upon the instrument [9]. Setting the option 'plotFunc=' to @errorbar produces error bar plots whenever the input time series have two columns: the mean and the std deviation. This is achieved by using the & operator [6] to combine the two respective databases.

Note the general shrinkage in the std deviations in conditional forecasts compared with the unconditional one.

```
yList = get(v,'yList');

dbplot(u.mean & u.std, ... [6]
    endHist-8:endFcast, ...
    yList, ...
    'plotFunc=',@errorbar, ...
    'zeroLine=',true, ...
    'highlight=',endHist-8:endHist); [7]
grfun.ftitle('Unconditional forecasts');

dbplot(c1.mean & c1.std, ...
    endHist-8:endFcast, ...
    yList, ...
    'plotFunc=',@errorbar, ...
    'zeroLine=',true, ...
    'highlight=',endHist-8:endHist); [8]
grfun.ftitle('Forecasts condition upon fixed interest rate');

dbplot(c2.mean & c2.std, ...
    endHist-8:endFcast, ...
    yList, ...
    'plotFunc=',@errorbar, ...
    'zeroLine=',true, ...
    'highlight=',endHist-8:endHist); [9]
grfun.ftitle('Forecasts condition upon constant nominal growth nn');
```


Unconditional forecasts
r
1.5
1
0.5
0
-0.5
-1
-1.5
2009:4
2010:4
2011:4
2012:4
2013:4
pp
1.5
1
0.5
0
-0.5
-1
-1.5
-2
yy
4
3
2
1
0
-1
-2
-3
-4
mm
25
20
15
10
5
0
-5
-10


Forecasts condition upon fixed interest rate
r
pp
yy
mm
1.5
1
0.5
0
-0.5
-1
-1.5
-2
4
3
2
1
-1
-2
-3
-4
25
20
15
10
5
-5
-10
2009:4
2010:4
2011:4
2012:4
2013:4



9 Help on IRIS Functions Used in This File

Use either `help` to display help in the command window, or `idoc` to display help in an HTML browser window.

```
help VAR
help VAR/forecast
help VAR/instrument
help VAR/get
help dbase/dbplot
help grfun/ftitle
```