# Resimulate Data

resimulate_data.m

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Summary

Take the estimated VAR, and resimulate the historical data to see that we indeed reproduce the observed paths. Calculate the contributions of residuals to the historical paths of the VAR variables, and run a counterfactual exercise with one type of residuals removed from the history.

## Contents

# 1 Clear Workspace

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

# 2 Load estimate VAR

Load the estimated VAR and the VAR database, and the dates.

```
load estimate_simple_VAR.mat v vd;
load read_data.mat startHist endHist;
```

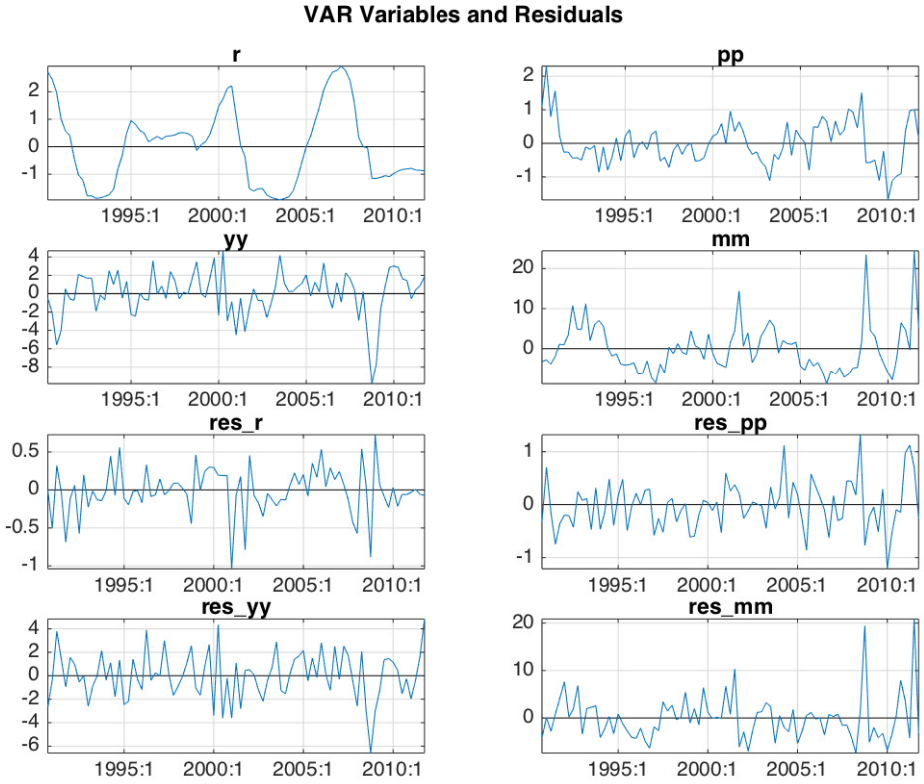
# 3 Resimulate Data

Plot the observations used in estimating the VAR, together with the estimated residuals [1]. Resimulate the date to reproduce the historical paths. The function `simulate` [2] takes only the pre-sample initial conditions for endogenous variables, and the in-sample residuals to run the VAR model from the input database, `vd`; nothing else. Note that we can only start the simulation at `startHist+p` for the initial condition to exist in the database. Report the maximum differences between the input series (database `vd`) and the simulated series (database `s`). They all amount to numerical rounding errors only [3].

```
yNames = get(v,'yNames');
eNames = get(v,'eNames');
p = get(v,'order');

dbplot(vd,Inf,[yNames,eNames], ... [1]
    'tight=',true, ...
    'zeroline=',true, ...
    'subplot=',[4,2]);
grid on;
grfun.ftitle('VAR Variables and Residuals');

s = simulate(v,vd,startHist+p:endHist); [2]

s
disp('Max abs discrepancy between original and resimulated data');
maxabs(s,vd) [3]
```

```
s =
        r: [87x1 tseries]
```

```
        pp: [87x1 tseries]
        yy: [87x1 tseries]
        mm: [87x1 tseries]
     res_r: [85x1 tseries]
    res_pp: [85x1 tseries]
    res_yy: [85x1 tseries]
    res_mm: [85x1 tseries]
Max abs discrepancy between original and resimulated data
ans =
         r: 2.4425e-15
        pp: 4.4409e-16
        yy: 1.3323e-15
        mm: 5.3291e-15
     res_r: 0
    res_pp: 0
    res_yy: 0
    res_mm: 0
```



## 4 Simulate Contributions of Residuals

Resimulate the historical data again, but now request the contributions of individual residuals to the observed paths by using the option 'contributions=' 4. The output database, c, now contains 5 columns for each variable<?fiveCols?>: the first 4 columns are contributions of the 4 residuals (res_r, res_pp, res_yy, res_mm), whereas the last, 5-th, column is the contribution of the initial condition and constant. Adding the 5 columns up simply reproduces the original paths 6.

```
66 c = simulate(v,vd,startHist+p:endHist, ...
67     'contributions=',true); 4
68
69 c 5
70
71 r = sum(c.r,2); 6
72 maxabs(r,vd.r);
```

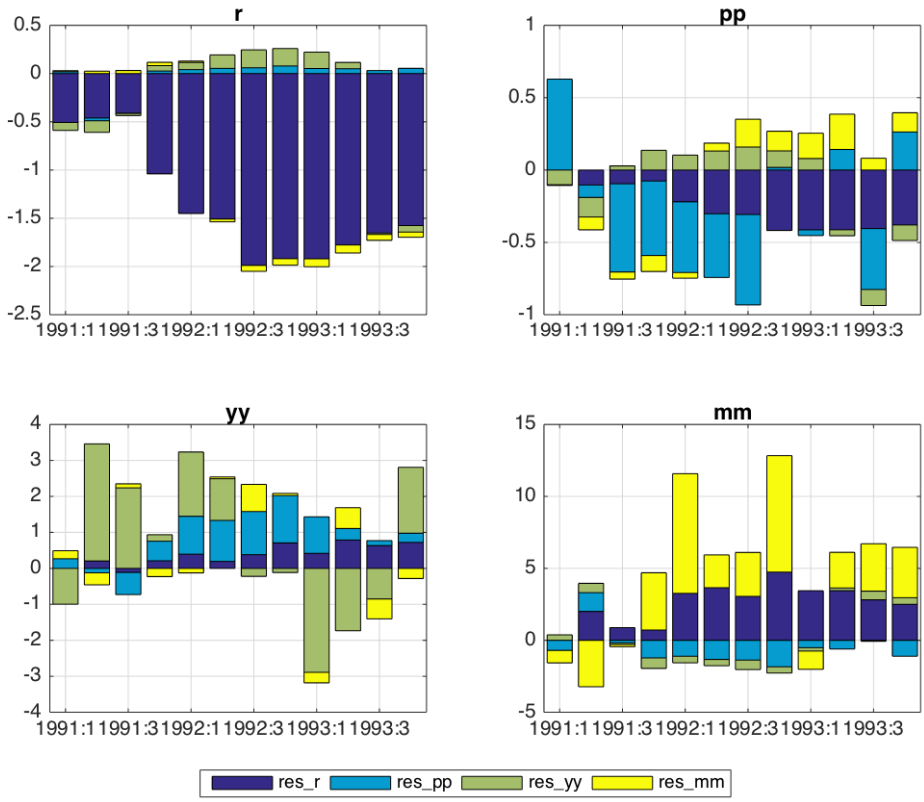
```
c =
         r: [87x5 tseries]
        pp: [87x5 tseries]
        yy: [87x5 tseries]
        mm: [87x5 tseries]
     res_r: [87x5 tseries]
    res_pp: [87x5 tseries]
    res_yy: [87x5 tseries]
    res_mm: [87x5 tseries]
```

Retrieve the first 4 columns for each series ?, i.e. only the contributions of residuals but not the initial condition and constant. Plot the contributions of residuals to all variables (in the first three years). Use the option 'plotFunc=' to call the function barcon to plot the contributions 7.

```
82 c = dbcol(c,1:4) %<firstFour?>
83 dbplot(c,startHist+p+1:startHist+p+12,yNames, ...
84     'plotFunc=',@barcon); 7
85
86 le = grfun.bottomlegend(get(v,'eNames'), ...
87     'interpreter','none');
```

```
c =
         r: [87x4 tseries]
        pp: [87x4 tseries]
        yy: [87x4 tseries]
        mm: [87x4 tseries]
     res_r: [87x4 tseries]
    res_pp: [87x4 tseries]
    res_yy: [87x4 tseries]
```

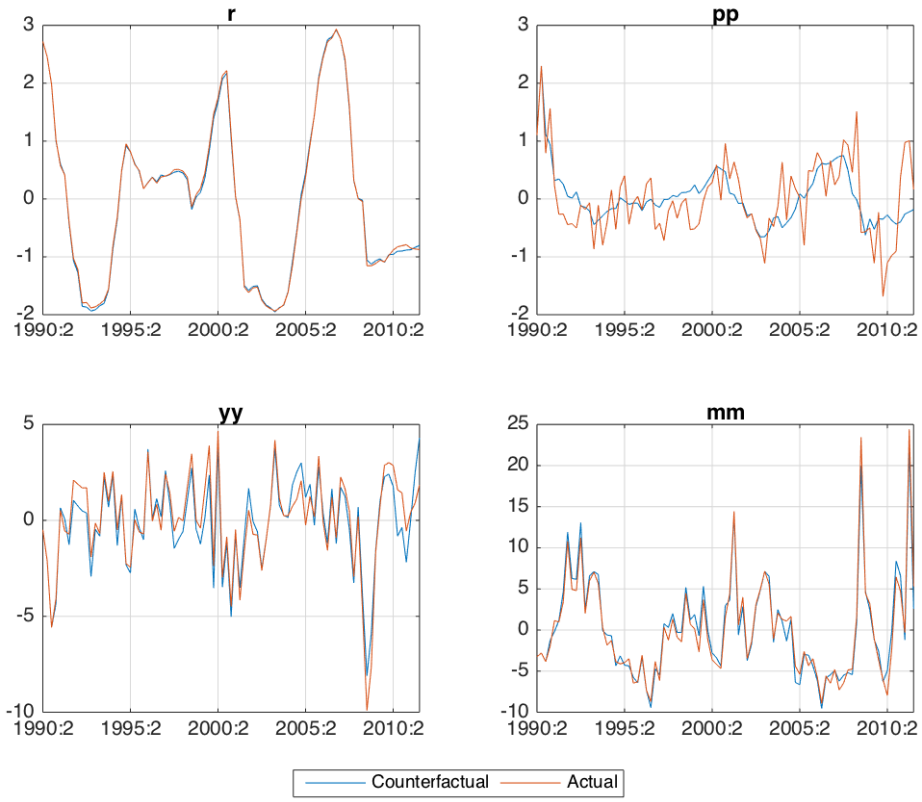
```
    res_mm: [87x4 tseries]
```




## 5 Run Counterfactual Simulation

Remove the inflation residuals, res_pp, from the historical database 8, and resimulate the data again 9. The simulated paths now correspond to a hypothetical situation with no forecast errors in inflation, pp. Plot the counterfactual paths against the actually observed ones.

```
vd1 = vd;
vd1.res_pp(:) = 0; 8

s1 = simulate(v,vd1,startHist+p:endHist); 9

dbplot(s1 & vd,startHist:endHist,yNames);
grfun.bottomlegend('Counterfactual','Actual');
```




## 6 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/simulate
help dbase/dbplot
help grfun/title
help maxabs
```