Course Project

Advanced macro (Spring 2022)

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April 9, 2021

```
clear
clc
close all
```

Question 1

```
opts = spreadsheetImportOptions("NumVariables", 4);

% Specify sheet and range
opts.Sheet = "RBC";
opts.DataRange = "A3:D251"; % up to 2010Q1

% Specify column names and types
opts.VariableNames = ["y", "c", "i", "h"];
opts.SelectedVariableNames = ["y", "c", "i", "h"];
opts.VariableTypes = ["double", "double", "double", "double"];

% Import the data
Data = readtable("DD_Data_Second_Edition.xlsx", opts, "UseExcel", false);
clear opts
```

```
[~,y] = hpfilter(log(Data.y),1600);
[~,c] = hpfilter(log(Data.c),1600);
[~,i] = hpfilter(log(Data.i),1600);
[~,n] = hpfilter(log(Data.h),1600);

cycles = [y c i n]; % cycle components
```

```
stds = std(cycles); % stadard deviations
relative_stds = stds./stds(1); % stadard deviations
corrs = corr(y,cycles); % correlattions with y
autocorrs = zeros(1,4); % auto corr
xcorrslag = zeros(1,4); % corss corr with y(t-1)
% xcorrslead = zeros(1,4); % with y(t+1)
for i = 1:size(cycles,2)

    acfs = autocorr(cycles(:,i),'NumLags',1);
    xcfs = crosscorr(cycles(:,1),cycles(:,i),'NumLags',1);

    autocorrs(i) = acfs(2);
    xcorrslag(i) = xcfs(1);
end

moments = [stds' relative_stds' autocorrs' corrs' xcorrslag'];
```

```
rownames = {'Data y','Data c','Data i','Data n'};
varnames = {'STD','Relative STD','Autocorr lag 1','Corr w/ Y(t)','Crosscorr w/ Y(t+1)'};

T_data = table(moments(:,1),moments(:,2),moments(:,3),moments(:,4),moments(:,5),'RowNames',rowr
```

T_data = 4×5 table

	STD	Relative STD	Autocorr lag 1	Corr w/ Y(t)	Crosscorr w/ Y(t+1)
1 Data y	0.0182	1.0000	0.8607	1.0000	0.8607
2 Data c	0.0083	0.4548	0.8386	0.8229	0.7370
3 Data i	0.0797	4.3804	0.7875	0.9485	0.7960
4 Data n	0.0195	1.0716	0.8967	0.8401	0.6255

Question 2

```
dynare dejong3_MK
```

```
Starting Dynare (version 5.0).
Calling Dynare with arguments: none
Starting preprocessing of the model file ...
Found 15 equation(s).
Evaluating expressions...done
Computing static model derivatives (order 1).
Computing dynamic model derivatives (order 1).
Processing outputs ...
done
Preprocessing completed.


STEADY-STATE RESULTS:

y          1.02869
c          0.783763
ii         0.244926
n          0.333333
l          0.666667
k          9.79704
z          1
R          1.01
logz       0
logy       0.0282852
logc       -0.243649
logii      -1.4068
logn       -1.09861
logk       2.28208
logR       0.00995033

EIGENVALUES:
      Modulus            Real         Imaginary

         0.78            0.78                 0
       0.9493          0.9493                 0
        1.064           1.064                 0
    1.267e+18       1.267e+18                 0


There are 2 eigenvalue(s) larger than 1 in modulus
for 2 forward-looking variable(s)

The rank condition is verified.
```

```
Total computing time : 0h00m00s
```

```matlab
VCV = oo_.var; % variance covariance matrix for y, c, i, h
STD = sqrt(diag(VCV)); % std
relative_STD = STD./STD(1); % relative std
Autocorrs = diag(oo_.autocorr{1,1}); % lag 1 (cf: https://www.dynare.org/manual/the-model-file.
Corrs = VCV(1,:)';
for i = 1:4
    Corrs(i) = Corrs(i)/(sqrt(VCV(1,1))*sqrt(VCV(i,i))); % cov divided by product of stds
end
Crosscorr = oo_.autocorr{1,1}(:,1); % w/ y(t-1)
```

```matlab
% corr_L_YL = VCV(4,5)/(STD(4)*STD(5)); % correlation of L and Y/L
rownames = {'Model y','Model c','Model i','Model n'};
varnames = {'STD','Relative STD','Autocorr lag 1','Corr w/ Y(t)','Crosscorr w/ Y(t+1)'};

T_Model = table(STD,relative_STD,Autocorrs,Corrs,Crosscorr,'RowNames',rownames,'VariableNames',
```

T_Model = 4×5 table

	STD	Relative STD	Autocorr lag 1	Corr w/ Y(t)	Crosscorr w/ Y(t+1)
1 Model y	0.0131	1.0000	0.6174	1.0000	0.6174
2 Model c	0.0025	0.1874	0.8570	0.6634	0.2372
3 Model i	0.0501	3.8287	0.6073	0.9931	0.6401
4 Model n	0.0077	0.5912	0.6059	0.9874	0.6461

Question 3

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