Financial Econometrics Workshop 4

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1 Introduction

In this workshop we will introduce VAR model in STATA. Additionally, we will examine the Granger Causality for the variables in the VAR. Lastly, the impulse response functions will be produced.

2 Input Data and Date Transformation

The first step in STATA is input data, make sure your .dta file is in the right working directory. In this workshop we will use the dataset: monthly JP Morgan/Goldman Sachs stock price data from 2000/01/01 to 2014/12/01.

Menu:

File → Change Working Directory → STATA Workshop

Command:

```
use gs.dta,clear
generate date_1 = date(date,"YMD") #transform date as year-month-day
generate datem = mofd(date_1) #the monthly date (months since 1960m1
    ) containing date_1
format datem %tm # %tm encoded monthly date (months since 1960m1)
tsset datem
```

Note:

`tsset` declares data to be time-series data.

3 Graphic Analysis and Data Transformation

In this section, you will learn how to combine two variables by [tsline]

Command:

```
tsline gs_adjclose jpm_adjclose,lpattern("-""_")
g log_gs_adjclose = log(gs_adjclose)
g dlog_gs_adjclose = d.log_gs_adjclose
g log_jpm_adjclose = log(jpm_adjclose)
g dlog_jpm_adjclose = d.log_jpm_adjclose
```

4 VAR Model Selection and Estimation

`varsoc` command can be used to calculate different orders of IC (AIC BIC HQIC).

In this workshop, we use 12 as the maximum lag order.

Command:

```
varsoc dlog_gs_adjclose dlog_jpm_adjclose,maxlag(12) # Selection-
    order Criteria

var dlog_gs_adjclose dlog_jpm_adjclose,lags(1/5) # VAR(5) estimation

varstable
varstable,graph # Check VAR stationarity
varlmar # LM test for residuals
vargranger # Granger Causality Test
```

Note:

In this workshop, we use the minimum value of AIC(6) as the lag length.

Note:

Different researchers may have different preferences for IC.

5 Impulse Response Functions and Variance Decomposition *optional

In this section, we will examine the impulse response functions and variance decomposition between two variables.

Command:

```
irf create adjclose,set(workshop4) step(20) # Create irf file which will produce 20-step-ahead forecast

irf graph irf,yline(0) noci # Graphs of impulse response function

irf graph oirf,yline(0) noci # Graphs of orthogonal impulse response function


irf graph fevd, r(dlog_gs_adjclose)noci # variance decomposition for dlog_gs_adjclose
irf table fevd, r(dlog_gs_adjclose)noci

irf graph fevd, r(dlog_jpm_adjclose)noci # variance decomposition for dlog_jpm_adjclose
irf table fevd, r(dlog_jpm_adjclose)noci

irf graph fevd
irf table fevd
```

Note:

We can use `table` and `graph` code to produce result, respectively.

Note:

`r(varname)` can be used to specify the variable you would like to use.