

GV903: Advanced Research Methods

Class 10 Basic Issues in Time Series

Dataset: `ar1series.dta`

1. Make a scatter plot and run an OLS regression of y on x_2 .
2. Test for serial correlation using the Breusch-Godfrey test (`estat bgodfrey`)
3. Assuming you have a AR(1) model run the following regression:

$$y_t = \mu\rho y_{t-1} + \beta x_{2,t} + \delta x_{2,t-1}$$

Test the non-linear restriction $H_0 : \delta = -\rho\beta$

4. Is this a AR(1) process or not?

Dataset: `us_time_series.dta`

1. Investigate the data and plot the lines across time for all the variables using the `line` command.
2. Run some Dickey-Fuller tests to see if any of the variables have a unit root.
3. Using `corrgram` examine the autocorrelation of each of these variables. You can also plot the results using `ac` and `pac`.
4. Investigate the cross-correlation of pairs of the variables using `xcorr x y`. That is to see the correlation of x now with y now and in the future.
5. Examine for cointegration between pairs of the variables. To do that, first run an OLS regression of y on x , get the residuals and use the Augmented Dickey-Fuller test allowing for 10 lags. That can be performed running `dfuller e, lags(10)`.
6. Run a VAR model after you decide how many lags you want to include in the model. To decide how many lags should be included in the model use first `varsoc inflation fedfunds unrate, maxlag(10)` and then run

```
var inflation fedfunds unrate, lags(1/3)
```

Examine the Granger causality using the `vargranger` command after you run the VAR model.