Granger Causality Test

Granger Causality

- A VAR(p) is a system of n dynamic equations. It is often of interest to inquire and test the exogeneity of some variables with respect to others and to uncover what the feedback mechanisms are.
- For example, a change in money supply may affect future values of money supply not only through its own dynamic mechanism but also through its effect on future inflation
- **Testing for Granger Causality**
- Test the null hypothesis $H_0 : \beta_1 = ... = \beta_p = 0$ in the regression
  $x_t = c + \Phi(L)x_{t-1} + \beta_1 y_{t-1} + ... + \beta_p y_{t-p} + \varepsilon_t$
- Rejection of the null is taken as evidence that y Granger-causes x. One can use an F-test (Wald test).

- Y Granger-causes x doesn't mean that there is an economic generating mechanism such that future values of x are caused by y. Granger-causality is a statement about the predictive ability of y in forecasting x.
- Omitted variables (such as examining bivariate Granger-causality in an n-dimensional VAR) can lead to detecting spurious causal relations.