

Package Name: SRVAR

Author: Davaajargal Luvsannyam

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Default Proc Name: SRVAR

Default Menu Text: Sign Restricted VAR

Interface: Dialog and command line

Description

This add-in allows you to perform the estimation of Sign Restricted Vector Regression (SRVAR) models by using a rejection method(see more details in Uhlig 2005).

To illustrate the main idea of this add-in, consider the following VAR model

$$y_t = B_1 y_{t-1} + B_2 y_{t-2} + u_t,$$

where y_t is an $nx1$ vector variables. B is an nxn matrix of coefficients. The error term u is mean zero with variance covariance matrix

$$\Sigma = E[u_t' u_t]$$

Write this vector autoregression as

$$y_t = (I \otimes X_t) \beta + u_t, \quad t = 1, \dots, T$$

Assume that the u_t are i.i.d. with distribution $N(0, \Sigma)$. Let P be dimension of X , and b and S be the OLS estimates β and Σ . With the Jeffrey's prior (Zellner 1971)

$$f(\beta, \Sigma) \propto |\Sigma|^{-(n+1)/2}$$

the posterior distribution of Σ is Normal –inverse Wishart, with

$$\Sigma^{-1} \sim \text{Wishart}[(TS)^{-1}, T - P] \text{ and, given } \Sigma, \\ \beta \sim N[b, \Sigma \otimes (XX)^{-1}]$$

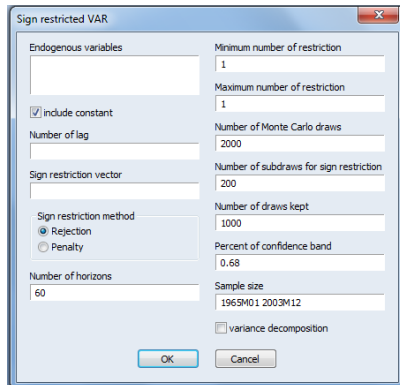
The steps involved in recovering the structural shocks for a rejection method, given a set of sign restrictions, can be summarised as follows:

1. Run an unrestricted VAR in order to get b and S .
2. Randomly draw β and Σ from the posterior distributions
3. Extract the orthogonal innovations from the model using a Cholesky decomposition.
4. Calculate the resulting impulse responses from Step 3.
5. Randomly draw an orthogonal impulse vector α .
6. Multiply the responses from Step 4 times α and check if they match the imposed signs.
7. If yes, keep the response. If not, drop the draw.

Repeat Steps 2-7.

Dialog

Upon running the add-in from the menus, a dialog will appear:



The first box lets you specify endogenous variables for Sign Restricted VAR while the second box specifies a number of lags. On the next box enter a sign index of variables for impulse response analysis. Please use +index for a positive constraint and -index for a negative constraint. For example, if you want the impulse responses to be positive on the 4th variable and negative on the 3rd, you would use +4, -3 (for command line case, you should create a vector for constraint. For example, *vector constr = @fill(+4, -3)*)

Other boxes specify some optional inputs. Minimum number of restriction and maximum number of restriction are the range of impulse response functions constrained (for impact response, enter 1).

References:

- Uhlig, Harald, 2005. "What are the effects of monetary policy on output? Results from an agnostic identification procedure," *Journal of Monetary Economics*, Elsevier, vol. 52(2), pages 381-419, March.
- Zellner, Arnold, 1971, "Introduction to Bayesian Inference in Econometrics" New York, Wiley

Command line:

Syntax: `srvar(options) lag(number) sign_index(vector) @ endogenous variables(series)`

E.g. `srvar(const=0, kmax=6) 12 constr @ gdpcl gdpdef cprindex fedfunds`

Options:

<i>argument</i>	<i>Explanations</i>
const	0 or 1(default, include constant)
method	0 (Penalty function) or 1 (default, Rejection)
horizon	number of steps for impulse response function
kmin	range of impulse constraint
kmax	range of impulse constraint
n1	number of Monte Carlo draws
n2	number of subdraws
nkeep	number of draws kept
ci	percent of error band
sample	sample size
fevd	0 (default) or 1(do variance decomposition)