Using LINVER in EViews

May 2022

1. Getting started

(a) The routine tasks associated with loading LINVER equations and coefficients into EViews are carried out with the *read_xml_model* add-in command. Install it by starting EViews and executing the *regadd* program found in the BACKGROUND_CODE subdirectory. This needs to be done only once. Users of the FRB/US package may have already installed this add-in. The BACKGROUND_CODE subdirectory in addition contains the *master_library* file of subroutines that is in the FRB/US package.

(b) The EVIEWS folder contains the *stochsims_eviews* program, which executes a set of stochastic simulations under VAR expectations. The file and path names in the program assume that the user's default directory is the EVIEWS folder. The simulations are run around a baseline in which all model variables are zero. The comments at the start of the program list the key options available to the user. See section 2 below for more information on the available monetary and fiscal policy settings and section 3 for more information on the available methods for sampling from the file of historical residuals of FRB/US equations to create shocks for the stochastic simulations.

(c) LINVER's equations and coefficients are in *linver.xml*. Although each of the twenty-five expectations variables has two equations, one that is used for VAR expectations and a one for model-consistent (MC) expectations, only the VAR expectations ones are used in the stochastic simulation program. Stochastic simulations with MC expectations should be done with the Matlab or Octave programs, as they execute much more quickly than would an MC EViews program.

2. Policy options

Monetary policy The options for setting the federal funds rate (*rff*) consist of four policy rules and two exogenous policies that hold either the nominal or real funds rate fixed. Choose a specific rule with the parameter *mpolicy* as described in the following table.

mpolicy	Description	Policy rule equation
intay	inertial Taylor rule	Rffintay
tay	Taylor rule	Rfftay
tlr	Taylor rule with unemployment gap	Rfftlr
gen	generalized rule	Rffgen
ex	exogenous nominal funds rate	Na
rr	exogenous real funds rate	Na

The long-run stability of LINVER solutions requires that one of the four endogenous policy rules be in force. For a shock that shifts the equilibrium real rate of interest, long-run stability also requires that over time monetary policymakers update their estimate of the equilibrium rate. The value of the parameter *drstar_val* in the simulation program controls whether the estimate is gradually updated ("1") or not ("0"). The default value is "0", as most of the shocks that enter the stochastic simulations have no effect the equilibrium real rate, and the few that do have inconsequential macroeconomic implications in simulations running as long as fifty years.

Fiscal policy The options for setting for the trend value of the personal income tax rate (*trpt*) consist of two policy rules and an exogenous case in which the tax rate fixed. Choose a specific option with the parameter *fpolicy* as described in the table below. The default policy ("s") gradually stabilizes the ratio of the budget surplus (as given by the weighted difference between the logs of receipts and outlays) to GDP. The long-run stability of LINVER simulations may require that one of the endogenous fiscal rules be in force.

fpolicy	Description	Policy rule equation
s	gradual surplus ratio targeting	trpts
d	gradual deficit ratio targeting	trptd
x	exogenous tax rate	na

3. Shocks for stochastic simulations.

The text file *hist_residuals.txt* contains the historical residuals of the main FRB/US behavioral equations from 1970Q1 to 2019Q4. The parameter *draw_method* provides users with three options for how random shocks are generated using the historical residuals — "mvnorm", "boot", and "state":

- Under the mvnorm option, shocks are drawn randomly from a multivariate normal distribution with mean zero and a variance-covariance matrix estimated using the historical sample of residuals.

- Under the boot option, shocks are constructed by randomly sampling quarters of the matrix of (demeaned) historical residuals. Unlike the first option, this form of bootstrapping preserves any deviations from normality in the multivariate characteristics of the historical residuals. As is the case with the mvnorm option, the boot option assumes that the equation residuals are uncorrelated over time.

- Under the state option (the default), the shocks hitting the economy at each point in time depend on the state of the simulated economy, where the latter is determined randomly using a Markov-switching model with three states — normal, mild slump, and severe

slump. In the normal state, shocks are bootstrapped by random sampling of the historical non-recessionary quarters of the matrix of historical residuals. In the mild slump state, shocks equal the residuals that occurred in one of the recessions that occurred between 1970 and 2001, with the sequence of shocks matching that seen historically. In the severe slump state, shocks equal the sequence of residuals that occurred during the Great Recession. The transition probabilities and steady-state frequencies of the three states are calibrated to match that seen since 1970. See González-Astudillo and Vilán (2019) for further details.