Title

vecstable — Check the stability condition of VECM estimates

Syntax

`vecstable [ , options ]`

options	Description
Main	
`estimates(`*estname*`)`	use previously stored results *estname*; default is to use active results
`amat(`*matrix_name*`)`	save the companion matrix as *matrix_name*
`graph`	graph eigenvalues of the companion matrix
`dlabel`	label eigenvalues with the distance from the unit circle
`modlabel`	label eigenvalues with the modulus
marker_options	change look of markers (color, size, etc.)
`rlopts(`*cline_options*`)`	affect rendition of reference unit circle
`nogrid`	suppress polar grid circles
`pgrid([...])`	specify radii and appearance of polar grid circles; see *Options* for details
Add plots	
`addplot(`*plot*`)`	add other plots to the generated graph
Y axis, X axis, Titles, Legend, Overall	
twoway_options	any options other than `by()` documented in [G-3] ***twoway_options***

`vecstable` can be used only after `vec`; see [TS] **vec**.

Menu

Statistics > Multivariate time series > VEC diagnostics and tests > Check stability condition of VEC estimates

Description

`vecstable` checks the eigenvalue stability condition in a vector error-correction model (VECM) fit using `vec`.

Options

Main

`estimates(`*estname*`)` requests that `vecstable` use the previously obtained set of `vec` estimates stored as *estname*. By default, `vecstable` uses the active results. See [R] **estimates** for information on manipulating estimation results.

amat(*matrix_name*) specifies a valid Stata matrix name by which the companion matrix can be saved. The companion matrix is referred to as the **A** matrix in Lütkepohl (2005) and [TS] **varstable**. The default is not to save the companion matrix.

graph causes vecstable to draw a graph of the eigenvalues of the companion matrix.

dlabel labels the eigenvalues with their distances from the unit circle. dlabel cannot be specified with modlabel.

modlabel labels the eigenvalues with their moduli. modlabel cannot be specified with dlabel.

marker_options specify the look of markers. This look includes the marker symbol, the marker size, and its color and outline; see [G-3] ***marker_options***.

rlopts(*cline_options*) affects the rendition of the reference unit circle; see [G-3] ***cline_options***.

nogrid suppresses the polar grid circles.

pgrid([*numlist*][, *line_options*]) [pgrid([*numlist*][, *line_options*]) ... pgrid([*numlist*][, *line_options*])] determines the radii and appearance of the polar grid circles. By default, the graph includes nine polar grid circles with radii 0.1, 0.2, ..., 0.9 that have the grid linestyle. The *numlist* specifies the radii for the polar grid circles. The *line_options* determine the appearance of the polar grid circles; see [G-3] ***line_options***. Because the pgrid() option can be repeated, circles with different radii can have distinct appearances.

Add plots

addplot(*plot*) adds specified plots to the generated graph; see [G-3] ***addplot_option***.

Y axis, X axis, Titles, Legend, Overall

twoway_options are any of the options documented in [G-3] ***twoway_options***, excluding by(). These include options for titling the graph (see [G-3] ***title_options***) and for saving the graph to disk (see [G-3] ***saving_option***).

Remarks and examples

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Inference after vec requires that the cointegrating equations be stationary and that the number of cointegrating equations be correctly specified. Although the methods implemented in vecrank identify the number of stationary cointegrating equations, they assume that the individual variables are I(1). vecstable provides indicators of whether the number of cointegrating equations is misspecified or whether the cointegrating equations, which are assumed to be stationary, are not stationary.

vecstable is analogous to varstable. vecstable uses the coefficient estimates from the previously fitted VECM to back out estimates of the coefficients of the corresponding VAR and then compute the eigenvalues of the companion matrix. See [TS] **varstable** for details about how the companion matrix is formed and about how to interpret the resulting eigenvalues for covariance-stationary VAR models.

If a VECM has K endogenous variables and r cointegrating vectors, there will be $K - r$ unit moduli in the companion matrix. If any of the remaining moduli computed by vecrank are too close to one, either the cointegrating equations are not stationary or there is another common trend and the rank() specified in the vec command is too high. Unfortunately, there is no general distribution theory that allows you to determine whether an estimated root is too close to one for all the cases that commonly arise in practice.

▷ Example 1

In example 1 of [TS] **vec**, we estimated the parameters of a bivariate VECM of the natural logs of the average disposable incomes in two of the economic regions created by the U.S. Bureau of Economic Analysis. In that example, we concluded that the predicted cointegrating equation was probably not stationary. Here we continue that example by refitting that model and using `vecstable` to analyze the eigenvalues of the companion matrix of the corresponding VAR.

```
. use http://www.stata-press.com/data/r13/rdinc
. vec ln_ne ln_se
  (output omitted)
. vecstable
   Eigenvalue stability condition
```

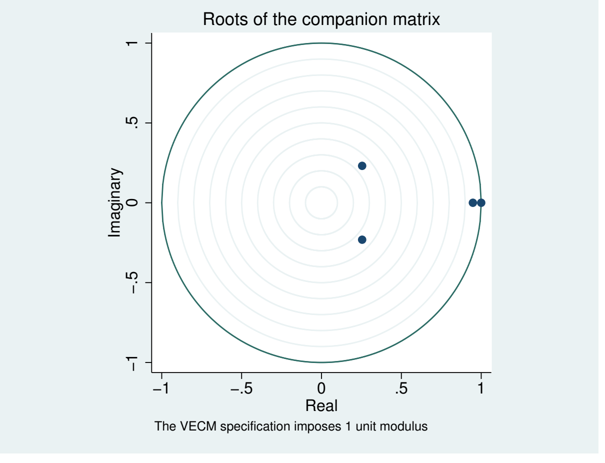
Eigenvalue	Modulus
1	1
.9477854	.947785
.2545357 + .2312756*i*	.343914
.2545357 − .2312756*i*	.343914

```
   The VECM specification imposes a unit modulus.
```

The output contains a table showing the eigenvalues of the companion matrix and their associated moduli. The table shows that one of the roots is 1. The table footer reminds us that the specified VECM imposes one unit modulus on the companion matrix.

The output indicates that there is a real root at about 0.95. Although there is no distribution theory to measure how close this root is to one, per other discussions in the literature (for example, Johansen [1995, 137–138]), we conclude that the root of 0.95 supports our earlier analysis, in which we concluded that the predicted cointegrating equation is probably not stationary.

If we had included the `graph` option with `vecstable`, the following graph would have been displayed:



The graph plots the eigenvalues of the companion matrix with the real component on the x axis and the imaginary component on the y axis. Although the information is the same as in the table, the graph shows visually how close the root with modulus 0.95 is to the unit circle.

◁

Stored results

`vecstable` stores the following in `r()`:

Scalars

`r(unitmod)`	number of unit moduli imposed on the companion matrix

Matrices

`r(Re)`	real part of the eigenvalues of $\mathbf{A}$
`r(Im)`	imaginary part of the eigenvalues of $\mathbf{A}$
`r(Modulus)`	moduli of the eigenvalues of $\mathbf{A}$

where $\mathbf{A}$ is the companion matrix of the VAR that corresponds to the VECM.

Methods and formulas

`vecstable` uses the formulas given in *Methods and formulas* of [TS] **irf create** to obtain estimates of the parameters in the corresponding VAR from the `vec` estimates. With these estimates, the calculations are identical to those discussed in [TS] **varstable**. In particular, the derivation of the companion matrix, $\mathbf{A}$, from the VAR point estimates is given in [TS] **varstable**.

References

Hamilton, J. D. 1994. *Time Series Analysis*. Princeton: Princeton University Press.

Johansen, S. 1995. *Likelihood-Based Inference in Cointegrated Vector Autoregressive Models*. Oxford: Oxford University Press.

Lütkepohl, H. 2005. *New Introduction to Multiple Time Series Analysis*. New York: Springer.

Also see

[TS] **vec** — Vector error-correction models

[TS] **vec intro** — Introduction to vector error-correction models