graph twoway kdensity — Kernel density plots

Description	Quick start	Menu	Syntax
Options	Remarks and examples	References	Also see

Description

graph twoway kdensity plots a kernel density estimate for *varname* using graph twoway line; see [G-2] graph twoway line.

Quick start

Kernel density plot of v1 twoway kdensity v1

Same as above, use the biweight kernel function twoway kdensity v1, kernel(biweight)

Same as above, but specify the half-width of the kernel to be 2 twoway kdensity v1, kernel(biweight) bwidth(2)

Overlay a kernel density plot on top of a histogram twoway histogram v1 || kdensity v1

A separate graph area for each level of catvar twoway kdensity v1, by(catvar)

A single graph area with curves showing the distribution for catvar = 0 and catvar = 1 twoway kdensity v1 if catvar==0 || kdensity v1 if catvar==1

Menu

Graphics > Two-way graph (scatter, line, etc.)

Syntax

<u>tw</u>oway kdensity varname [if] [in] [weight] [, options]

options	Description	
<u>k</u> ernel(<i>kernel</i>)	specify kernel function; default is kernel(epanechnikov)	
<u>bw</u> idth(#)	smoothing parameter	
n(#)	number of points to evaluate	
<u>ra</u> nge(##)	range for plot, minimum and maximum	
<pre><u>range(varname)</u></pre>	range for plot obtained from varname	
boundary	estimate density one bwidth() beyond maximum and minimum; not allowed with range()	
<u>hor</u> izontal	graph horizontally	
area(#)	rescaling parameter	
cline_options	change look of the line	
axis_choice_options	associate plot with alternative axis	
twoway_options	titles, legends, axes, added lines and text, by, regions, name, aspect ratio, etc.	
kernel	Description	
epanechnikov	Epanechnikov kernel function; the default	
 epan2	alternative Epanechnikov kernel function	
<u>bi</u> weight	biweight kernel function	
<u>cos</u> ine	cosine trace kernel function	
gaussian	Gaussian kernel function	
parzen	Parzen kernel function	
<u>rec</u> tangle	rectangle kernel function	
<u>tri</u> angle	triangle kernel function	

fweights and aweights are allowed; see [U] 11.1.6 weight.

Options

kernel(kernel) and bwidth(#) specify how the kernel density estimate is to be obtained and are in fact the same options as those specified with the command kdensity; see [R] kdensity.

kernel(*kernel*) specify the kernel-weight function to be used. The default is kernel(epanechnikov).

bwidth(#) specifies the smoothing parameter.

See [R] kdensity for more information about these options.

All the other graph twoway kdensity options modify how the result is displayed, not how it is obtained.

n(#) specifies the number of points at which the estimate is evaluated. The default is n(300).

range(# #) and range(varname) specify the range of values at which the kernel density estimates are
to be plotted. The default is range(m M), where m and M are the minimum and maximum of the
varname specified on the graph twoway kdensity command.

range(##) specifies a pair of numbers to be used as the minimum and maximum.

range (varname) specifies another variable for which its minimum and maximum are to be used.

- boundary specifies that the result be estimated for one bwidth() beyond the maximum and minimum value of *varname*. boundary cannot be specified with range().
- horizontal specifies that the result be plotted horizontally (that is, reflected along the identity line).
- area(#) specifies a multiplier by which the density estimates are adjusted before being plotted. The
 default is area(1). area() is useful when overlaying a density estimate on top of a histogram that is
 itself not scaled as a density. For instance, if you wished to scale the density estimate as a frequency,
 area() would be specified as the total number of nonmissing observations.

cline_options specify how the density line is rendered and its appearance; [G-3] *cline_options*.

- *axis_choice_options* associate the plot with a particular y or x axis on the graph; see [G-3] *axis_choice_options*.
- *twoway_options* are a set of common options supported by all twoway graphs. These options allow you to title graphs, name graphs, control axes and legends, add lines and text, set aspect ratios, create graphs over by () groups, and change some advanced settings. See [G-3] *twoway_options*.

Remarks and examples

graph twoway kdensity *varname* uses the kdensity command to obtain an estimate of the density of *varname* and uses graph twoway line to plot the result.

Remarks are presented under the following headings:

Typical use Use with by()

Typical use

The density estimate is often graphed on top of the histogram:

```
. use https://www.stata-press.com/data/r19/lifeexp
(Life expectancy, 1998)
. twoway histogram lexp, color(*.5) || kdensity lexp
```



Notice the use of graph twoway histogram's color (*.5) option to dim the bars and make the line stand out; see [G-4] *colorstyle*.

You can modify the text for the keys in the legend using the legend() option; see [G-3] *leg-end_options*.

Use with by()

graph twoway kdensity may be used with by():

```
. use https://www.stata-press.com/data/r19/lifeexp, clear
(Life expectancy, 1998)
. twoway histogram lexp, color(*.5) || kdensity lexp ||, by(region)
```



Because we have only three graphs, we will move the legend to the empty cell, which is the fourth position of our 2×2 array. The pos(0) suboption moves the legend to the middle position within the cell:

```
. twoway histogram lexp, color(*.5) || kdensity lexp ||,
by(region, legend(at(4) pos(0)))
```



To learn more about modifying the legend when using the by () option, see Use of legends with by() in [G-3] by_option .

References

Cox, N. J. 2005. Speaking Stata: Density probability plots. *Stata Journal* 5: 259–273.
2007. Software Updates: Speaking Stata: Density probability plots. *Stata Journal* 7: 593.

Also see

- [R] kdensity Univariate kernel density estimation
- [G-2] graph twoway histogram Histogram plots

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