

graph twoway kdensity — Kernel density plots[Description](#)
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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 > Twoway graph (scatter, line, etc.)

Syntax

```
twoway kdensity varname [if] [in] [weight] [, options]
```

<i>options</i>	Description
<code>kernel(<i>kernel</i>)</code>	specify kernel function; default is <code>kernel(epanechnikov)</code>
<code>bwidth(#)</code>	smoothing parameter
<code>n(#)</code>	number of points to evaluate
<code>range(# #)</code>	range for plot, minimum and maximum
<code>range(<i>varname</i>)</code>	range for plot obtained from <i>varname</i>
<code>boundary</code>	estimate density one <code>bwidth()</code> beyond maximum and minimum; not allowed with <code>range()</code>
<code>horizontal</code>	graph horizontally
<code>area(#)</code>	rescaling parameter
<i>cline_options</i>	change look of the line
<i>axis_choice_options</i>	associate plot with alternative axis
<i>twoway_options</i>	titles, legends, axes, added lines and text, by, regions, name, aspect ratio, etc.

<i>kernel</i>	Description
<code>epanechnikov</code>	Epanechnikov kernel function; the default
<code>epan2</code>	alternative Epanechnikov kernel function
<code>biweight</code>	biweight kernel function
<code>cosine</code>	cosine trace kernel function
<code>gaussian</code>	Gaussian kernel function
<code>parzen</code>	Parzen kernel function
<code>rectangle</code>	rectangle kernel function
<code>triangle</code>	triangle kernel function

`fweights` and `awweights` 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

[stata.com](http://www.stata.com)

`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:

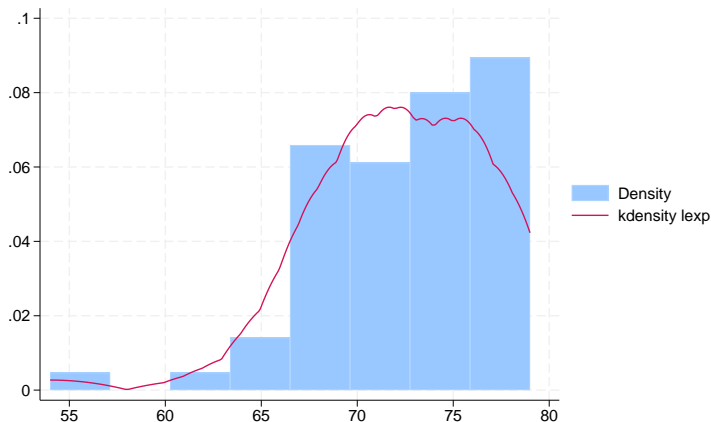
Typical use

Use with by()

Typical use

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

```
. use https://www.stata-press.com/data/r18/lifeexp  
(Life expectancy, 1998)  
. twoway histogram lexp, color(*.5) || kdensity lexp
```



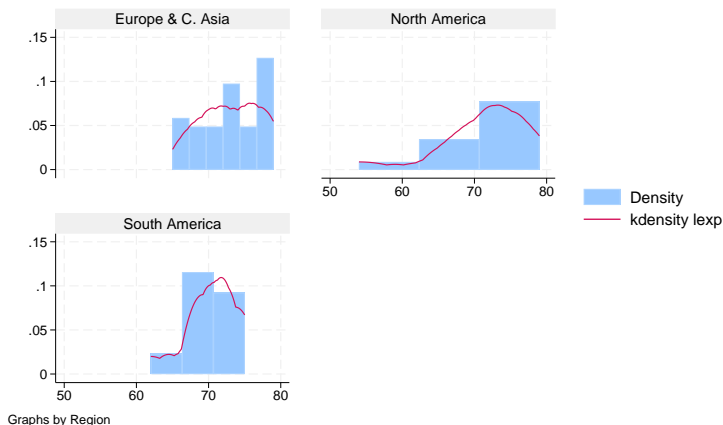
Notice the use of `graph twoway histogram's` `color(*.5)` option to dim the bars and make the line stand out; see [G-4] [colorstyle](#).

You can modify the text for the keys in the legend using the `legend()` option; see [G-3] [legend_options](#).

Use with by()

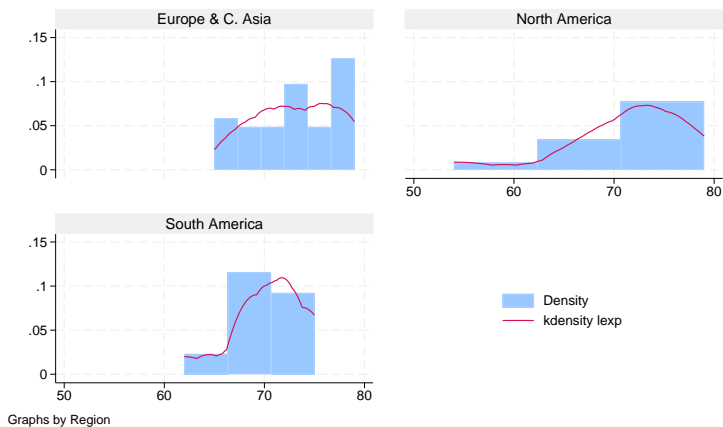
graph twoway kdensity may be used with by():

```
. use https://www.stata-press.com/data/r18/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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