

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
```

As above, use the `biweight` kernel function

```
twoway kdensity v1, kernel(biweight)
```

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
bwidth (#)	smoothing parameter
kernel (<i>kernel</i>)	specify kernel function; default is kernel (epanechnikov)
range (# #)	range for plot, minimum and maximum
range (<i>varname</i>)	range for plot obtained from <i>varname</i>
n (#)	number of points to evaluate
area (#)	rescaling parameter
horizontal	graph horizontally
boundary	estimate density one bwidth () beyond maximum and minimum; not allowed with range ()
<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
epanechnikov	Epanechnikov kernel function; the default
epan2	alternative Epanechnikov kernel function
biweight	biweight kernel function
cosine	cosine trace kernel function
gaussian	Gaussian kernel function
parzen	Parzen kernel function
rectangle	rectangle kernel function
triangle	triangle kernel function

fweights and **awweights** are allowed; see [U] [11.1.6 weight](#).

Options

bwidth(#) and **kernel**(*kernel*) 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](#).

bwidth(#) specifies the smoothing parameter.

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

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.

`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.

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

`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.

`horizontal` specifies that the result be plotted horizontally (that is, reflected along the identity line).

`boundary` specifies that the result be estimated for one `bwidth()` beyond the maximum and minimum value of *varname*. `boundary` cannot be specified with `range()`.

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:

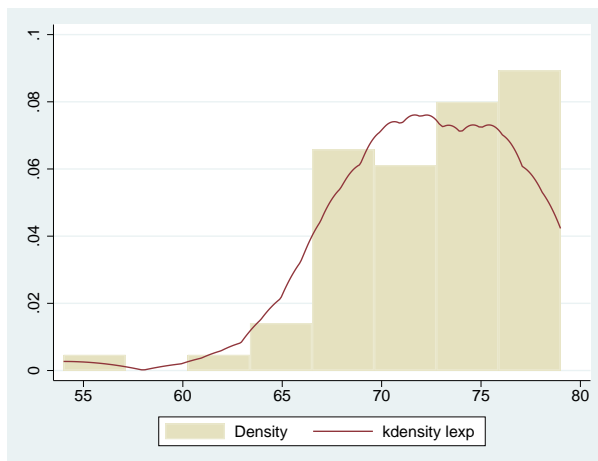
Typical use

Use with by()

Typical use

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

```
. use https://www.stata-press.com/data/r17/lifeexp
(Life expectancy, 1998)
. twoway histogram lexp, color(*.5) || kdensity lexp
```



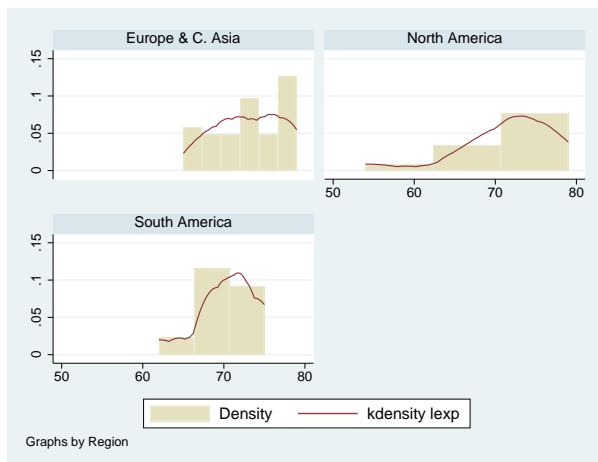
Notice the use of `graph twoway histogram`'s `color(*.5)` option to dim the bars and make the line stand out; see [G-4] [colorstyle](#).

Notice also the y and x axis titles: “Density/kdensity lexp” and “Life expectancy at birth/x”. The “kdensity lexp” and “x” were contributed by the `twoway kdensity`. When you overlay graphs, you nearly always need to respecify the axis titles using the `axis_title_options` `ytitle()` and `xtitle()`; see [G-3] [axis_title_options](#).

Use with by()

graph twoway kdensity may be used with by():

```
. use https://www.stata-press.com/data/r17/lifeexp, clear
(Life expectancy, 1998)
. twoway histogram lexp, color(*.5) || kdensity lexp ||, by(region)
```



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