

## graph twoway lpoly — Local polynomial smooth plots

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## Description

`graph twoway lpoly` plots a local polynomial smooth of *yvar* on *xvar*.

## Quick start

Kernel-weighted local polynomial smooth plot of *y* versus *x* with local mean smoothing

```
twoway lpoly y x
```

As above, and overlay on a scatterplot to show the observed data

```
twoway scatter y x || lpoly y x
```

As above, but with gray markers and a navy blue line

```
twoway scatter y x, mcolor(gray) || lpoly y x, lcolor(navy)
```

Specify the half-width of the kernel to be 110

```
twoway scatter y x || lpoly y x, bwidth(110)
```

Specify a polynomial of degree 3

```
twoway scatter y x || lpoly y x, degree(3)
```

Specify the triangle kernel function

```
twoway scatter y x || lpoly y x, kernel(triangle)
```

Show both the triangle and default Epanechnikov kernel functions

```
twoway scatter y x || lpoly y x, kernel(triangle) || lpoly y x
```

With a separate graph area for each level of categorical variable *catvar*

```
twoway scatter y x || lpoly y x , by(catvar)
```

## Menu

Graphics > Twoway graph (scatter, line, etc.)

# Syntax

`twoway lpoly yvar xvar [if] [in] [weight] [, options]`

<i>options</i>	Description
<code>kernel(kernel)</code>	kernel function; default is <code>kernel(epanechnikov)</code>
<code>bwidth(#)</code>	kernel bandwidth
<code>degree(#)</code>	degree of the polynomial smooth; default is <code>degree(0)</code>
<code>n(#)</code>	obtain the smooth at <code>#</code> points; default is <code>min(N, 50)</code>
<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)` specifies the kernel function for use in calculating the weighted local polynomial estimate. The default is `kernel(epanechnikov)`. See [\[R\] kdensity](#) for more information on this option.
- `bwidth(#)` specifies the half-width of the kernel, the width of the smoothing window around each point. If `bwidth()` is not specified, a rule-of-thumb bandwidth estimator is calculated and used; see [\[R\] lpoly](#).
- `degree(#)` specifies the degree of the polynomial to be used in the smoothing. The default is `degree(0)`, meaning local mean smoothing.
- `n(#)` specifies the number of points at which the smooth is to be calculated. The default is `min(N, 50)`, where  $N$  is the number of observations.
- cline\_options* specify how the line is rendered and its appearance; see [\[G-3\] 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 lpoly yvar xvar` uses the `lpoly` command—see [R] [lpoly](#)—to obtain a local polynomial smooth of `yvar` on `xvar` and uses `graph twoway line` to plot the result.

Remarks are presented under the following headings:

*Typical use*

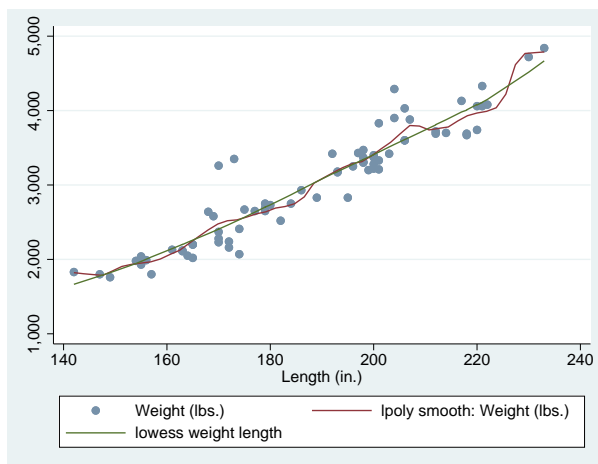
*Use with `by()`*

### Typical use

The local polynomial smooth is often graphed on top of the data, possibly with other smoothers or regression lines:

```
. use https://www.stata-press.com/data/r17/auto
(1978 automobile data)

. twoway scatter weight length, mcolor(*.6) ||
    lpoly weight length           ||
    lowess weight length
```



We used `mcolor(*.6)` to dim the points and thus make the lines stand out; see [G-4] [colorstyle](#).

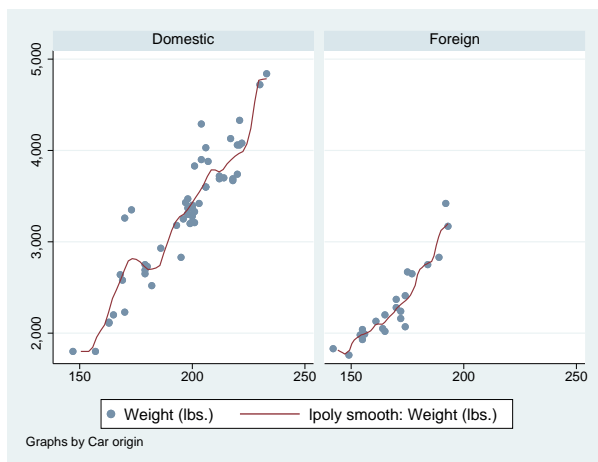
## Use with by()

`graph twoway lpoly` may be used with `by()`:

```

. use https://www.stata-press.com/data/r17/auto, clear
(1978 automobile data)
. twoway scatter weight length, mcolor(*.6) ||
    lpoly weight length,          ||
    , by(foreign)

```



## References

- Cox, N. J. 2005. [Speaking Stata: Smoothing in various directions](#). *Stata Journal* 5: 574–593.
- . 2010. [Software Updates: Speaking Stata: Smoothing in various directions](#). *Stata Journal* 10: 164.

## Also see

- [R] [lpoly](#) — Kernel-weighted local polynomial smoothing
- [G-2] [graph twoway lpoly](#) — Local polynomial smooth plots with CIs