graph twoway lpoly — Local polynomial smooth plots

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 ]
```

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<th>Options</th>
<th>Description</th>
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<td><code>kernel(kernel)</code></td>
<td>kernel function; default is <code>kernel(epanechnikov)</code></td>
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<tr>
<td><code>bwidth(#)</code></td>
<td>kernel bandwidth</td>
</tr>
<tr>
<td><code>degree(#)</code></td>
<td>degree of the polynomial smooth; default is <code>degree(0)</code></td>
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<tr>
<td><code>n(#)</code></td>
<td>obtain the smooth at # points; default is <code>min(N, 50)</code></td>
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<tr>
<td><code>cline_options</code></td>
<td>change look of the line</td>
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<tr>
<td><code>axis_choice_options</code></td>
<td>associate plot with alternative axis</td>
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<td><code>twoway_options</code></td>
<td>titles, legends, axes, added lines and text, by, regions, name, aspect ratio, etc.</td>
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### kernel

<table>
<thead>
<tr>
<th>kernel</th>
<th>Description</th>
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<tbody>
<tr>
<td><code>epanechnikov</code></td>
<td>Epanechnikov kernel function; the default</td>
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<tr>
<td><code>epan2</code></td>
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<td>biweight kernel function</td>
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<td><code>gaussian</code></td>
<td>Gaussian kernel function</td>
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<tr>
<td><code>parzen</code></td>
<td>Parzen kernel function</td>
</tr>
<tr>
<td><code>rectangle</code></td>
<td>rectangle kernel function</td>
</tr>
<tr>
<td><code>triangle</code></td>
<td>triangle kernel function</td>
</tr>
</tbody>
</table>

fweights and aweights 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/r16/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()`:

```stata
. use https://www.stata-press.com/data/r16/auto, clear
(1978 Automobile Data)
. twoway scatter weight length, mcolor(*.6) ||
   lpoly weight length, ||
   , by(foreign)
```

![Graphs by Car type](image)

References


Also see

[R] `lpoly` — Kernel-weighted local polynomial smoothing

[G-2] `graph twoway lpolyci` — Local polynomial smooth plots with CIs