graph twoway lpolyci — Local polynomial smooth plots with CIs

Syntax

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

```
options          Description

  kernel(kernel)  kernel function; default is kernel(epanechnikov)
  bwwidth(#)     kernel bandwidth
  degree(#)      degree of the polynomial smooth; default is degree(0)
  n(#)           obtain the smooth at # points; default is min(N, 50)
  level(#)       set confidence level; default is level(95)
  pwidth(#)      pilot bandwidth for standard error calculation
  var(#)         estimate of the constant conditional variance
  nofit          do not plot the smooth
  fitplot(plottype) how to plot the smooth; default is fitplot(line)
  ciplot(plottype) how to plot CIs; default is ciplot(rarea)

fcline_options   change look of the smoothed line
fitarea_options  change look of CI
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
  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 aweights are allowed; see [U] 11.1.6 weight.
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Menu

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

Description

\texttt{graph twoway lpolyci} plots a local polynomial smooth of \texttt{yvar} on \texttt{xvar} by using \texttt{graph twoway line} (see \textit{[G-2] graph twoway line}), along with a confidence interval by using \texttt{graph twoway rarea} (see \textit{[G-2] graph twoway rarea}).

Options

\texttt{kernel(kernel)} specifies the kernel function for use in calculating the weighted local polynomial estimate. The default is \texttt{kernel(epanechnikov)}. See \textit{[R] kdensity} for more information on this option.

\texttt{bwidth(#)} specifies the half-width of the kernel, the width of the smoothing window around each point. If \texttt{bwidth()} is not specified, a rule-of-thumb bandwidth estimator is calculated and used; see \textit{[R] lpoly}.

\texttt{degree(#)} specifies the degree of the polynomial to be used in the smoothing. The default is \texttt{degree(0)}, meaning local mean smoothing.

\texttt{n(#)} specifies the number of points at which the smooth is to be evaluated. The default is \texttt{min(N,50)}, where \textit{N} is the number of observations.

\texttt{level(#)} specifies the confidence level, as a percentage, for confidence intervals. The default is \texttt{level(95)} or as set by \texttt{set level}; see \textit{[U] 20.7 Specifying the width of confidence intervals}.

\texttt{pwidth(#)} specifies the pilot bandwidth to be used for standard error computations. The default is chosen to be 1.5 times the value of the rule-of-thumb bandwidth selector.

\texttt{var(#)} specifies an estimate of a constant conditional variance required for standard error computation. By default, the conditional variance at each smoothing point is estimated by the normalized weighted residual sum of squares obtained from locally fitting a polynomial of order \textit{p} + 2, where \textit{p} is the degree specified in \texttt{degree()}. 

\texttt{nofit} prevents the smooth from being plotted.

\texttt{fitplot(plottype)} specifies how the prediction is to be plotted. The default is \texttt{fitplot(line)}, meaning that the smooth will be plotted by \texttt{graph twoway line}. See \textit{[G-2] graph twoway} for a list of \texttt{plottype} choices. You may choose any that expects one \textit{y} and one \textit{x} variable. \texttt{fitplot()} is seldom used.

\texttt{ciplot(plottype)} specifies how the confidence interval is to be plotted. The default is \texttt{ciplot(rarea)}, meaning that the confidence bounds will be plotted by \texttt{graph twoway rarea}.

A reasonable alternative is \texttt{ciplot(rline)}, which will substitute lines around the smooth for shading. See \textit{[G-2] graph twoway} for a list of \texttt{plottype} choices. You may choose any that expects two \textit{y} variables and one \textit{x} variable.

\texttt{fcline_options} specify how the \texttt{lpolyci} line is rendered and its appearance; see \textit{[G-3] fcline_options}.

\texttt{fitarea_options} specify how the confidence interval is rendered; see \textit{[G-3] fitarea_options}. If you specify \texttt{ciplot()}, you should specify whatever is appropriate instead of using \texttt{fitarea_options}.

\texttt{axis_choice_options} associate the plot with a particular \textit{y} or \textit{x} axis on the graph; see \textit{[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 lpolyci yvar xvar uses the lpoly command—see [R] lpoly—to obtain a local polynomial smooth of yvar on xvar and confidence intervals and uses graph twoway line and graph twoway rarea to plot results.

Remarks are presented under the following headings:

Typical use
Use with by()

Typical use

graph twoway lpolyci can be used to overlay the confidence bands obtained from different local polynomial smooths. For example, for local mean and local cubic polynomial smooths:

```
use http://www.stata-press.com/data/r13/auto
(1978 Automobile Data)
.twoway lpolyci weight length, nofit ||
   lpolyci weight length, degree(3) nofit
cplot(rline) pstyle(ci2) ||
   scatter weight length, msymbol(o)
```

The plotted area corresponds to the confidence bands for the local mean smooth and lines correspond to confidence intervals for the local cubic smooth.

When you overlay graphs, you nearly always need to respecify the axis titles by using the axis_title_options ytitle() and xtitle(); see [G-3] axis_title_options.
Use with by()

graph twoway lpolyci may be used with by():

. use http://www.stata-press.com/data/r13/auto, clear
(1978 Automobile Data)
. twoway lpolyci weight length ||
   scatter weight length, msymbol(o) ||
   , by(foreign)

Also see

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