**graph twoway lowess** — Local linear smooth plots



## Description

`graph twoway lowess` plots a lowess smooth of *yvar* on *xvar* using `graph twoway line`; see [G-2] **graph twoway line**.

## Quick start

Local linear smooth plot of `y` versus `x` using Cleveland's tricube weighting function with a bandwidth of 0.8

```
twoway lowess y x
```

Same as above, overlaid on a scatterplot of `y` versus `x`

```
twoway scatter y x || lowess y x
```

Same as above, but draw points with less intense color to make the line more visible

```
twoway scatter y x, mcolor(*.6) || lowess y x
```

Use running-mean smoothing

```
twoway scatter y x || lowess y x, mean
```

Specify a bandwidth of 0.5

```
twoway scatter y x || lowess y x, bwidth(.5)
```

Suppress use of Cleveland's tricube weighting function

```
twoway scatter y x || lowess y x, noweight
```

## Menu

Graphics > Two-way graph (scatter, line, etc.)

## Syntax

```
twoway lowess yvar xvar [if] [in] [, options]
```

| *options* | Description |
|---|---|
| bwidth(#) | smoothing parameter |
| mean | use running-mean smoothing |
| noweight | use unweighted smoothing |
| logit | transform the smooth to logits |
| adjust | adjust smooth's mean to equal *yvar*'s mean |
| *cline_options* | change look of the line |
| *axis_choice_options* | associate plot with alternative axis |
| *twoway_options* | titles, legends, axes, added lines and text, by, regions, name, aspect ratio, etc. |

## Options

bwidth(#) specifies the bandwidth. bwidth(.8) is the default. Centered subsets of $N$*bwidth() observations, $N$ = number of observations, are used for calculating smoothed values for each point in the data except for endpoints, where smaller, uncentered subsets are used. The greater the bwidth(), the greater the smoothing.

mean specifies running-mean smoothing; the default is running-line least-squares smoothing.

noweight prevents the use of Cleveland's (1979) tricube weighting function; the default is to use the weighting function.

logit transforms the smoothed *yvar* into logits.

adjust adjusts by multiplication the mean of the smoothed *yvar* to equal the mean of *yvar*. This is useful when smoothing binary (0/1) data.

*cline_options* specify how the lowess 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 lowess *yvar xvar* uses the lowess command—see [R] **lowess**—to obtain a local linear smooth of *yvar* on *xvar* and uses graph twoway line to plot the result.

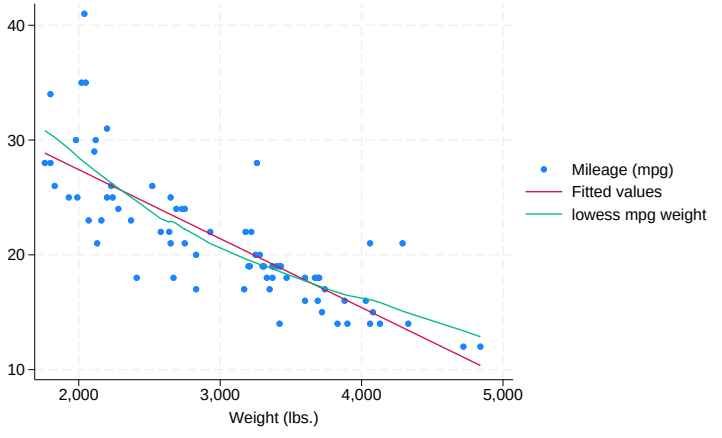
Remarks are presented under the following headings:

*Typical use*
*Use with by( )*

## Typical use

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

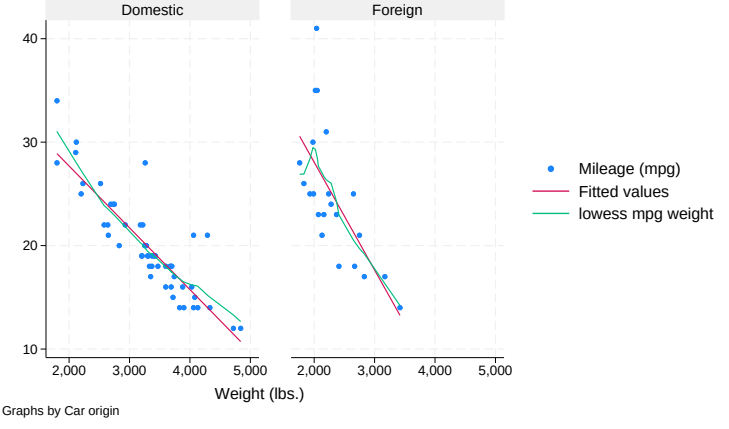
```
. use https://www.stata-press.com/data/r19/auto
(1978 automobile data)
. twoway scatter mpg weight    ||
         lfit    mpg weight    ||
         lowess  mpg weight
```



## Use with by()

graph twoway lowess may be used with by():

```
. use https://www.stata-press.com/data/r19/auto, clear
(1978 automobile data)
. twoway scatter mpg weight ||
         lfit    mpg weight ||
         lowess  mpg weight ||, by(foreign)
```




# References

Cleveland, W. S. 1979. Robust locally weighted regression and smoothing scatterplots. *Journal of the American Statistical Association* 74: 829–836. https://doi.org/10.2307/2286407.

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.

Royston, P., and N. J. Cox. 2005. A multivariable scatterplot smoother. *Stata Journal* 5: 405–412.

# Also see

[R] **lowess** — Lowess smoothing

[G-2] **graph twoway mspline** — Two-way median-spline plots