graph twoway mspline — Two-way median-spline plots

Description

`twoway mspline` calculates cross medians and then uses the cross medians as knots to fit a cubic spline. The resulting spline is graphed as a line plot.

Quick start

Median-spline plot of y versus x

```
twoway mspline y x
```

Same as above, and overlay the median-spline plot on a scatterplot of the observed data

```
twoway scatter y x || mspline y x
```

Same as above, but specify 10 cross-median knots

```
twoway scatter y x || mspline y x, bands(10)
```

Specify 5 points between knots

```
twoway scatter y x || mspline y x, n(5)
```

Separate graph areas for each level of `catvar`

```
twoway scatter y x || mspline y x, n(5) by(catvar)
```

Label the y axis from 0 to 10 in increments of 2

```
twoway scatter y x || mspline y x, n(5) ylabel(0(2)10)
```

Specify "My X Variable" as the title for the x axis

```
twoway scatter y x || mspline y x, xtitle("My X Variable")
```

Same as above, but suppress the legend

```
twoway scatter y x || mspline y x, xtitle("My X Variable") ///
  legend(off)
```

Menu

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

Syntax

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

options	Description
`bands(#)`	number of cross-median knots
`n(#)`	number of points between knots
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.

All options are *rightmost*; see [G-4] **Concept: repeated options**.

Options

`bands(#)` specifies the number of bands for which cross medians should be calculated. The default is $\max\{\min(b_1, b_2), b_3\}$, where b_1 is round$\{10 * \log10(N)\}$, b_2 is round$(\sqrt{N})$, b_3 is $\min(2, N)$, and N is the number of observations.

The x axis is divided into # equal-width intervals and then the median of y and the median of x are calculated in each interval. It is these cross medians to which a cubic spline is then fit.

`n(#)` specifies the number of points between the knots for which the cubic spline should be evaluated. `n(10)` is the default. `n()` does not affect the result that is calculated, but it does affect how smooth the result appears.

cline_options specify how the median-spline 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

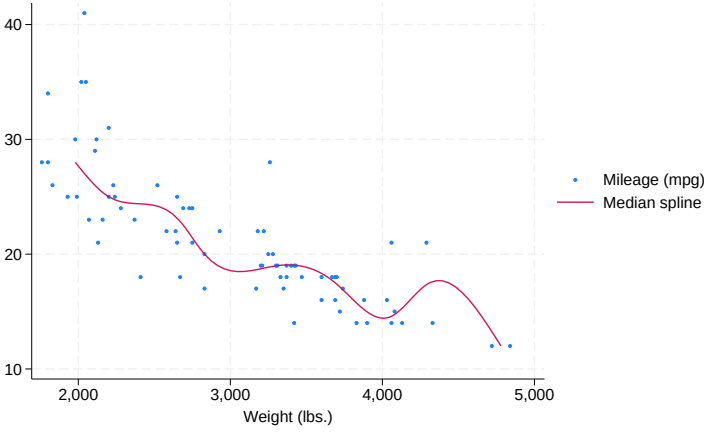
Remarks are presented under the following headings:

Typical use
Cautions
Use with by()

Typical use

Median splines provide a convenient way to show the relationship between y and x:

```
. use https://www.stata-press.com/data/r19/auto
(1978 automobile data)
. scatter mpg weight, msize(*.5) || mspline mpg weight
```

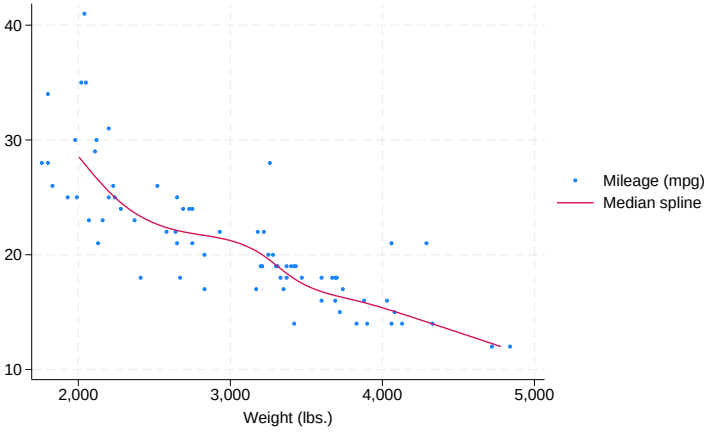


The important part of the above command is `mspline mpg weight`. On the `scatter`, we specified `msize(*.5)` to make the marker symbols half their normal size; see [G-4] ***size***.

Cautions

The graph shown above illustrates a common problem with this technique: it tracks wiggles that may not be real and can introduce wiggles if too many bands are chosen. An improved version of the graph above would be

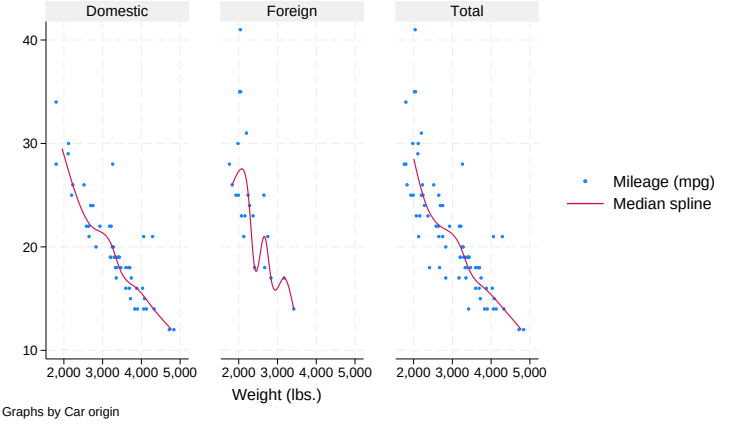
```
. scatter mpg weight, msize(*.5) || mspline mpg weight, bands(8)
```



Use with by()

mspline may be used with by() (as can all the twoway plot commands):

```
. scatter mpg weight, msize(*.5) ||
  mspline mpg weight, bands(8)   ||, by(foreign, total row(1))
```



Also see

[R] **makespline** — Spline generation

[G-2] **graph twoway fpfit** — Two-way fractional-polynomial prediction plots

[G-2] **graph twoway lfit** — Two-way linear prediction plots

[G-2] **graph twoway line** — Two-way line plots

[G-2] **graph twoway mband** — Two-way median-band plots

[G-2] **graph twoway qfit** — Two-way quadratic prediction plots