

## graph twoway mspline — Twoway median-spline plots

[Syntax](#)                      [Menu](#)                      [Description](#)                      [Options](#)  
[Remarks and examples](#)      [Also see](#)

## Syntax

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

<i>options</i>	Description
<code>bands(#)</code>	number of cross-median knots
<code>n(#)</code>	number of points between knots
<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.

See [G-3] *cline\_options*, [G-3] *axis\_choice\_options*, and [G-3] *twoway\_options*.

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

## Menu

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

## 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.

## 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  $\text{round}\{10 * \log_{10}(N)\}$ ,  $b_2$  is  $\text{round}(\sqrt{N})$ ,  $b_3$  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

[stata.com](http://www.stata.com)

Remarks are presented under the following headings:

*Typical use*

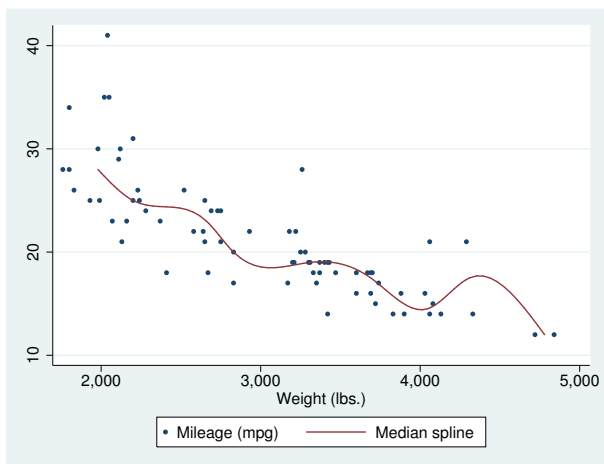
*Cautions*

*Use with by()*

## Typical use

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

```
. use http://www.stata-press.com/data/r13/auto  
(1978 Automobile Data)  
. scatter mpg weight, msize(*.5) || mspline mpg weight
```

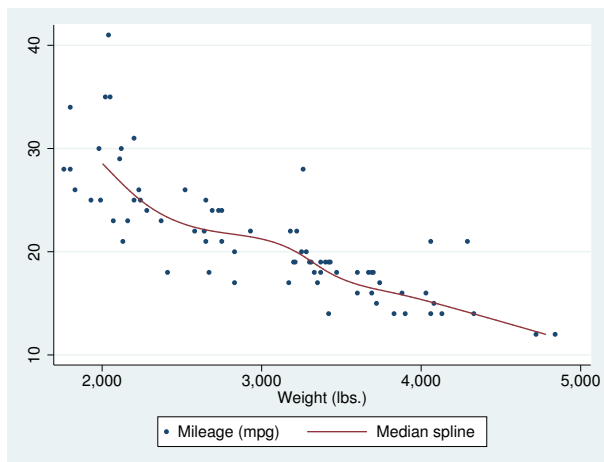


The important part of the above command is “`mspline mpg weight`”. On the `scatter`, we specified `msize(*.5)` to make the marker symbols half their normal size; see [G-4] *relativesize*.

## 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

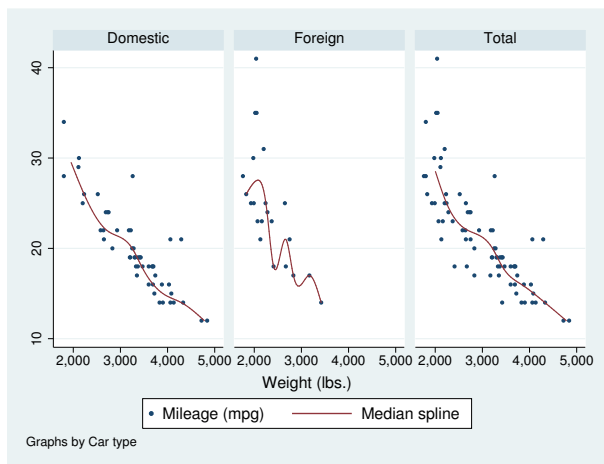
```
. scatter mpg weight, msize(*.5) || mspline mpg weight, bands(8)
```



## 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

[G-2] [graph twoway line](#) — Twoway line plots

[G-2] [graph twoway mband](#) — Twoway median-band plots

[G-2] [graph twoway lfit](#) — Twoway linear prediction plots

[G-2] [graph twoway qfit](#) — Twoway quadratic prediction plots

[G-2] [graph twoway ffit](#) — Twoway fractional-polynomial prediction plots

[R] [mkspline](#) — Linear and restricted cubic spline construction