graph twoway pcarrow — Paired-coordinate plot with arrows

Description

`twoway pcarrow` draws an arrow for each observation in the dataset. The arrow starts at the coordinate (*y1var*, *x1var*) and ends at the coordinate (*y2var*, *x2var*), with an arrowhead drawn at the ending coordinate.

`twoway pcbarrow` draws an arrowhead at each end; that is, it draws bidirectional arrows.

Quick start

Directional arrow plot from (`y1`, `x1`) to (`y2`, `x2`)

```
twoway pcarrow y1 x1 y2 x2
```

Bidirectional arrow plot

```
twoway pcbarrow y1 x1 y2 x2
```

Specify arrowheads of size 4

```
twoway pcarrow y1 x1 y2 x2, msize(4)
```

Same as above, but specify barbs of size 4

```
twoway pcarrow y1 x1 y2 x2, msize(4) barbsize(4)
```

Same as above, but specify orange lines

```
twoway pcarrow y1 x1 y2 x2, msize(4) barbsize(4) lcolor(orange)
```

Label the arrows using the values of `labvar`

```
twoway pcarrow y1 x1 y2 x2, mlabel(labvar)
```

Same as above, with labels near the arrowhead

```
twoway pcarrow y1 x1 y2 x2, mlabel(labvar) headlabel
```

Menu

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

Syntax

Directional arrows

```
twoway pcarrow y1var x1var y2var x2var [if] [in] [, options]
```

Bidirectional arrows

```
twoway pcbarrow y1var x1var y2var x2var [if] [in] [, options]
```

options	Description
`mstyle(`*markerstyle*`)`	overall style of arrowhead
`msize(`*markersizestyle*`)`	size of arrowhead
`mangle(`*anglestyle*`)`	angle of arrowhead
`barbsize(`*markersizestyle*`)`	size of filled portion of arrowhead
`mcolor(`*colorstyle*`)`	color and opacity of arrowhead, inside and out
`mfcolor(`*colorstyle*`)`	arrowhead "fill" color and opacity
`mlcolor(`*colorstyle*`)`	arrowhead outline color and opacity
`mlwidth(`*linewidthstyle*`)`	arrowhead outline thickness
`mlstyle(`*linestyle*`)`	thickness and color
`headlabel`	label head of arrow, not tail
`vertical`	orient plot naturally; the default
`horizontal`	orient plot transposing y and x values
line_options	change look of arrow shaft lines
colorvar_options	change color of arrowhead and arrow shaft lines based on values of a variable
marker_label_options	add marker labels; change look or position
axis_choice_options	associate plot with alternative axis
twoway_options	titles, legends, axes, added lines and text, by regions, name, aspect ratio, etc.

Most options are *rightmost*, except *axis_choice_options*, `headlabel`, `vertical`, and `horizontal`, which are *unique*, and *twoway_options*, which are a mix of forms; see [G-4] **Concept: repeated options**.

Options

`mstyle(`*markerstyle*`)` specifies the overall look of arrowheads, including their size, their color, etc. The other options allow you to change each attribute of the arrowhead, but `mstyle()` is the point from which they start.

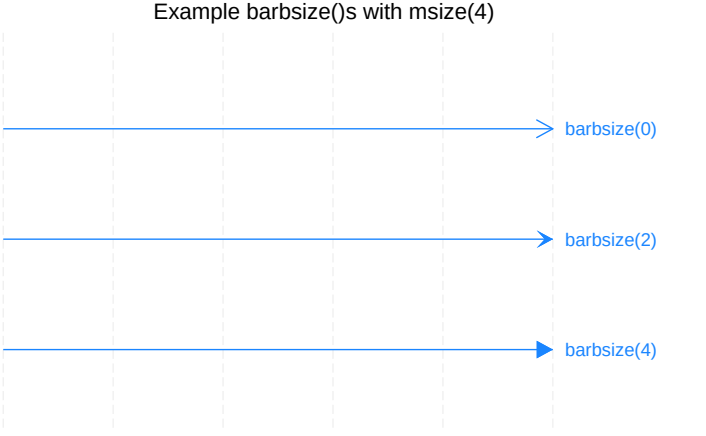
You need not specify `mstyle()` just because you want to change the look of the arrowhead. In fact, most people seldom specify the `mstyle()` option. You specify `mstyle()` when another style exists that is exactly what you desire or when another style would allow you to specify fewer changes to obtain what you want.

`pcarrow` plots borrow their options and associated "look" from standard markers, so all its options begin with `m`. See [G-4] ***markerstyle*** for a list of available marker/arrowhead styles.

`msize(`*markersizestyle*`)` specifies the size of arrowheads. See [G-4] ***markersizestyle*** for a list of size choices.

`mangle(`*anglestyle*`)` specifies the angle that each side of an arrowhead forms with the arrow's line. For most schemes, the default angle is 28.64.

`barbsize(`*markersizestyle*`)` specifies the portion of the arrowhead that is to be filled. `barbsize(0)` specifies that just the lines for the arrowhead be drawn. When `barbsize()` is equal to `msize()`, the arrowhead is filled to a right angle with the arrow line. The effect of `barbsize()` is easier to see than to describe:



`mcolor(`*colorstyle*`)` specifies the color of the arrowhead. This option sets the color and opacity of both the line used to outline the arrowhead and the inside of the arrowhead. Also see options `mfcolor()` and `mlcolor()` below. See [G-4] ***colorstyle*** for a list of color choices.

`mfcolor(`*colorstyle*`)` specifies the color and opacity of the inside of the arrowhead. See [G-4] ***colorstyle*** for a list of color choices.

`mlstyle(`*linestyle*`)`, `mlwidth(`*linewidthstyle*`)`, and `mlcolor(`*colorstyle*`)` specify the look of the line used to outline the arrowhead. See [G-4] **Concept: lines**, but you cannot change the line pattern of an arrowhead.

`headlabel` specifies that labels be drawn at the arrowhead, the (*y2var*,*x2var*) points rather than at the tail of the arrow, the (*y1var*,*x1var*) points. By default, when the `mlabel()` option is specified, labels are placed at the tail of the arrows; `headlabel` moves the labels from the tail to the head.

`vertical` and `horizontal` specify whether the y and x coordinates are to be swapped before plotting—`vertical` (the default) does not swap the coordinates, whereas `horizontal` does.

These options are rarely used when plotting only paired-coordinate data; they can, however, be used to good effect when combining paired-coordinate plots with range plots, such as `twoway rspike` or `twoway rbar`; see [G-2] **graph twoway rspike** and [G-2] **graph twoway rbar**.

line_options specify the look of the lines used to draw the shaft of the arrow, including pattern, width, and color; see [G-3] ***line_options***.

colorvar_options specify that the color of the arrowhead and the lines used to draw the shaft of the arrow be determined by the levels of the numeric variable *colorvar*; see [G-3] ***colorvar_options***.

marker_label_options specify if and how the arrows are to be labeled. By default, the labels are placed at the tail of the arrow, the point defined by *y1var* and *x1var*. See [G-3] ***marker_label_options*** for options that change the look of the labels.

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***.

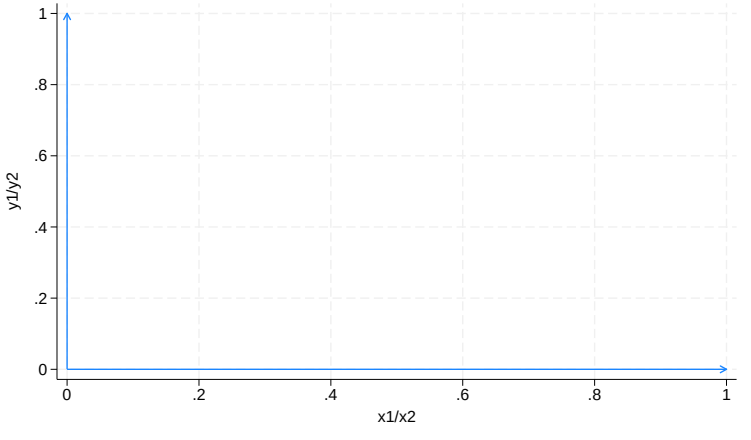
Remarks and examples

Remarks are presented under the following headings:

Basic use

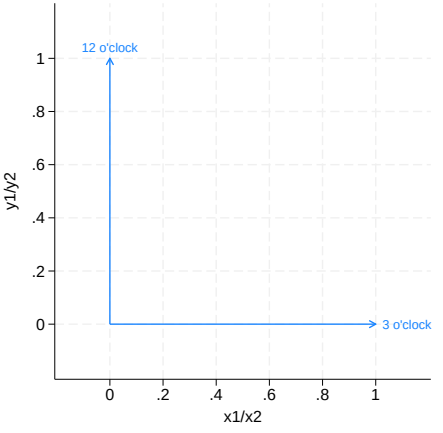
We have longitudinal data from 1968 and 1988 on the earnings and total experience of US women by occupation. We will input data for two arrows, both originating at (0,0) and extending at right angles from each other, and plot them.

```
. input y1 x1 y2 x2
  1.      0  0  0  1
  2.      0  0  1  0
  3. end
. twoway pcarrow y1 x1 y2 x2
```



We could add labels to the heads of the arrows while also adding a little room in the plot region and constraining the plot region to be square:

```
. drop _all
. input y1 x1 y2 x2 str10 time   pos
  1.     0  0  0  1 "3 o'clock"    3
  2.     0  0  1  0 "12 o'clock"  12
  3. end
. twoway pcarrow y1 x1 y2 x2, aspect(1) mlabel(time) headlabel
                      mlabvposition(pos) plotregion(margin(vlarge))
```



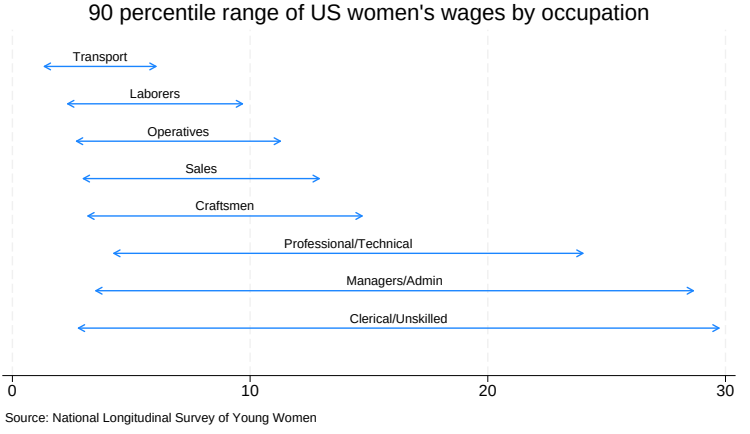
For examples of arrows in graphing multivariate results, see [MV] **biplot**.

Advanced use

As with many `twoway` plottypes, `pcarrow` and `pcbarrow` can be usefully combined with other `twoway` plottypes (see [G-2] **graph twoway**). Here a `scatter` plot is used to label ranges drawn by `pcbarrow` (though admittedly the ranges might better be represented using `twoway rcap`).

```
. use https://www.stata-press.com/data/r19/nlsw88, clear
(NLSW, 1988 extract)
. keep if occupation <= 8
(224 observations deleted)
. collapse (p05) p05=wage (p95) p95=wage (p50) p50=wage, by(occupation)
. generate mid = (p05 + p95) / 2
. generate dif = (p95 - p05)
. gsort -dif
. generate srt = _n
```

```
. twoway pcbarrow srt p05 srt p95 ||
         scatter  srt mid, msymbol(i) mlabel(occupation)
                           mlabpos(12) mlabcolor(black)
         plotregion(margin(t=5)) yscale(off)
         ylabel(, nogrid) legend(off)
         ytitle(Hourly wages)
         title("90 percentile range of US women's wages by occupation")
         note("Source: National Longitudinal Survey of Young Women")
```



References

Cox, N. J. 2005. Stata tip 21: The arrows of outrageous fortune. *Stata Journal* 5: 282–284.

———. 2009. Speaking Stata: Paired, parallel, or profile plots for changes, correlations, and other comparisons. *Stata Journal* 9: 621–639.

Also see

[G-2] **graph twoway** — Two-way graphs

[G-2] **graph twoway pcarrowi** — Two-way pcarrow with immediate arguments

[G-2] **graph twoway pccapsym** — Paired-coordinate plot with spikes and marker symbols

[G-2] **graph twoway pci** — Two-way paired-coordinate plot with immediate arguments

[G-2] **graph twoway pcscatter** — Paired-coordinate plot with markers

[G-2] **graph twoway pcspike** — Paired-coordinate plot with spikes