graph twoway line - Two-way line plots

Description	Quick start	Menu	Syntax
Options	Remarks and examples	Reference	Also see

Description

line draws line plots.

line is a command and a *plottype* as defined in [G-2] graph twoway. Thus the syntax for line is

- . graph twoway line ...
- . twoway line ...
- . line ...

Being a plottype, line may be combined with other plottypes in the twoway family (see [G-2] graph twoway), as in

. twoway (line ...) (scatter ...) (lfit ...) ...

which can equivalently be written as

. line ... || scatter ... || lfit ... || ...

Quick start

A line plot of y1 versus x twoway line y1 x

Same as above, but sort on values of x twoway line y1 x, sort

A line plot of y1, y2, and y3 each against sorted values of x twoway line y1 y2 y3 x, sort

Same as above, but specify a different pattern for each line twoway line y1 y2 y3 x, sort lpattern(dash solid dot)

Plot lines in a separate graph area for each level of catvar twoway line y1 y2 y3 x, sort by(catvar)

Add "My Title" as an overall graph title twoway line y1 y2 y3 x, sort by(catvar, title("My Title"))

Same as above, but add "My Title" as the title of each subgraph twoway line y1 y2 y3 x, sort by(catvar) title("My Title")

Menu

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

Syntax

[<u>tw</u>oway] line varlist [if] [in] [, options]

where varlist is

 $y_1 [y_2[...]] x$

options	Description
connect_options	change look of lines or connecting method
colorvar_options	change color of lines based on values of a variable
axis_choice_options	associate plot with alternative axis
twoway_options	titles, legends, axes, added lines and text, by, regions, name, aspect ratio, etc.

connect_options discusses options for one y versus one x; see *connect_options* in

[G-2] graph twoway scatter when plotting multiple ys against one x.

Options

connect_options specify how the points forming the line are connected and the look of the lines, including pattern, width, and color; see [G-3] *connect_options*.

[G-3] *connect_options* discusses options for one y versus one x, see *connect_options* in [G-2] **graph twoway scatter** when plotting multiple ys against one x.

- *colorvar_options* specify that the color of the lines be determined by the levels of the numeric variable *colorvar*; see [G-3] *colorvar_options*. *colorvar_options* are not allowed when plotting multiple *ys* against one *x*.
- *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:

One-way equivalency of line and scatter Typical use Advanced use Cautions

One-way equivalency of line and scatter

line is similar to scatter, the differences being that by default the marker symbols are not displayed and the points are connected:

Default msymbol() option: msymbol(none ...)

Default connect() option: connect(1...)

Thus you get the same results typing

. line yvar xvar

as typing

. scatter yvar xvar, msymbol(none) connect(1)

You can use scatter in place of line, but you may not use line in place of scatter. Typing

. line yvar xvar, msymbol(0) connect(none)

will not achieve the same results as

. scatter yvar xvar

because line, while it allows you to specify the *marker_option* msymbol(), ignores its setting.

Typical use

line draws line charts:

```
. use https://www.stata-press.com/data/r19/uslifeexp
(US life expectancy, 1900-1999)
. line le year
```



Line charts work well with time-series data. With other datasets, lines are often used to show predicted values and confidence intervals:

```
. use https://www.stata-press.com/data/r19/auto, clear
(1978 automobile data)
. quietly regress mpg weight
. predict hat
(option xb assumed; fitted values)
. predict stdf, stdf
. generate lo = hat - 1.96*stdf
. generate hi = hat + 1.96*stdf
. scatter mpg weight || line hat lo hi weight, pstyle(p2 p3 p3) sort
          40
          30
                                                                       Mileage (mpg)
                                                                       Fitted values
          20
                                                                       lo/hi
          10
           0
                2,000
                               3,000
                                              4,000
                                                              5,000
                                  Weight (lbs.)
```

Do not forget to include the sort option when the data are not in the order of the x variable, as they are not above. We also included pstyle(p2 p3 p3) to give the lower and upper confidence limit lines the same look; see Appendix: Styles and composite styles under Remarks and examples in [G-2] graph twoway scatter.

Because line is scatter, we can use any of the options allowed by scatter. Below we return to the US life expectancy data and graph black and white male life expectancies, along with the difference, specifying many options to create an informative and visually pleasing graph:

```
. use https://www.stata-press.com/data/r19/uslifeexp, clear
(US life expectancy, 1900-1999)
. generate diff = le_wm - le_bm
 label var diff "Difference"
     line le wm year, yaxis(1 2) xaxis(1 2)
  || line le bm year
  || line diff year
  || lfit diff year
  11,
          ytitle("",
                                 axis(2))
          xtitle("",
                                 axis(2))
          xlabel(1918,
                                 axis(2))
          ylabel(0(5)20,
                                 axis(2) grid)
          ylabel(0 20(10)80
          ytitle("Life expectancy at birth (years)")
          title("White and black life expectancy")
          subtitle("USA, 1900 to 1999")
          note("Source: National Vital Statistics, Vol 50, No. 6"
                "(1918 dip caused by 1918 influenza pandemic)")
                   White and black life expectancy
                            USA. 1900 to 1999
                      1918
             80

    ife expectancy at birth (years)

             70
             60
                                                                   Life expectancy, white male
             50
                                                                   Life expectancy, black male
             40
                                                                   Difference
             30
                                                                   Fitted values
             20
                                                         20
15
10
              0
                                                         Ō
               1900
                       1920
                              1940
                                      1960
                                             1980
                                                    2000
                                  Year
                Source: National Vital Statistics, Vol 50, No. 6
                (1918 dip caused by 1918 influenza pandemic)
```

See [G-2] graph twoway scatter.

Advanced use

The above graph would look better if we shortened the descriptive text used in the keys. Below we add

legend(label(1 "White male") label(2 "Black male"))

to our previous command:

```
line le wm year, yaxis(1 2) xaxis(1 2)
|| line le bm year
|| line diff year
|| lfit diff year
11,
        ytitle("",
                                axis(2))
        xtitle("",
                                axis(2))
        xlabel(1918,
                                 axis(2))
        ylabel(0(5)20,
                                axis(2) grid)
        ylabel(0 20(10)80
        ytitle("Life expectancy at birth (years)")
        title("White and black life expectancy")
        subtitle("USA, 1900 to 1999")
        note("Source: National Vital Statistics, Vol 50, No. 6"
               "(1918 dip caused by 1918 influenza pandemic)")
        legend(label(1 "White male") label(2 "Black male"))
                       White and black life expectancy
                                 USA, 1900 to 1999
                       1918
           80
        Life expectancy at birth (years)
           70
           60
                                                                                White male
           50
                                                                                Black male
           40
                                                                                Difference
           30
                                                                                Fitted values
           20
                                                                     20
15
10
                                                                     5
            0
              1900
                        1920
                                  1940
                                             1960
                                                       1980
                                                                 2000
                                       Year
               Source: National Vital Statistics, Vol 50, No. 6
(1918 dip caused by 1918 influenza pandemic
```

Cautions

Be sure that the data are in the order of the x variable, or specify line's sort option. If you do neither, you will get something that looks like the scribblings of a child:



Reference

Christodoulou, D. 2017. Heuristic criteria for selecting an optimal aspect ratio in a two-variable line plot. *Stata Journal* 17: 279–313.

Also see

- [G-2] graph twoway scatter Two-way scatterplots
- [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 mband Two-way median-band plots
- [G-2] graph twoway mspline Two-way median-spline plots
- [G-2] graph twoway qfit Two-way quadratic prediction plots

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