

## graph twoway line — Twoway line plots

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## 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
```

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
```

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"))
```

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 > Twoway graph (scatter, line, etc.)

## Syntax

```
[twoway] line varlist [if] [in] [, options]
```

where *varlist* is

$$y_1 [y_2 [\dots]] x$$

| <i>options</i>             | Description  |
|----------------------------|--|
| <i>connect_options</i>     | change look of lines or connecting method  |
| <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. |

*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*.

*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:

- Oneway equivalency of line and scatter*
- Typical use*
- Advanced use*
- Cautions*

### Oneway 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

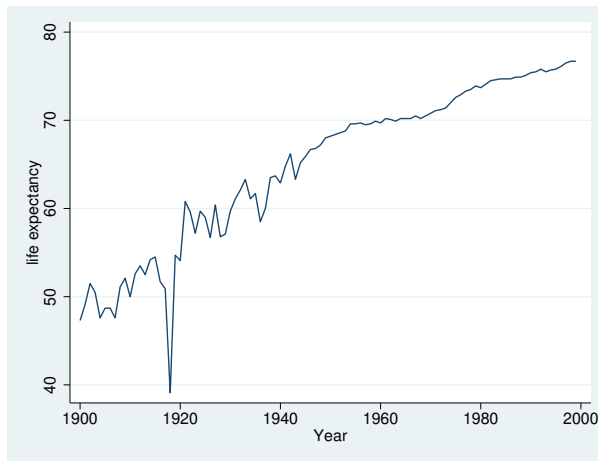
```
. scatter yvar xvar
```

because `line`, while it allows you to specify the *marker\_option* `msymbol()`, ignores its setting.

## Typical use

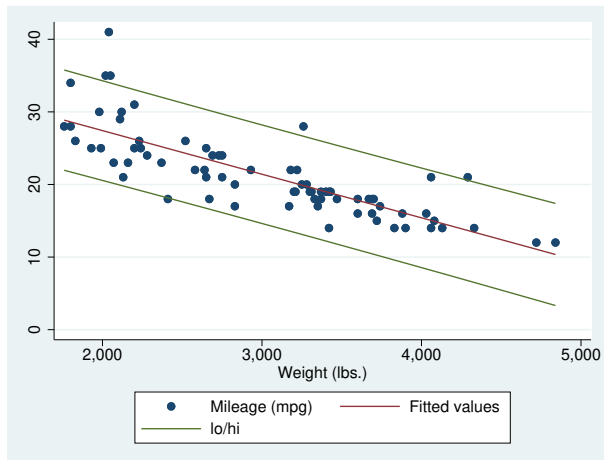
`line` draws line charts:

```
. use https://www.stata-press.com/data/r16/uslifeexp
(U.S. 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:

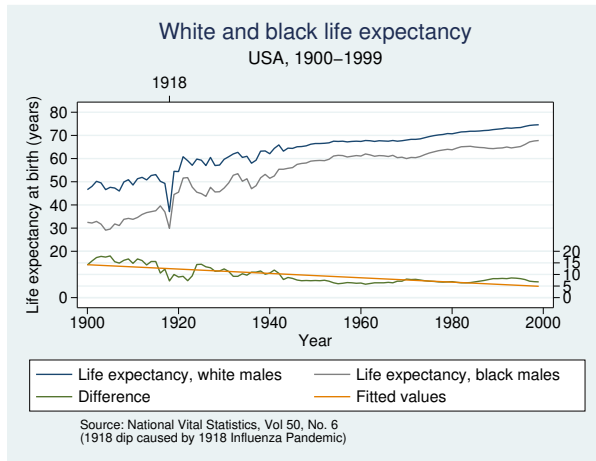
```
. use https://www.stata-press.com/data/r16/auto, clear
(1978 Automobile Data)
. quietly regress mpg weight
. predict hat
(option xb assumed; fitted values)
. predict stdf, stdf
. generate lo = hat - 1.96*stdf
. generate hi = hat + 1.96*stdf
. scatter mpg weight || line hat lo hi weight, pstyle(p2 p3 p3) sort
```



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 U.S. 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/r16/uslifeexp, clear
(U.S. 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
  ||,
  ylabel(0(5)20, axis(2) gmin angle(horizontal))
  ylabel(0 20(10)80, gmax angle(horizontal))
  ytitle("", axis(2))
  xlabel(1918, axis(2)) xtitle("", axis(2))
  ylabel(, axis(2) grid)
  ytitle("Life expectancy at birth (years)")
  title("White and black life expectancy")
  subtitle("USA, 1900-1999")
  note("Source: National Vital Statistics, Vol 50, No. 6"
       "(1918 dip caused by 1918 Influenza Pandemic)")
```



See [G-2] [graph twoway scatter](#).

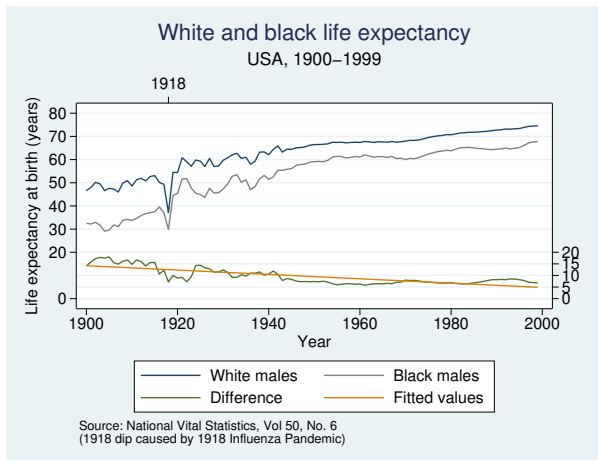
## Advanced use

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

```
legend(label(1 "White males") label(2 "Black males"))
```

to our previous command:

```
. line le_wm year, yaxis(1 2) xaxis(1 2)
|| line le_bm year
|| line diff year
|| lfit diff year
||,
ylabel(0(5)20, axis(2) gmin angle(horizontal))
ylabel(0 20(10)80, gmax angle(horizontal))
yttitle("", axis(2))
xlabel(1918, axis(2)) xttitle("", axis(2))
ylabel(, axis(2) grid)
yttitle("Life expectancy at birth (years)")
title("White and black life expectancy")
subtitle("USA, 1900-1999")
note("Source: National Vital Statistics, Vol 50, No. 6"
      "(1918 dip caused by 1918 Influenza Pandemic)")
legend(label(1 "White males") label(2 "Black males"))
```

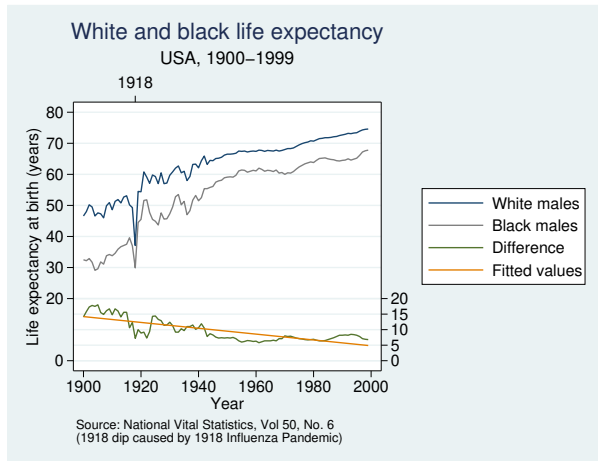


We might also consider moving the legend to the right of the graph, which we can do by adding

```
legend(col(1) pos(3))
```

resulting in

```
. line le_wm year, yaxis(1 2) xaxis(1 2)
|| line le_bm year
|| line diff year
|| lfit diff year
||,
ylabel(0(5)20, axis(2) gmin angle(horizontal))
ylabel(0 20(10)80, gmax angle(horizontal))
ytittle("", axis(2))
xlabel(1918, axis(2)) xtittle("", axis(2))
ylabel(, axis(2) grid)
ytittle("Life expectancy at birth (years)")
title("White and black life expectancy")
subtitle("USA, 1900-1999")
note("Source: National Vital Statistics, Vol 50, No. 6"
"(1918 dip caused by 1918 Influenza Pandemic)")
legend(label(1 "White males") label(2 "Black males"))
legend(col(1) pos(3))
```

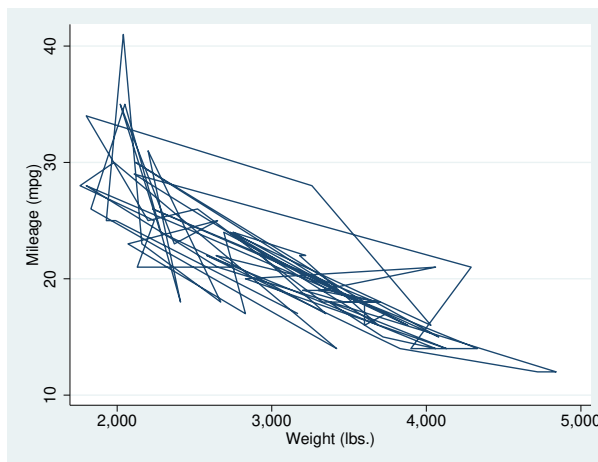


See [G-3] *legend\_options* for more information about dealing with legends.

## 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 scriblings of a child:

```
. use https://www.stata-press.com/data/r16/auto, clear
(1978 Automobile Data)
. line mpg weight
```



## 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](#) — Twoway scatterplots

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

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

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

[G-2] [graph twoway mspline](#) — Twoway median-spline plots

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