Introduction to Stata 14 Graphics
Stata 14 Graphics

Pros:

- Many graph types and plot types provided
- Multiple plot types may be overlaid
- Can easily change overall look of graphs
- Same options available for most types of graphs
- Very flexible

Cons:

- Sometimes slow
- Large syntax: 731 page graphics manual!
  - Stata 14 Graphics Manual is only available on-line:

Stata Graphics References:

- [http://data.princeton.edu/stata/Graphics.html](http://data.princeton.edu/stata/Graphics.html), by German Rodriguez
- Stata 14 Graphics Manual (may want to start with “graph intro”)

Stata Graphics Syntax

graph <graphtype>
   graph bar

graph twoway <plottype>
   graph twoway scatter
   graph twoway line
   graph twoway lfit
   graph twoway lfitci

graphs commands may have options
   some options have suboptions or a list of options
   graph twoway scatter var1 var2, xlabel(30(10)100, labsize(small))

appearance of graph defined by graph elements:
   data - marker symbols, lines
   elements within plot region – text, marker labels, line labels
   elements outside plot region – titles, legend, notes, axis labels, tick marks, axis titles
   size and shape of plot region and entire graph
Stata Graphics Syntax: A Simple Example

sysuse uslifeexp.dta, clear

graph twoway line le year

/* OR */
twoway line le year

/* OR */
line le year
Using Schemes

line le year, scheme(slmono)

/* to see list of scheme names:
   graph query, schemes

to change default scheme:
   set scheme schemename
*/
Multiple Dependent Variables

```
line le_wmale le_wfemale le_bmale le_bfemalw year
```
Adding Text

```
line le_wmale le_wfemale le_bmale le_bfemale year ///
, text(32 1920 "\{bf:1918\} \{it:Influenza\} Pandemic", place(3))
```

![Graph showing life expectancy trends with a significant dip in 1918 corresponding to the 1918 Influenza Pandemic.](image)

- Blue line: Life expectancy, white males
- Maroon line: Life expectancy, white females
- Green line: Life expectancy, black males
- Orange line: Life expectancy, black females
scatter le year if year >= 1950 || lfit le year if year >= 1950

/* OR */

scatter ///
le year if year >= 1950 ///
|| lfit le year if year >= 1950

/* OR */

twoway ///
(scatter le year if year >= 1950) ///
(lfit le year if year >= 1950)

/* OR */
#delimit ;
twoway
(scatter le year if year >= 1950)
(lfit le year if year >= 1950);
#delimit cr
Overlaying Two-Way Plot Types

scatter le year if year >= 1925 ///
|| lfit le year if year >= 1925 & ///
  year < 1950 ///
|| lfit le year if year >= 1950

/* OR */

twoway ///
(scatter le year if year >= 1925) ///
(lfit le year if year >= 1925 & ///
  year < 1950) ///
(lfit le year if year >= 1950)

/* OR */

#delimit ;
scatter le year if year >= 1925
|| lfit le year if year >= 1925 & year < 1950
|| lfit le year if year >= 1950;
#delimit cr
Overlaying Two-Way Plot Types

#delimit ;
scatter le_male le_female year if year >= 1950
|| lfit le_male year if year >= 1950
|| lfit le_female year if year >= 1950;
#delimit cr
Adding a Title and Removing the Legend

```stata
#delimit ;
scatter le_male le_female year if year >= 1950 || lfit le_male year if year >= 1950 || lfit le_female year if year >= 1950,
  title("US Male and Female Life Expectancy, 1950-2000")
  text(75 1978 "Female", place(3))
  text(68 1978 "Male", place(3))
  legend(off);
#delimit cr
```
Showing Confidence Intervals, Labelling Axes, Modifying Legend

sysuse lifeexp.dta, clear
#delimit ;
twoway
\(lfitci\) lexp safewater if region == 2) /* North America */
(scatter lexp safewater if region == 2)
\,title("Life expectancy at birth by access to safe water, 1998")
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(ring(0) pos(5) order(2 "Linear fit" 1 "95% CI"));
#delimit cr
Markers Labels and Subtitles

twoway
(lfitci lexp safewater if region == 2) /* North America */
(scatter lexp safewater if region == 2, mlabel(country))
title("Life expectancy at birth by access to safe water, 1998")
subtitle("North America")
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(ring(0) pos(5) order(2 "Linear fit" 1 "95% CI"));
Position of Marker Labels

```stata
generate pos = 12 if country == "Panama"
replace pos = 12 if country == "Honduras"
replace pos = 10 if country == "Cuba"
replace pos = 9 if country == "Jamaica"
replace pos = 9 if country == "El Salvador"
replace pos = 9 if country == "Trinidad and Tobago"
replace pos = 9 if country == "Dominican Republic"
#delimit ;
twoway
(lfitci lexp safewater if region == 2) /* North America */
(scatter lexp safewater if region == 2,
  , mlabel(country) mlabvposition(pos))
, title("Life expectancy at birth by access to safe water, 1998")
subtitle("North America")
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(ring(0) pos(5) order(2 "Linear fit" 1 "95% CI"))
plotregion(margin(r+10));
#delimit cr
```
Position of Marker Labels

```stata
#delimit ;
twoway
(scatter lexp safewater if region == 2 | region == 3
 ,mlabel(country))
,title("Life expectancy at birth by access to safe water, 1998")
subtitle("North and South America")
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
plotregion(margin(r+10));
#delimit cr
```

Life expectancy at birth by access to safe water, 1998
North and South America

![Graph showing life expectancy at birth by access to safe water.](image-url)
Position of Marker Labels and Legend Display

replace pos = 9 if country == "Argentina"
replace pos = 9 if country == "Canada"
replace pos = 9 if country == "Cuba"
replace pos = 9 if country == "Panama"
replace pos = 9 if country == "Venezuela"
replace pos = 9 if country == "Jamaica"
replace pos = 9 if country == "Dominican Republic"
replace pos = 9 if country == "Ecuador"
replace pos = 9 if country == "El Salvador"
replace pos = 12 if country == "Puerto Rico"
#delimit cr

twoway
(scatter lexp safewater if region == 2
 ,mlabel(country) mlabvposition(pos))
(scatter lexp safewater if region == 3
 ,mlabel(country) mlabvposition(pos))
,title("Life expectancy at birth by access to safe water, 1998")
subtitle("North and South America")
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(ring(0) pos(5) order(1 "North America" 2 "South America") cols(1));
#delimit cr
Marker Size and Symbol, Line Color

twoway
(scatter lexp safewater if region == 2
   ,mlabel(country) mlabvposition(pos) msize(small))
(scatter lexp safewater if region == 3
   ,mlabel(country) mlabvposition(pos) msize(small) msymbol(circle_hollow))
(lfit lexp safewater if region == 2, clcolor(navy))
(lfit lexp safewater if region == 3, clcolor(maroon))
,title("Life expectancy at birth by access to safe water, 1998")
subtitle("North and South America")
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(ring(0) pos(5) cols(1) order(1 "North America" 2 "South America" 3 "North America linear fit" 4 "South America linear fit"));
Marker and Marker Label Color, Line Style

twoway
(scatter lexp safewater if region == 2
,mlabel(country) mlabvposition(pos) msize(small) mcolor(black) mlabcolor(black))
(scatter lexp safewater if region == 3
,mlabel(country) mlabvposition(pos) msize(small) mcolor(black) mlabcolor(black)
msymbol(circle_hollow))
(lfit lexp safewater if region == 2, clcolor(black))
(lfit lexp safewater if region == 3, clcolor(black) clpattern(dash))
,title("Life expectancy at birth by access to safe water, 1998", color(black))
subtitle("North and South America")
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(ring(0) pos(5) cols(1) order(1 "North America" 2 "South America"
3 "North America linear fit" 4 "South America linear fit"));
By-Graph: Separate Graphs for Each Subset of Data

#delimit ;  
twoway scatter lexp safewater, by(region, total)  
   ,ytitle("Life expectancy at birth")  
   xtitle("Percent of population with access to safe water");  
#delimit cr
By-Graph Options

twoway scatter lexp safewater 
,by(region,total style(compact)

title("Life expectancy by access to safe water") note(""))
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water");
Axis Scale, Ticks and Labels

twoway scatter lexp safewater
, by(region,total style(compact)
    title("Life expectancy by access to safe water") note(""))
xscale(range(20 100))
xlabel(30(10)100, labsize(small))
xtitle("Percent of population with access to safe water")
ytitle("Life expectancy at birth")
yxlabel(angle(0));
Storing Graphs in Memory

twoway
(scatter lexp safewater if region == 2,
mcolor(black) msize(small)
mlabel(country) mlabvposition(pos) mlabcolor(black))
(lfit lexp safewater if region == 2, clcolor(black))
,name(north_america, replace)
subtitle("North America", color(black))
ylabel(,angle(0))
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(off);
Storing Graphs in Memory

twoway
(scatter lexp_sa safewater if region == 3, 
mcolor(black) msize(small) 
mlabel(country) mlabvposition(pos) mlabcolor(black)) 
(lfit lexp safewater if region == 3, clcolor(black))
,name(south_americ a, replace)
subtitle("South America", color(black))
ylabel(, angle(0))
ytitle("Life expectancy at birth")
xtitle("Percent of population with access to safe water")
legend(off);
Combining Graphs

```
graph combine north_america south_america
  ,title("Life expectancy by access to safe water", color(black)) col(1);
```

**Life expectancy by access to safe water**

North America

- Canada
- Cuba
- Dominican Republic
- El Salvador
- Guatemala
- Haiti
- Honduras
- Jamaica
- Mexico
- Nicaragua
- Panama
- Puerto Rico
- Trinidad and Tobago

South America

- Argentina
- Bolivia
- Brazil
- Colombia
- Ecuador
- Paraguay
- Peru
- Uruguay
- Venezuela

**Graphs:**

- Life expectancy at birth
- Percent of population with access to safe water
Life expectancy by access to safe water

North America

South America

Combining Graphs

graph combine north_america south_america, title("Life expectancy by access to safe water", color(black)) xcommon ycommon xsize(7) ysize(10.5) col(1);
Saving and Including Stata Graphs

save graph in portable format (format determined by filename extension)

vector formats contain drawing instructions (.wmf .emf .ps .eps .pdf)
resolution independent
work well if graph may be resized

```
graph export north_america.wmf
```

raster formats save graph pixel-by-pixel (.png)
use current resolution
work well if including graph on web pages

```
graph export north_america.png
```

include "portable-format-graph" in Windows application (Word, Powerpoint):

```
Insert -> Picture -> From File
```
Using Mata Functions to Add Graphs to Word Document*

create Stata graphs and and use `graph export` to save graphs in portable format

```stata
sysuse uslifeexp
line le year
graph export us_lifeexp_overall.emf, replace

line le_wmale le_wfemale le_bmale le_bfemale year
graph export us_lifeexp_race_gender.emf, replace
```

use Mata functions to:
create Word document
add Stata graphs
save Word document

```mata
mata:
    dh = _docx_new()
    _docx_image_add(dh, "us_lifeexp_overall.emf")
    _docx_image_add(dh, "us_lifeexp_race_gender.emf")
    rc = _docx_save(dh, "us_lifeexp_graphs.docx")
end
```

* Functions available starting with Stata 13