Title

[G-2] graph dot — Dot charts (summary statistics)

Syntax Menu Description Options Remarks and examples
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Syntax

```
graph dot yvars [if] [in] [weight] [, options]
```

where *yvars* is

```
(asis) varlist
```

or is

```
[(stat)] varname                     [[(stat)] ...]
[(stat)] varlist                     [[(stat)] ...]
[(stat)] [name=]varname[...]         [[(stat)] ...]
```

where *stat* may be any of

```
mean median p1 p2 ...p99 sum count min max
```

or

any of the other *stats* defined in [D] **collapse**

`mean` is the default. `p1` means the first percentile, `p2` means the second percentile, and so on; `p50` means the same as `median`. `count` means the number of nonmissing values of the specified variable.

options	Description
group_options	groups over which lines of dots are drawn
yvar_options	variables that are the dots
linelook_options	how the lines of dots look
legending_options	how *yvars* are labeled
axis_options	how numerical y axis is labeled
title_and_other_options	titles, added text, aspect ratio, etc.

Each is defined below.

group_options	Description
over(*varname* [, *over_subopts*])	categories; option may be repeated
nofill	omit empty categories
missing	keep missing value as category
allcategories	include all categories in the dataset

yvar_options	Description
ascategory	treat *yvars* as first over() group
asyvars	treat first over() group as *yvars*
percentages	show percentages within *yvars*
cw	calculate *yvar* statistics omitting missing values of any *yvar*

linelook_options	Description
outergap([*]#)	gap between top and first line and between last line and bottom
linegap(#)	gap between *yvar* lines; default is 0
marker(#, *marker_options*)	marker used for #th *yvar* line
pcycle(#)	marker styles before pstyles recycle
linetype(dot | line | rectangle)	type of line
ndots(#)	# of dots if linetype(dot); default is 100
dots(*marker_options*)	look if linetype(dot)
lines(*line_options*)	look if linetype(line)
rectangles(*area_options*)	look if linetype(rectangle)
rwidth(*relativesize*)	rectangle width if linetype(rectangle)
[no]extendline	whether line extends through plot region margins; extendline is usual default
lowextension(*relativesize*)	extend line through axis (advanced)
highextension(*relativesize*)	extend line through axis (advanced)

See [G-3] ***marker_options***, [G-3] ***line_options***, [G-3] ***area_options***, and [G-4] ***relativesize***.

legending_options	Description
legend_options	control of *yvar* legend
nolabel	use *yvar* names, not labels, in legend
yvaroptions(*over_subopts*)	*over_subopts* for *yvars*; seldom specified
showyvars	label *yvars* on x axis; seldom specified

See [G-3] ***legend_options***.

axis_options	Description
yalternate	put numerical y axis on right (top)
xalternate	put categorical x axis on top (right)
exclude0	do not force y axis to include 0
yreverse	reverse y axis
axis_scale_options	y-axis scaling and look
axis_label_options	y-axis labeling
ytitle(...)	y-axis titling

See [G-3] ***axis_scale_options***, [G-3] ***axis_label_options***, and [G-3] ***axis_title_options***.

title_and_other_options	Description
text(...)	add text on graph; x range $[0, 100]$
yline(...)	add y lines to graph
aspect_option	constrain aspect ratio of plot region
std_options	titles, graph size, saving to disk
by(*varlist*, ...)	repeat for subgroups

See [G-3] ***added_text_options***, [G-3] ***added_line_options***, [G-3] ***aspect_option***, [G-3] ***std_options***, and [G-3] ***by_option***.

The *over_subopts*—used in over(*varname*, *over_subopts*) and, on rare occasion, in yvaroptions(*over_subopts*)—are

over_subopts	Description
relabel(# "*text*" ...)	change axis labels
label(*cat_axis_label_options*)	rendition of labels
axis(*cat_axis_line_options*)	rendition of axis line
gap([*]#)	gap between lines within over() category
sort(*varname*)	put lines in prespecified order
sort(#)	put lines in height order
sort((*stat*) *varname*)	put lines in derived order
descending	reverse default or specified line order

See [G-3] ***cat_axis_label_options*** and [G-3] ***cat_axis_line_options***.

aweights, fweights, and pweights are allowed; see [U] **11.1.6 weight** and see note concerning weights in [D] **collapse**.

Menu

Graphics > Dot chart

Description

`graph dot` draws horizontal dot charts. In a dot chart, the categorical axis is presented vertically, and the numerical axis is presented horizontally. Even so, the numerical axis is called the y axis, and the categorical axis is still called the x axis:

```
. graph dot (mean) numeric_var, over(cat_var)

                          x
                          |
        first group       |......o..............
                          |
        second group      |..........o..........
              .           |
              .           |
                          |______________________
                           |    |    |    |    |
                           0    2    4    6    8
```

The syntax for dot charts is identical to that for bar charts; see [G-2] **graph bar**.

We use the following words to describe a dot chart:

```
                        x axis
                          |
            Group 1       |..........o...............
            Group 2       |..............o...........
            Group 3       |..................o.......     <-   lines
            Group 4       |......................o...
                          |___________________________
                           |    |    |    |    |    |
                           0    1    2    3    4    5     <-   y axis
```

The above dot chart contains four *lines*. The words used to describe a line are

```
                                       marker
                                      /
                           .............o............
                           |--distance--|       \
                                                 dots
```

Options

Options are presented under the following headings:

group_options
yvar_options
linelook_options
legending_options
axis_options
title_and_other_options
Suboptions for use with over( ) and yvaroptions( )

group_options

`over(`*varname*[`,` *over_subopts*]`)` specifies a categorical variable over which the *yvars* are to be repeated. *varname* may be string or numeric. Up to two `over()` options may be specified when multiple *yvars* are specified, and up to three `over()`s may be specified when one *yvar* is specified; options may be specified; see *Appendix: Examples of syntax* below.

`nofill` specifies that missing subcategories be omitted. For instance, consider

```
. graph dot (mean) y, over(division) over(region)
```

Say that one of the divisions has no data for one of the regions, either because there are no such observations or because `y==.` for such observations. In the resulting chart, the marker will be missing:

```
                     division 1  |..........o....
           region 1  division 2  |....o..........
                     division 3  |.......o.......
                                 |
                     division 1  |..o............
           region 2  division 2  |...............
                     division 3  |..........o....
                                 +---------------
                                   |    |    |    |
```

If you specify `nofill`, the missing category will be removed from the chart:

```
                     division 1  |..........o....
           region 1  division 2  |....o..........
                     division 3  |.......o.......
                                 |
           region 2  division 1  |..o............
                     division 3  |..........o....
                                 +---------------
                                   |    |    |    |
```

`missing` specifies that missing values of the `over()` variables be kept as their own categories, one for `.`, another for `.a`, etc. The default is to ignore such observations. An `over()` variable is considered to be missing if it is numeric and contains a missing value or if it is string and contains "".

`allcategories` specifies that all categories in the entire dataset be retained for the `over()` variables. When `if` or `in` is specified without `allcategories`, the graph is drawn, completely excluding any categories for the `over()` variables that do not occur in the specified subsample. With the `allcategories` option, categories that do not occur in the subsample still appear in the legend, but no markers are drawn where these categories would appear. Such behavior can be convenient when comparing graphs of subsamples that do not include completely common categories for all `over()` variables. This option has an effect only when `if` or `in` is specified or if there are missing values in the variables. `allcategories` may not be combined with `by()`.

yvar_options

`ascategory` specifies that the *yvars* be treated as the first `over()` group.

When you specify `ascategory`, results are the same as if you specified one *yvar* and introduced a new first `over()` variable. Anyplace you read in the documentation that something is done over the first `over()` category, or using the first `over()` category, it will be done over or using *yvars*.

Suppose that you specified

```
. graph dot y1 y2 y3, ascategory whatever_other_options
```

The results will be the same as if you typed

```
. graph dot y, over(newcategoryvariable) whatever_other_options
```

with a long rather than wide dataset in memory.

`asyvars` specifies that the first `over()` group be treated as *yvars*.

When you specify `asyvars`, results are the same as if you removed the first `over()` group and introduced multiple *yvars*. We said in most ways, not all ways, but let's ignore that for a moment. If you previously had *k yvars* and, in your first `over()` category, *G* groups, results will be the same as if you specified k*G yvars and removed the `over()`. Anyplace you read in the documentation that something is done over the *yvars* or using the *yvars*, it will be done over or using the first `over()` group.

Suppose that you specified

```
. graph dot y, over(group) asyvars whatever_other_options
```

Results will be the same as if you typed

```
. graph dot y1 y2 y3 ..., whatever_other_options
```

with a wide rather than long dataset in memory. Variables *y1*, *y2*, ..., are sometimes called the virtual *yvars*.

`percentages` specifies that marker positions be based on percentages that *yvar_i* represents of all the *yvars*. That is,

```
. graph dot (mean) inc_male inc_female
```

would produce a chart with the markers reflecting average income.

```
. graph dot (mean) inc_male inc_female, percentage
```

would produce a chart with the markers being located at 100 × `inc_male`/(`inc_male` + `inc_female`) and 100 × `inc_female`/(`inc_male` + `inc_female`).

If you have one *yvar* and want percentages calculated over the first `over()` group, specify the `asyvars` option. For instance,

```
. graph dot (mean) wage, over(i) over(j)
```

would produce a chart where marker positions reflect mean wages.

```
. graph dot (mean) wage, over(i) over(j) asyvars percentages
```

would produce a chart where marker positions are $100 \times (\text{mean}_{ij}/(\text{Sum}_i\ \text{mean}_{ij}))$

`cw` specifies casewise deletion. If `cw` is specified, observations for which any of the *yvars* are missing are ignored. The default is to calculate each statistic by using all the data possible.

linelook_options

`outergap(*#)` and `outergap(#)` specify the gap between the top of the graph to the beginning of the first line and the last line to the bottom of the graph.

`outergap(*#)` specifies that the default be modified. Specifying `outergap(*1.2)` increases the gap by 20%, and specifying `outergap(*.8)` reduces the gap by 20%.

`outergap(#)` specifies the gap as a percentage-of-bar-width units. `graph dot` is related to `graph bar`. Just remember that `outergap(50)` specifies a sizable but not excessive gap.

`linegap(#)` specifies the gap to be left between *yvar* lines. The default is `linegap(0)`, meaning that multiple *yvars* appear on the same line. For instance, typing

```
. graph dot y1 y2, over(group)
```

results in

```
group 1  |..x....o........
group 2  |........x..o....
group 3  |.......x.....o..
         +----------------
           |    |    |    |
```

In the above, o represents the symbol for `y1` and x the symbol for `y2`. If you want to have separate lines for the separate *yvars*, specify `linegap(20)`:

```
. graph dot y1 y2, over(group) linegap(20)
                   group 1  |.......o........
                            |..x.............
                            |
                   group 2  |...........o....
                            |........x.......
                            |
                   group 3  |.............o..
                            |.......x........
                            +-----------------
                              |    |    |    |
```

Specify a number smaller or larger than 20 to reduce or increase the distance between the `y1` and `y2` lines.

Alternatively, and generally preferred, is specifying option `ascategory`, which will result in

```
. graph dot y1 y2, over(group) ascategory
                   group 1  y1  |.......o........
                            y2  |..o.............
                                |
                   group 2  y1  |...........o....
                            y2  |........o.......
                                |
                   group 3  y1  |.............o..
                            y2  |.......o........
                                +-----------------
                                  |    |    |    |
```

`linegap()` affects only the *yvar* lines. If you want to change the gap for the first, second, or third `over()` groups, specify the *over_subopt* `gap()` inside the `over()` itself.

`marker(#, `*marker_options*`)` specifies the shape, size, color, etc., of the marker to be used to mark the value of the #th *yvar* variable. `marker(1, ...)` refers to the marker associated with the first *yvar*, `marker(2, ...)` refers to the marker associated with the second, and so on. A particularly useful *marker_option* is `mcolor(`*colorstyle*`)`, which sets the color of the marker. For instance, you might specify `marker(1, mcolor(green))` to make the marker associated with the first *yvar* green. See [G-4] ***colorstyle*** for a list of color choices, and see [G-3] ***marker_options*** for information on the other *marker_options*.

`pcycle(#)` specifies how many variables are to be plotted before the pstyle (see [G-4] ***pstyle***) of the markers for the next variable begins again at the pstyle of the first variable—`p1dot` (with the markers for the variable following that using `p2dot` and so on). Put another way, # specifies how quickly the look of markers is recycled when more than # variables are specified. The default for most schemes is `pcycle(15)`.

`linetype(dot)`, `linetype(line)`, and `linetype(rectangle)` specify the style of the line.

`linetype(dot)` is the usual default. In this style, dots are used to fill the line around the marker:

```
........o........
```

`linetype(line)` specifies that a solid line be used to fill the line around the marker:

```
————————o————————
```

`linetype(rectangle)` specifies that a long "rectangle" (which looks more like two parallel lines) be used to fill the area around the marker:

```
=======o=======
```

`ndots(`*#*`)` and `dots(`*marker_options*`)` are relevant only in the `linetype(dots)` case.

`ndots(`*#*`)` specifies the number of dots to be used to fill the line. The default is `ndots(100)`.

`dots(`*marker_options*`)` specifies the marker symbol, color, and size to be used as the dot symbol. The default is to use `dots(msymbol(p))`. See [G-3] ***marker_options***.

`lines(`*line_options*`)` is relevant only if `linetype(line)` is specified. It specifies the look of the line to be used; see [G-3] ***line_options***.

`rectangles(`*area_options*`)` and `rwidth(`*relativesize*`)` are relevant only if `linetype(rectangle)` is specified.

`rectangles(`*area_options*`)` specifies the look of the parallel lines (rectangle); see [G-3] ***area_options***.

`rwidth(`*relativesize*`)` specifies the width (height) of the rectangle (the distance between the parallel lines). The default is usually `rwidth(.45)`; see [G-4] ***relativesize***.

`noextendline` and `extendline` are relevant in all cases. They specify whether the line (dots, a line, or a rectangle) is to extend through the plot region margin and touch the axes. The usual default is `extendline`, so `noextendline` is the option. See [G-3] ***region_options*** for a definition of the plot region.

`lowextension(`*relativesize*`)` and `highextension(`*relativesize*`)` are advanced options that specify the amount by which the line (dots, line or a rectangle) is extended through the axes. The usual defaults are `lowextension(0)` and `highextension(0)`. See [G-4] ***relativesize***.

legending_options

legend_options allows you to control the legend. If more than one *yvar* is specified, a legend is produced. Otherwise, no legend is needed because the `over()` groups are labeled on the categorical x axis. See [G-3] ***legend_options***.

`nolabel` specifies that, in automatically constructing the legend, the variable names of the *yvars* be used in preference to "mean of *varname*" or "sum of *varname*", etc.

`yvaroptions(`*over_subopts*`)` allows you to specify *over_subopts* for the *yvars*. This is seldom specified.

`showyvars` specifies that, in addition to building a legend, the identities of the *yvars* be shown on the categorical x axis. If `showyvars` is specified, it is typical to also specify `legend(off)`.

axis_options

`yalternate` and `xalternate` switch the side on which the axes appear. `yalternate` moves the numerical y axis from the bottom to the top; `xalternate` moves the categorical x axis from the left to the right. If your scheme by default puts the axes on the opposite sides, `yalternate` and `xalternate` reverse their actions.

`exclude0` specifies that the numerical y axis need not be scaled to include 0.

`yreverse` specifies that the numerical y axis have its scale reversed so that it runs from maximum to minimum.

axis_scale_options specify how the numerical y axis is scaled and how it looks; see [G-3] ***axis_scale_options***. There you will also see option `xscale()` in addition to `yscale()`. Ignore `xscale()`, which is irrelevant for dot plots.

axis_label_options specify how the numerical y axis is to be labeled. The *axis_label_options* also allow you to add and suppress grid lines; see [G-3] ***axis_label_options***. There you will see that, in addition to options `ylabel()`, `ytick()`, `ymlabel()`, and `ymtick()`, options `xlabel()`, ..., `xmtick()` are allowed. Ignore the `x*()` options, which are irrelevant for dot charts.

`ytitle()` overrides the default title for the numerical y axis; see [G-3] ***axis_title_options***. There you will also find option `xtitle()` documented, which is irrelevant for dot charts.

title_and_other_options

`text()` adds text to a specified location on the graph; see [G-3] ***added_text_options***. The basic syntax of `text()` is

`text(`$\#_y$ $\#_x$ `"`*text*`")`

`text()` is documented in terms of twoway graphs. When used with dot charts, the "numeric" x axis is scaled to run from 0 to 100.

`yline()` adds vertical lines at specified y values; see [G-3] ***added_line_options***. The `xline()` option, also documented there, is irrelevant for dot charts. If your interest is in adding grid lines, see [G-3] ***axis_label_options***.

aspect_option allows you to control the relationship between the height and width of a graph's plot region; see [G-3] ***aspect_option***.

std_options allow you to add titles, control the graph size, save the graph on disk, and much more; see [G-3] ***std_options***.

`by(`*varlist*`, ...)` draws separate plots within one graph; see [G-3] ***by_option***.

Suboptions for use with over() and yvaroptions()

`relabel(# "`*text*`" ...)` specifies text to override the default category labeling. See the description of the `relabel()` option in [G-2] **graph bar** for more information about this very useful option.

`label(`*cat_axis_label_options*`)` determines other aspects of the look of the category labels on the x axis. Except for `label(labcolor())` and `label(labsize())`, these options are seldom specified; see [G-3] ***cat_axis_label_options***.

`axis(`*cat_axis_line_options*`)` specifies how the axis line is rendered. This is a seldom specified option. See [G-3] ***cat_axis_line_options***.

`gap(`*#*`)` and `gap(*`*#*`)` specify the gap between the lines in this `over()` group. `gap(`*#*`)` is specified in percentage-of-bar-width units. Just remember that `gap(50)` is a considerable, but not excessive width. `gap(*`*#*`)` allows modifying the default gap. `gap(*1.2)` would increase the gap by 20%, and `gap(*.8)` would decrease the gap by 20%.

`sort(`*varname*`)`, `sort(`*#*`)`, and `sort((`*stat*`)` *varname*`)` control how the lines are ordered. See *How bars are ordered* and *Reordering the bars* in [G-2] **graph bar**.

`sort(`*varname*`)` puts the lines in the order of *varname*.

`sort(`*#*`)` puts the markers in distance order. # refers to the *yvar* number on which the ordering should be performed.

`sort((`*stat*`)` *varname*`)` puts the lines in an order based on a calculated statistic.

`descending` specifies that the order of the lines—default or as specified by `sort()`—be reversed.

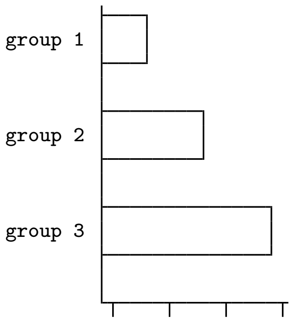
Remarks and examples

Remarks are presented under the following headings:

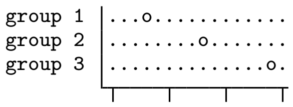
Relationship between dot plots and horizontal bar charts

Despite appearances, **graph hbar** and **graph dot** are in fact the same command, meaning that concepts and options are the same:

```
. graph hbar y, over(group)
```

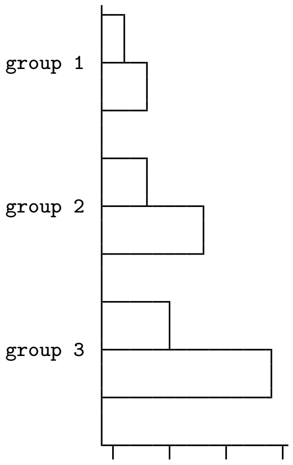


```
. graph dot y, over(group)
```



There is only one substantive difference between the two commands: Given multiple *yvars*, **graph hbar** draws multiple bars:

```
. graph hbar y1 y2, over(group)
```



graph dot draws multiple markers on single lines:

```
    . graph dot y1 y2, over(group)

                    group 1 |.x.o...........
                    group 2 |...x....o......
                    group 3 |.....x........o.
                            +----------------
                             |    |    |    |
```

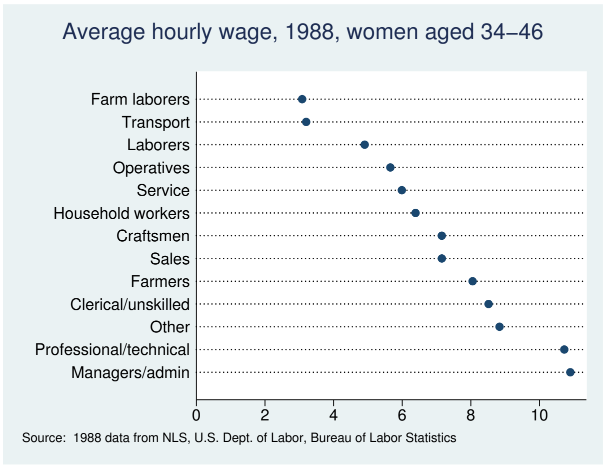
The way around this problem (if it is a problem) is to specify option ascategory or to specify option linegap(#). Specifying ascategory is usually best.

Read about graph hbar in [G-2] **graph bar**.

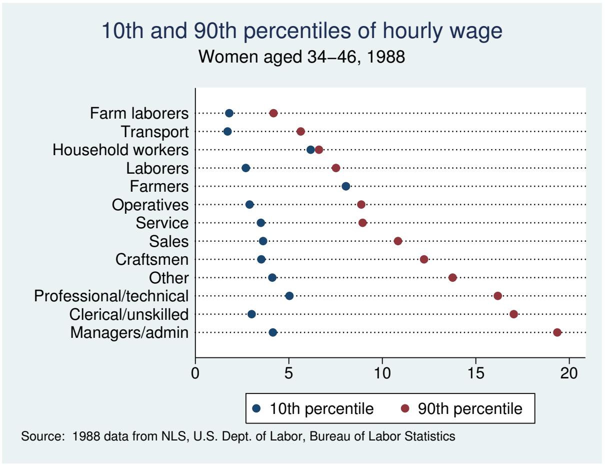
Examples

Because graph dot and graph hbar are so related, the following examples should require little by way of explanation:

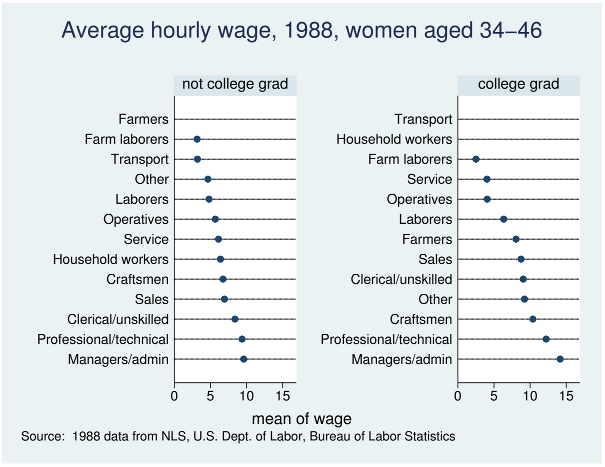
```
    . use http://www.stata-press.com/data/r13/nlsw88
    (NLSW, 1988 extract)

    . graph dot wage, over(occ, sort(1))
            ytitle("")
            title("Average hourly wage, 1988, women aged 34-46", span)
            subtitle(" ")
            note("Source:  1988 data from NLS, U.S. Dept. of Labor,
                  Bureau of Labor Statistics", span)
```



```
    . graph dot (p10) wage (p90) wage,
            over(occ, sort(2))
            legend(label(1 "10th percentile") label(2 "90th percentile"))
            title("10th and 90th percentiles of hourly wage", span)
            subtitle("Women aged 34-46, 1988" " ", span)
            note("Source:  1988 data from NLS, U.S. Dept. of Labor,
                  Bureau of Labor Statistics", span)
```



```
. graph dot (mean) wage,
        over(occ, sort(1))
        by(collgrad,
             title("Average hourly wage, 1988, women aged 34-46", span)
             subtitle(" ")
             note("Source:  1988 data from NLS, U.S. Dept. of Labor,
                    Bureau of Labor Statistics", span)
        )
```



Appendix: Examples of syntax

Let us consider some `graph dot` commands and what they do:

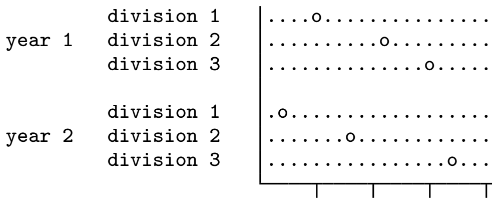
`graph dot revenue`
One line showing average revenue.

`graph dot revenue profit`
One line with two markers, one showing average revenue and the other average profit.

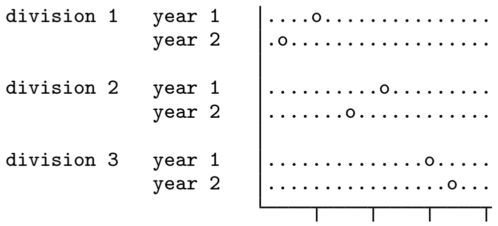
`graph dot revenue, over(division)`
#_of_divisions lines, each with one marker showing average revenue for each division.

`graph dot revenue profit, over(division)`
  #_of_divisions lines, each with two markers, one showing average revenue and the other average profit for each division.

`graph dot revenue, over(division) over(year)`
  #_of_divisions × *#_of_years* lines, each with one marker showing average revenue for each division, repeated for each of the years. The grouping would look like this (assuming 3 divisions and 2 years):



`graph dot revenue, over(year) over(division)`
  Same as above, but ordered differently. In the previous example, we typed `over(division) over(year)`. This time, we reverse it:



`graph dot revenue profit, over(division) over(year)`
  #_of_divisions × *#_of_years* lines each with two markers, one showing average revenue and the other showing average profit for each division, repeated for each of the years.

`graph dot (sum) revenue profit, over(division) over(year)`
  #_of_divisions × *#_of_years* lines each with two markers, the first showing the sum of revenue and the second showing the sum of profit for each division, repeated for each of the years.

`graph dot (median) revenue profit, over(division) over(year)`
  #_of_divisions × *#_of_years* lines each with two markers showing the median of revenue and median of profit for each division, repeated for each of the years.

`graph dot (median) revenue (mean) profit, over(division) over(year)`
  #_of_divisions × *#_of_years* lines each with two markers showing the median of revenue and mean of profit for each division, repeated for each of the years.

References

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Also see

[G-2] **graph bar** — Bar charts

[D] **collapse** — Make dataset of summary statistics