

Deconstructing and Constructing Graphics

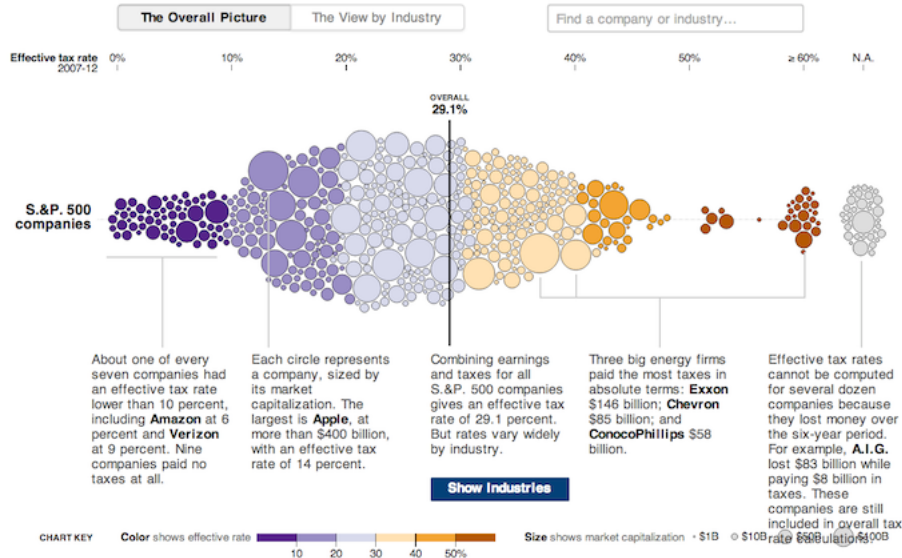
Data Computing

Published: May 25, 2013

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Across U.S. Companies, Tax Rates Vary Greatly

Last week, in a Congressional hearing, Apple got grilled for its low-tax strategy. But not every business can copy that approach. Here is a look at what S&P 500 companies paid in corporate income taxes — federal, state, local and foreign — from 2007 to 2012, according to S&P Capital IQ. [Related Article »](#)



Breaking down the Chart

1. What variables form the frame?
2. What (if any) variables are used for faceting?
3. What are the glyphs?
(If there's more than one type of glyph, pick one type that seems important.)
 - a. What are the graphical attributes (“aesthetics”) of the glyph?
 - i. ?
 - ii. ?
 - iii. ?
 - iv. ?
 - v. ?
 - vi. ?
 - b. For each of the glyph aesthetics, which variable sets the value? Add on to the answer in (a).
4. What guides/scales are displayed? Check off the relevant entries in your list of aesthetics.
5. What annotations are there?
6. What is the coordinate system? If more than one, describe each of them.

- a. ?
 - b. ?
 - c. ?
7. How many layers are there? If more than one, describe each of them.
- a. ?
 - b. ?
 - c. ?
8. For each of the variables that appears in the graph, write down a couple of typical values. Indicate whether the variable is quantitative or categorical.
- a. ?
 - b. ?
 - c. ?
 - d. ?
 - e. ?
 - f. ?
9. For categorical variables, say whether the ordering (topology) is helpful. If not, suggest a better criterion for ordering.
- a. ?
 - b. ?
 - c. ?

Constructing the Chart

Consider three different grammar components of the graph:

1. Frame
2. Glyphs, known as *geoms* in `ggplot2`.
3. Facets

There must always be a frame and at least one glyph layer in a (non-empty) chart.

Write down an appropriate `ggplot2` statement for generating each component. Say what aesthetics apply to each layer. (Any layer can inherit aesthetics from the frame, or can override them.) Take `TheData` to be a data frame containing relevant variables. If other dataframes are needed, call them `Data1`, `Data2`, etc.

1. Frame: `ggplot(data = TheData, ?)`
2. Layer 1:
3. Layer 2:
4. Layer 3:
5. Faceting:

Write down an appropriate command to construct the graph (or something like it). As a reminder, here are a few of the `ggplot2` functions:

`ggplot()`, `geom_point()`, `geom_barchart()`, `geom_blank()`, `geom_boxplot()`, `geom_density()`,
`geom_errorbar()`, `geom_polygon()`, `geom_line()`, `geom_path()`, `geom_ribbon()`, `geom_rug()`,
`geom_text()`, `scale_y_log10()`, `scale_x_log10()`, `xlabel()`, `ylabel()`

For other graphical types, e.g. dendrograms, networks, etc. and for non-rectangular coordinates, just say what you see without having to construct it.