

CSSS 569 · Visualizing Data and Models

Problem Set 1

Professor: Chris Adolph, Political Science and CSSS

Winter Quarter 2018

Due in class on Thursday, 18 January 2018

General instructions for homeworks: Homework can be handwritten or typed. For any exercises done with R or other statistical packages, you should attach all code you have written and all (interesting) output. Materials should be stapled together in order by problem. The most readable and elegant format for homework answers incorporates student comments, code, output, and graphics into a seamless narrative, as one would see in a textbook.

Problem 1: Critique a Visual Display of Scientific Information (VDSI)

Select a visual display of scientific information from an article or book published in a social science field. The VDSI should exemplify some virtues of good design, but have at least one critical flaw. This is practice for the Breakout memo you will write. I recommend choosing an “easy” – obviously flawed and fixable – example for this homework and a more challenging example worthy of discussion for the latter.

- a. Provide a copy of the display and an explanatory paragraph to allow the general reader (e.g., your instructor) to understand and evaluate the scientific findings of the original paper.
- b. Critique the display, using (any combination of) the principles of good design discussed in lecture or your readings. You are free to disagree with the principles

espoused by any authority in the course, so long as you explain your disagreement (e.g., formulate an alternative standard, explain why an exception is warranted, or navigate a controversy over display techniques). Your critique should point out both virtues and flaws of the VDSI.

- c. Propose an improved VDSI, drawing on examples and ideas from class and your own creativity. Your proposals should rectify at least the most important flaw cited above.

The proposal can take the form of explanatory sketches done free-hand or via computer, or, if you can easily obtain the original data, you may find it easier to rework the graphic using the software of your choice, though I discourage you from using an inflexible package like Excel.

Problem 2: Graphical Skills Test

Using your existing skills and the software of your choice (but not Excel!), reconstruct as much of the Iversen & Soskice scatterplot as you can. The goal is to spend no more than an hour or two to see what you can do (or learn to do) in that time. If you use R or another programming language, attach your code. Otherwise, describe how you made the graphic, step by step.

Elements of the scatterplot you might try to replicate:

- a. Log scaling
- b. Intelligible axis titles and tick labels
- c. Points labeled by country and color coded/marked by party system
- d. An embedded, simple legend
- e. Rugs showing marginal distributions
- f. Linear, preferably robust, fits
- g. Confidence intervals around fitted lines

I don't expect you to be able to integrate all of these in an hour or two. Do your best; if you take this problem seriously, you will receive full credit. The collective performance of the class will help me pitch coming lectures on graphical programming at the level that helps the most students.

The Iverson & Soskice data are available on the course website in a comma-separated variable (csv) file, `iverRevised.csv`. This is my preferred format for sharing data. After setting R's working directory to the folder to which you have downloaded the dataset, you may read it using the command:

```
data <- read.csv("iverRevised.csv", header=TRUE)
```

csv files can also be easily loaded in many other packages.

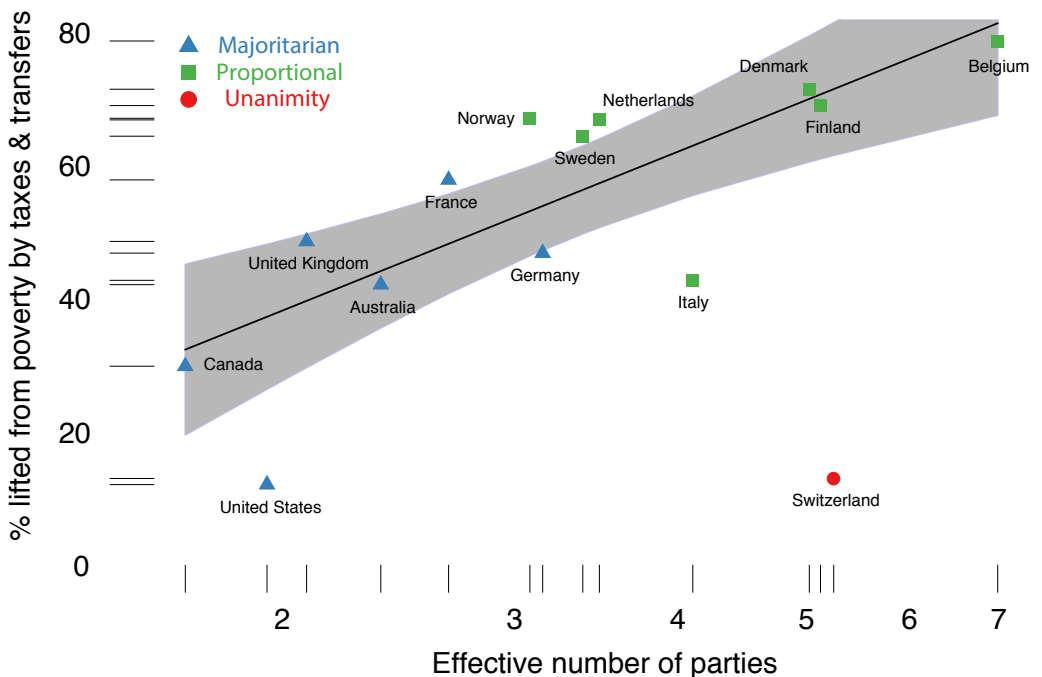


Figure 1. Electoral systems and redistribution. Source: Torben Iversen and David Soskice, 2002, "Why do some democracies redistribute more than others?" manuscript, Harvard University; redrawn.

The data are also reproduced here:

| country | povertyReduction | effectiveParties | partySystem |
|----------------|------------------|------------------|--------------|
| Australia | 42.16 | 2.38 | Majoritarian |
| Belgium | 78.79 | 7.01 | Proportional |
| Canada | 29.9 | 1.69 | Majoritarian |
| Denmark | 71.54 | 5.04 | Proportional |
| Finland | 69.08 | 5.14 | Proportional |
| France | 57.91 | 2.68 | Majoritarian |
| Germany | 46.9 | 3.16 | Majoritarian |
| Italy | 42.81 | 4.11 | Proportional |
| Netherlands | 66.93 | 3.49 | Proportional |
| Norway | 67.17 | 3.09 | Proportional |
| Sweden | 64.48 | 3.39 | Proportional |
| Switzerland | 13.02 | 5.26 | Unanimity |
| United Kingdom | 48.66 | 2.09 | Majoritarian |
| United States | 12.1 | 1.95 | Majoritarian |

where

| | |
|------------------|---|
| country | country as a string |
| povertyReduction | % of impoverished persons lifted from poverty by redistribution |
| effectiveParties | the effective number of parties |
| partySystem | three-category coding of party systems |