earth

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812–1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.

Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour six mille hommes ; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. ——— Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M.M. Thiers, de Ségur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mohilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

MOSCOU

6.000 22.000 33.000

Polotzk Gloubokoe Witebsk Chjat

Moskowa R. 100.000 100.000 Tarantino

422.000 400.000 60.000 175.000 145.000 Mojaisk Malo-jarosewli

Niemen R. Kowno Wilna Smolensk Dorogobouge Wizma 87.000 96.000

10.000 4.000 8.000 14.000 Smorgoni Molodezno 12.000 Bérézina R. 30.000 Orscha 55.000 37.000

Niemen R. 24.000 Botr 20.000

28.000 Studienska 26.000

Minsk 50.000 Mohilow
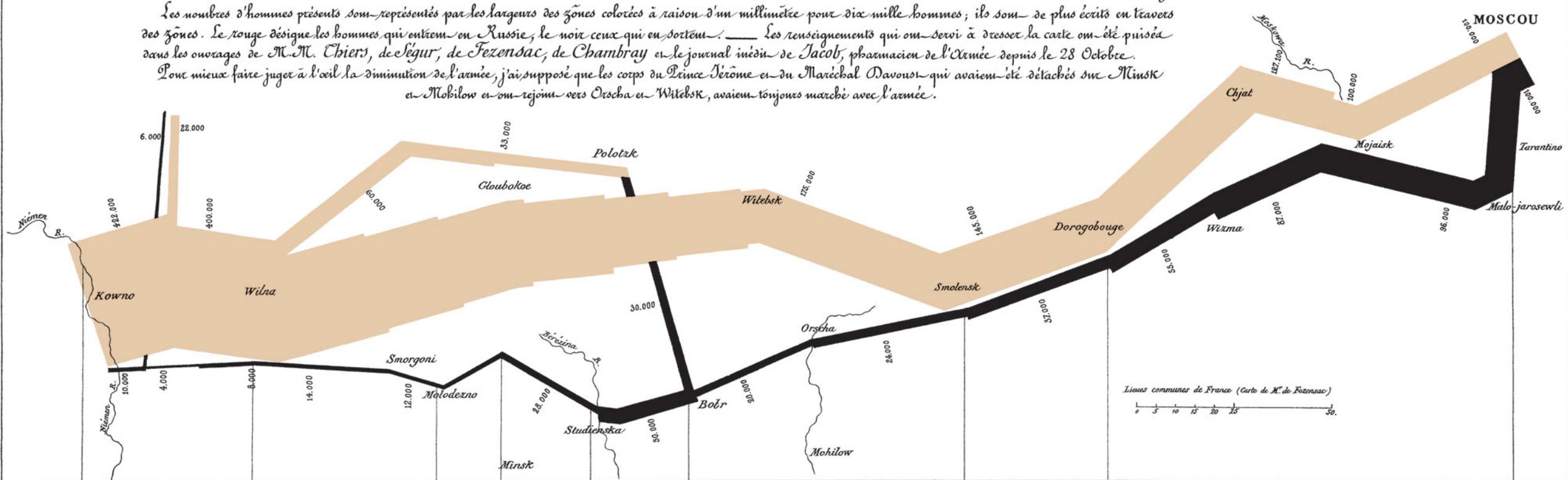
Lieues communes de France (Carte de M. de Fezensac)
0 5 10 15 20 25 50.

TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les Cosaques passent au galop le Niémen gelé.

Zéro le 18 8bre 5 10 Pluie 24 8bre

— 11°

— 9° le 9 9bre

— 20° le 28 9bre

— 21° le 14 9bre

— 24° le 1er X.bre

— 26° le 7 X.bre

— 30° le 6 X.bre 30 degrés

GREAT M...

PLACE

WORK HOUSE

PORTLAND MEWS

PUMP

MARSHALL ST

TYLER COURT

BERWICK STREET

DUFOURS PLACE

LOWER STREET

DUCK LANE

TYLER STREET

BROAD STREET

STREET

PUMP

BREWERY

POLAND STREET

KING STREET

CROSS STREET

STREET

CAMBRIDGE ST

NEW STREET

HOPKINS ST

STREET

LITTLE WINDMILL STREET

PETER STREET

GREAT PULTENEY STREET

WILLIAM AND MARY YARD

BRIDLE STREET

SILVER STREET

CROSS ST

PULTENEY CT

Charts Are Persuasive

Researchers compared the share of people persuaded by a verbal description of a drug trial with the share of those persuaded when a chart adding no new information was   included.

Proportion of people who were persuaded by the information

Read verbal description only
68%

Also saw a chart
97%

Source: "Blinded With Science: Trivial Graphs and Formulas Increase Ad Persuasiveness and Belief in Product Efficacy" by Aner Tal and Brian Wansink

Via The Upshot, New York Times (http://www.nytimes.com/2014/11/25/upshot/a-persuasive-chart-showing-how-persuasive-charts-are.html)

WITH GREAT POWER COMES GREAT RESPONSIBILITY

So what's the right chart to use?

Line Chart for viewing trends in data over time.

Line Chart for viewing trends in data over time.

If you have two y-axes, keep them proportional.

Oklahoma State Prisons Have 4,772 More Inmates and 461 Fewer Correctional Officers Since 2000

2,114

19,956

15,184

1,653

Fiscal Year

◆ Inmates (Public Prisons) ■ Correctional Officers
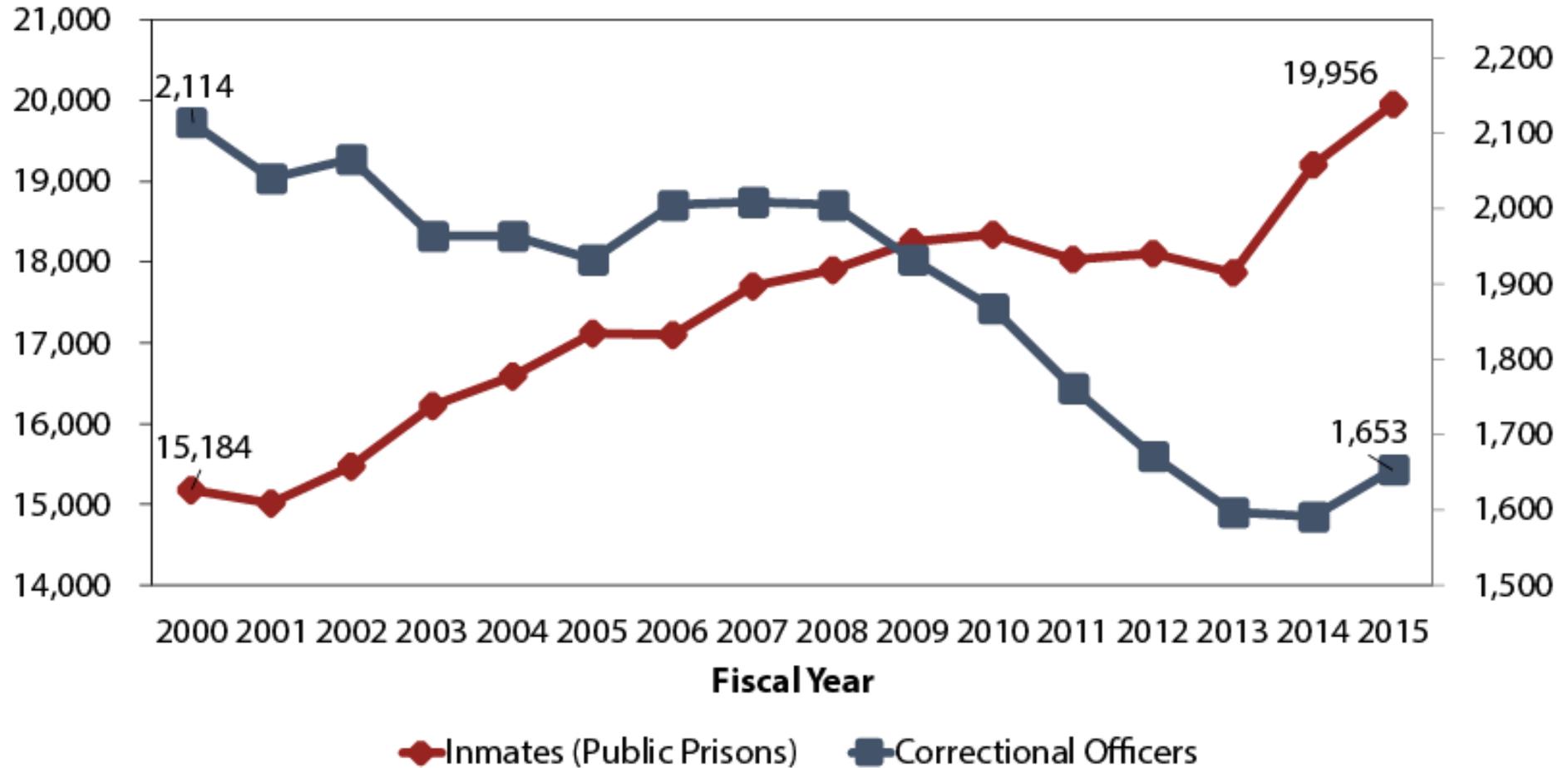
Data Source: Oklahoma Department of Corrections. All numbers as of 6/30 each year.

Line Chart for viewing trends in data over time.

+50%

+50%

If you have two y-axes, keep them proportional.

Oklahoma State Prisons Have 4,772 More Inmates and 461 Fewer Correctional Officers Since 2000

2,114

19,956

15,184

1,653

Inmates axis		Officers axis
21,000		2,200
20,000		2,100
19,000		2,000
18,000		1,900
17,000		1,800
16,000		1,700
15,000		1,600
14,000		1,500

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

Fiscal Year

◆ Inmates (Public Prisons)   ■ Correctional Officers
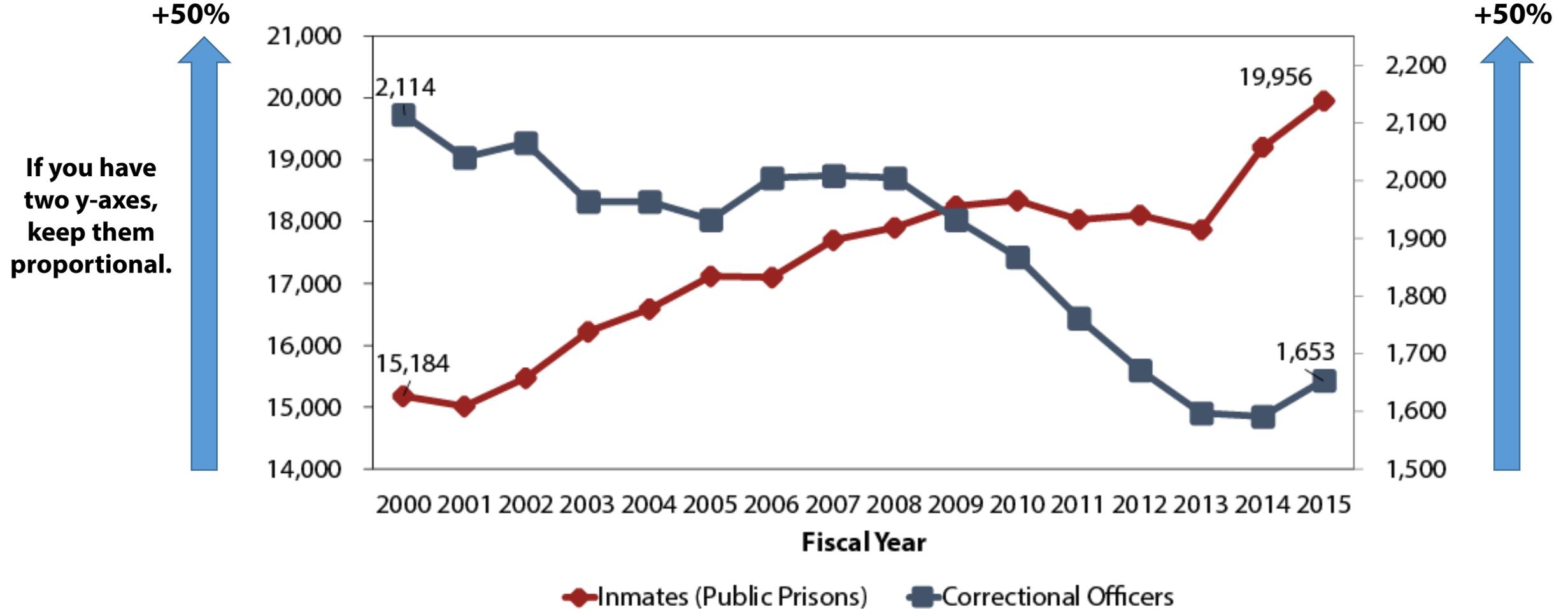
Data Source: Oklahoma Department of Corrections. All numbers as of 6/30 each year.

Bar Chart for comparing data across categories.

Bar Chart for comparing data across categories.

State and Local Government Expenditures Per Person, 2013

Category	US Average	Oklahoma
Education	$2,770	$2,490
Health & Social Services	$2,434	$2,197
Transportation	$592	$628
Public Safety	$734	$597
Environment & Housing	$621	$437
Govt Administration & Judicial System	$395	$346
Other	$2,572	$1,678
Total	$10,116	$8,373

■ US Average ■ Oklahoma
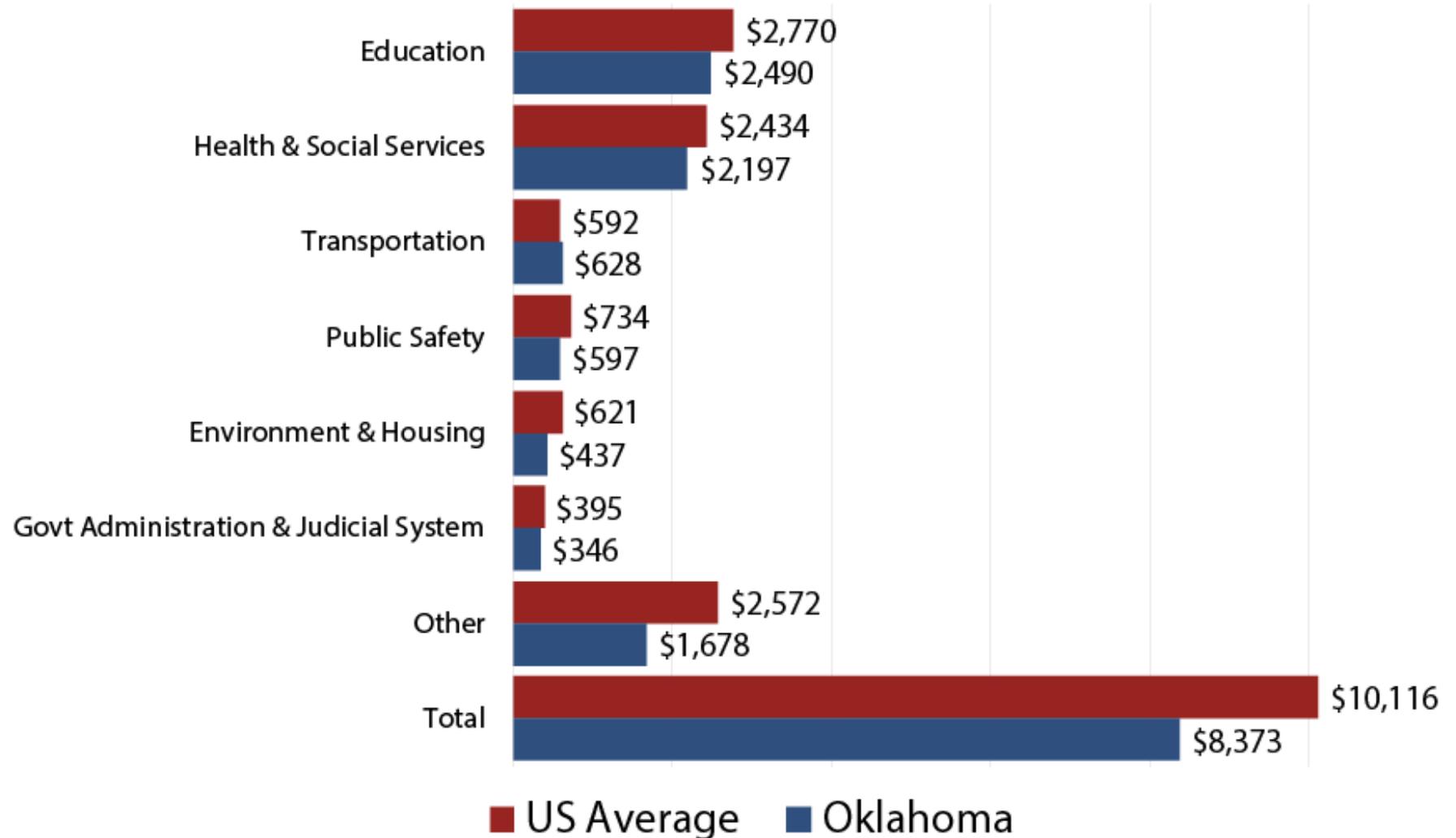
How to lie with a **Bar Chart**.

Oklahoma

Population Migration 1985-2010
Lost 33,649 people
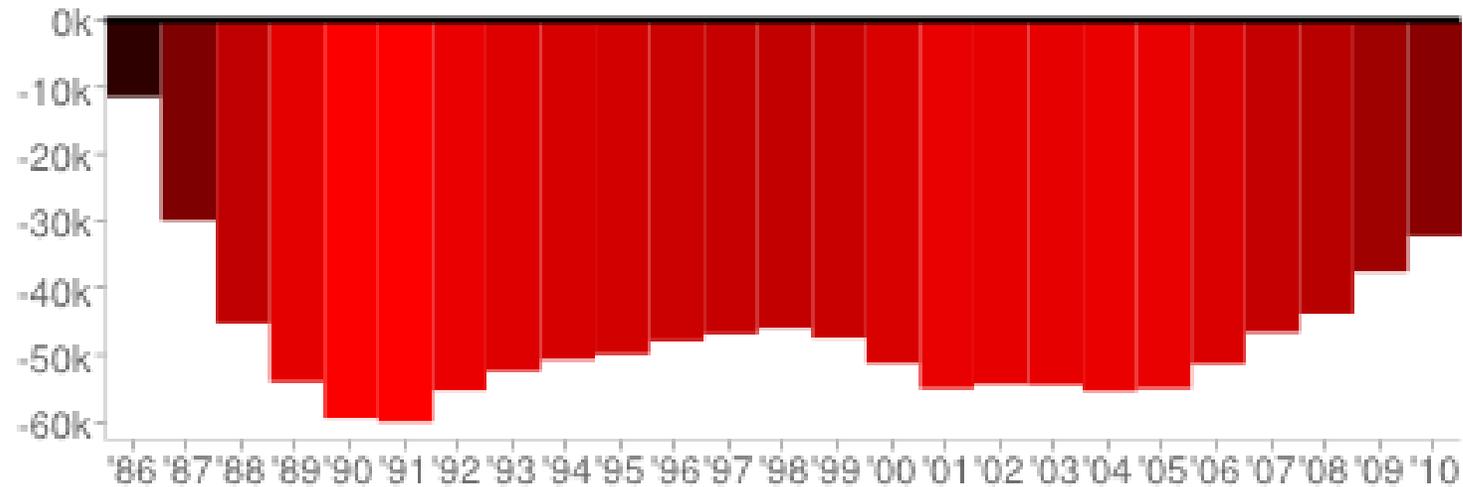
Source: howmoneywalks.com

Oklahoma Annual Net Migration, 1994-2010

Data Source: Internal Revenue Service
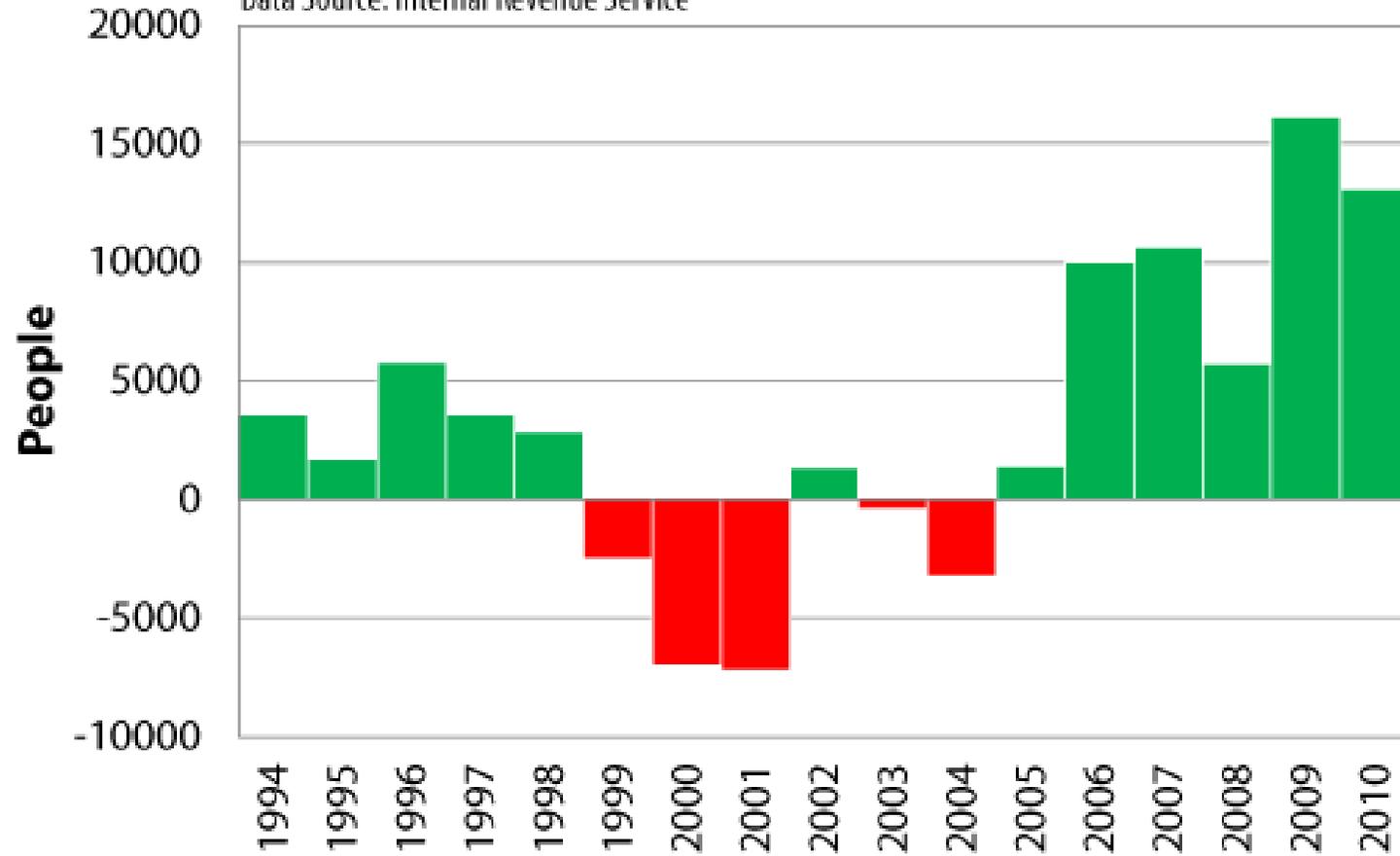
Oklahoma

Population Migration 1985-2010
Lost 33,649 people
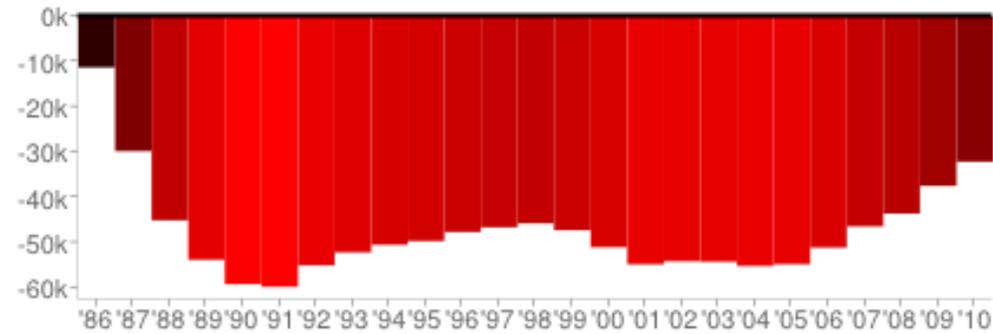
Oklahoma Resident Population, 1986-2010
Gained 506,747 people
Data Source: U.S. Census
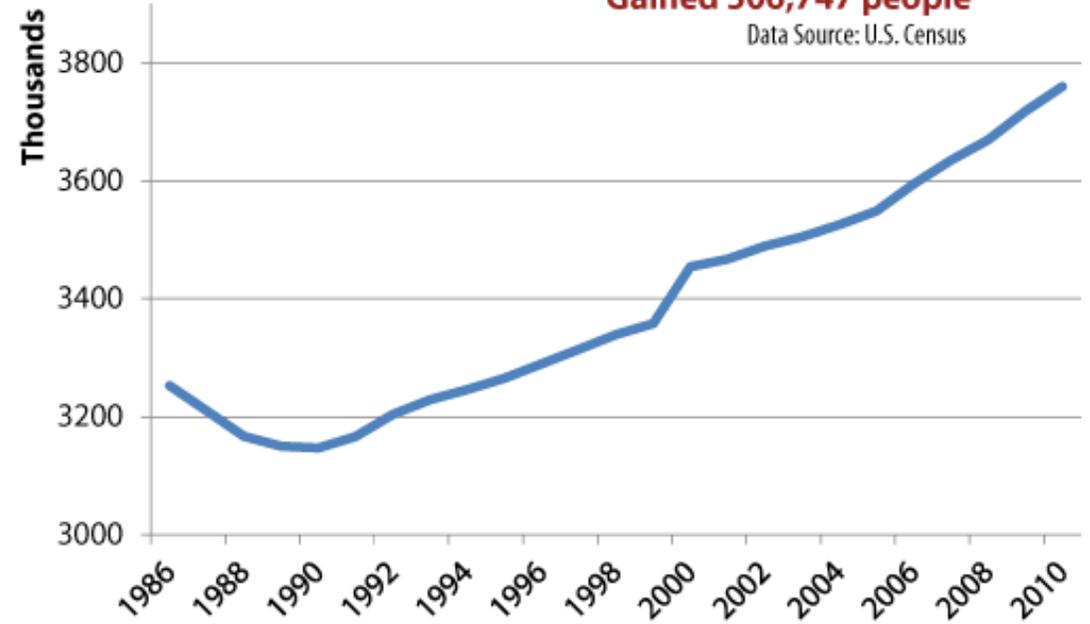
# **Pie charts** to show relative proportions.

Pie charts to show relative proportions.

FY 2017 Appropriations to Ten Largest Agencies

Total Appropriations:
$6778.1M

Total Ten Largest:
$6,143.2M (90.6%)

Human Services:
$651.5M (9.6%)

Corrections: $484.9M
(7.2%)

Mental Health:
$324.8M (4.8%)

Transportation
$154.9M (2.3%)

CareerTech: $118.3M
(1.7%)

Public Safety: $89.0M
(1.3%)

Juvenile Affairs:
$92.1M (1.4%)

OHCA (Medicaid)
$991.1M (14.6%)

Higher Education
$810.0M (12.0%)

Common Education $2,426.7M (35.8%)

All Other Agencies
$634.9M (9.4%)

Oklahoma Policy Institute | www.okpolicy.org
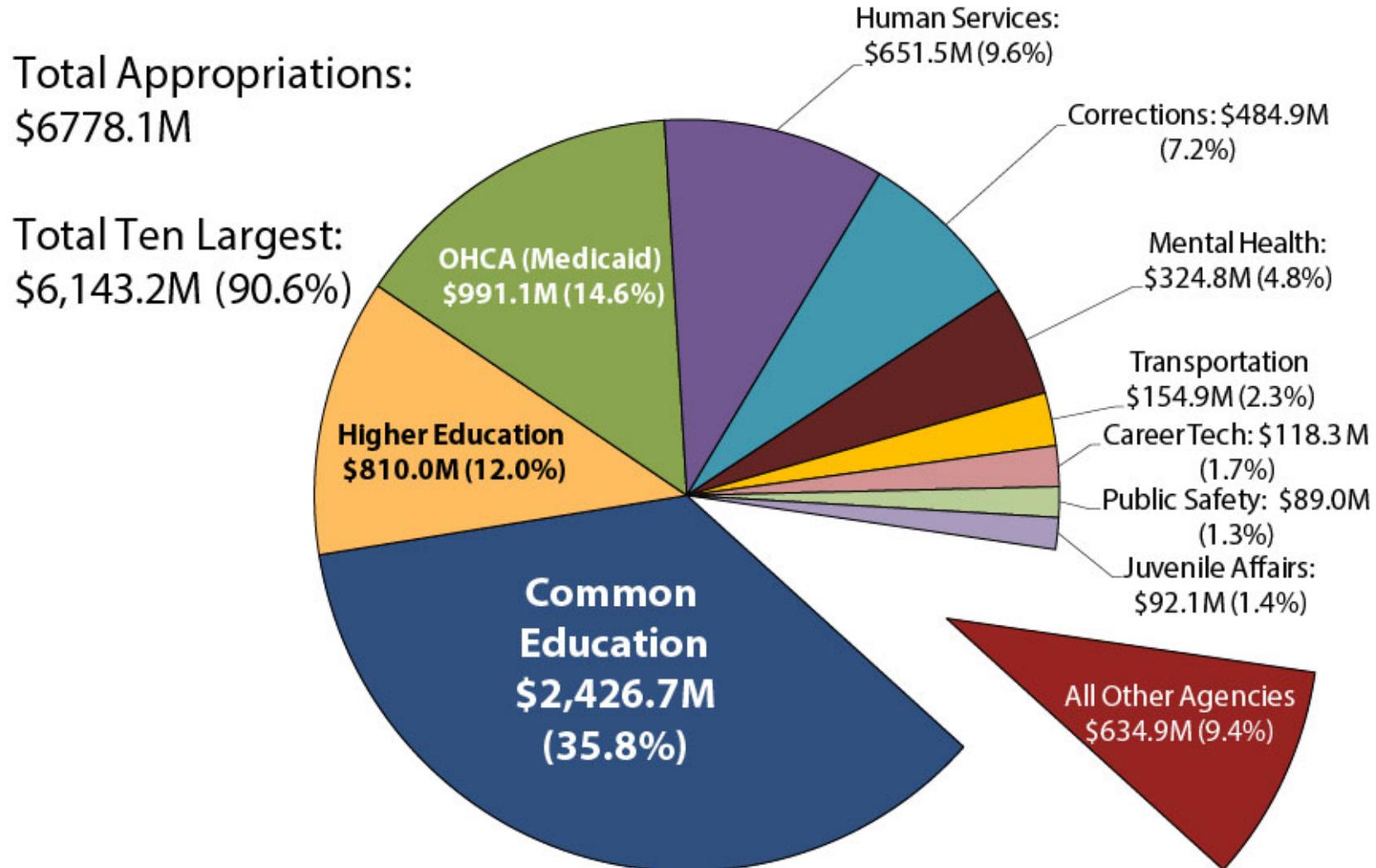
Pie charts are hard to compare across multiple graphs.
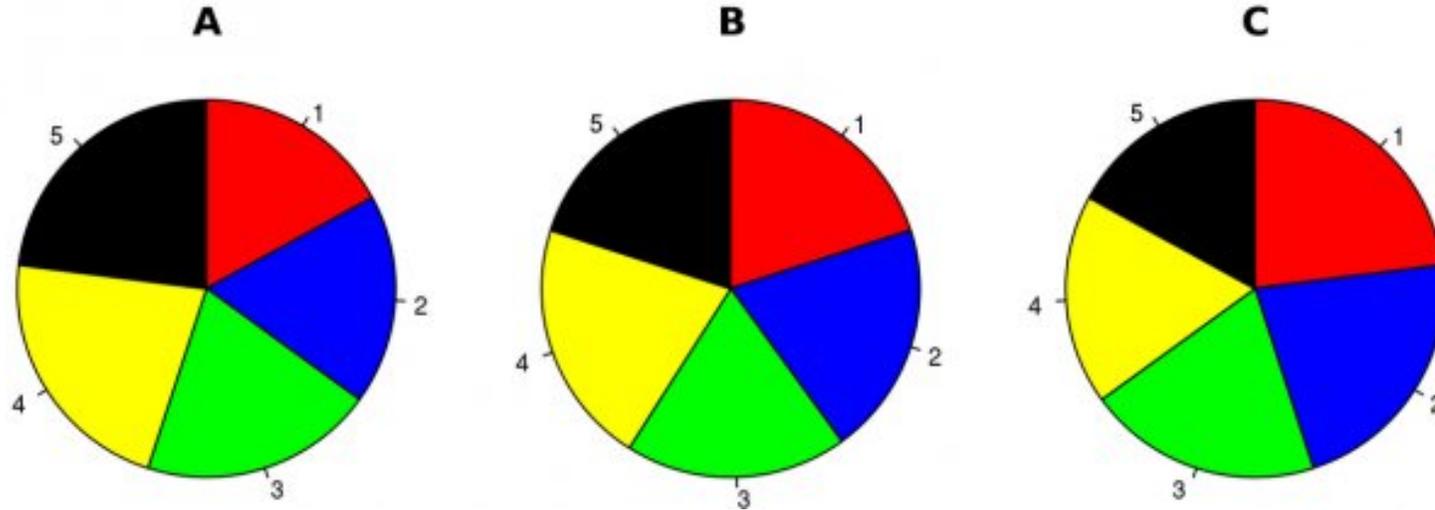
Pie charts are hard to compare across multiple graphs.
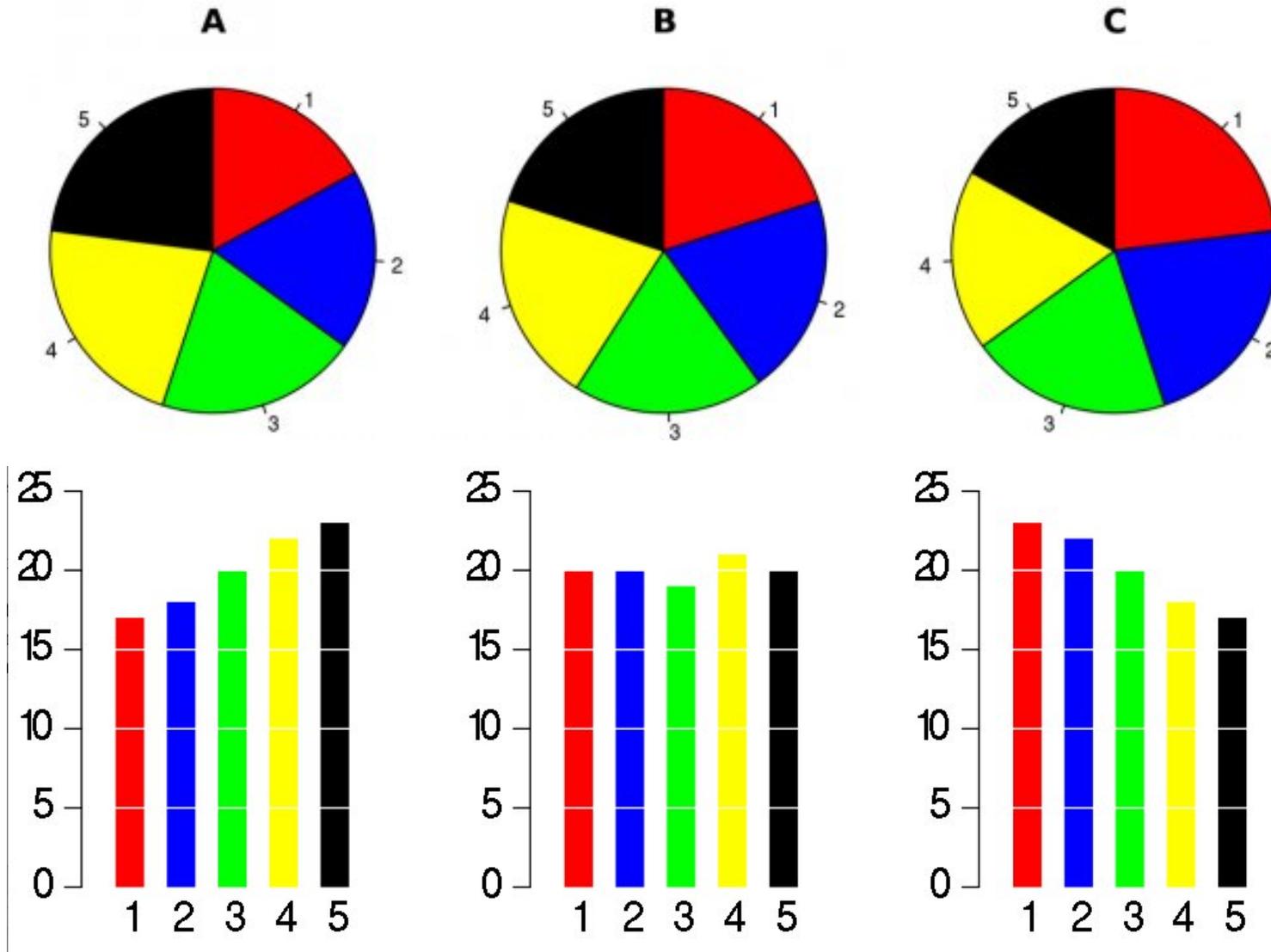
## Use a **Bar Chart** instead.

And make sure it adds up!

9%

32%

51%
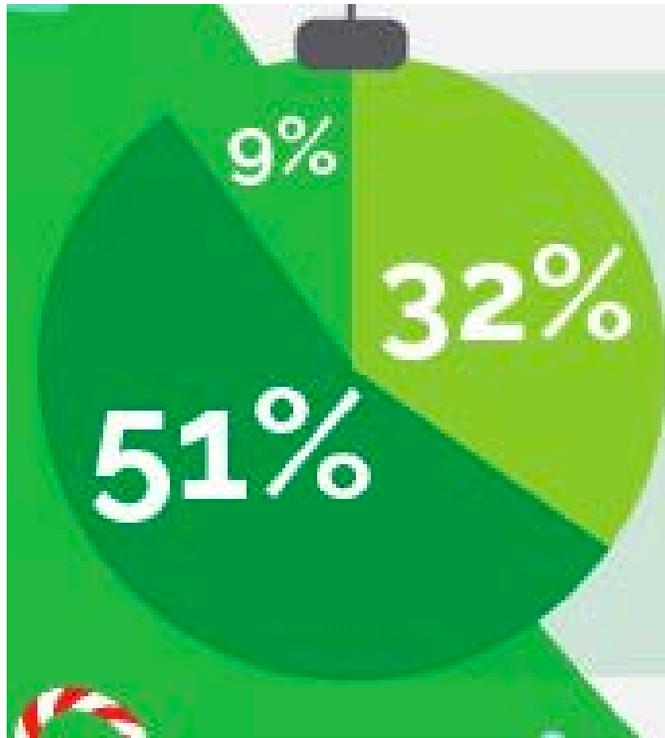
Although Christmas is traditionally celebrated to remember the birth of Jesus Christ,

32% consider it a cultural holiday

51% of Americans consider it a religious holiday

9% Both/Other

Source: WTF Visualizations, http://viz.wtf/

Scatter plot to investigate relationship between different variables.

Scatter plot to investigate relationship between different variables.

Strong Correlation Between Education And Wages

Median Hourly Wage (y-axis): $12 to $21

Percentage of Workforce with Bachelor's Degree or Better (x-axis): 20% to 50%
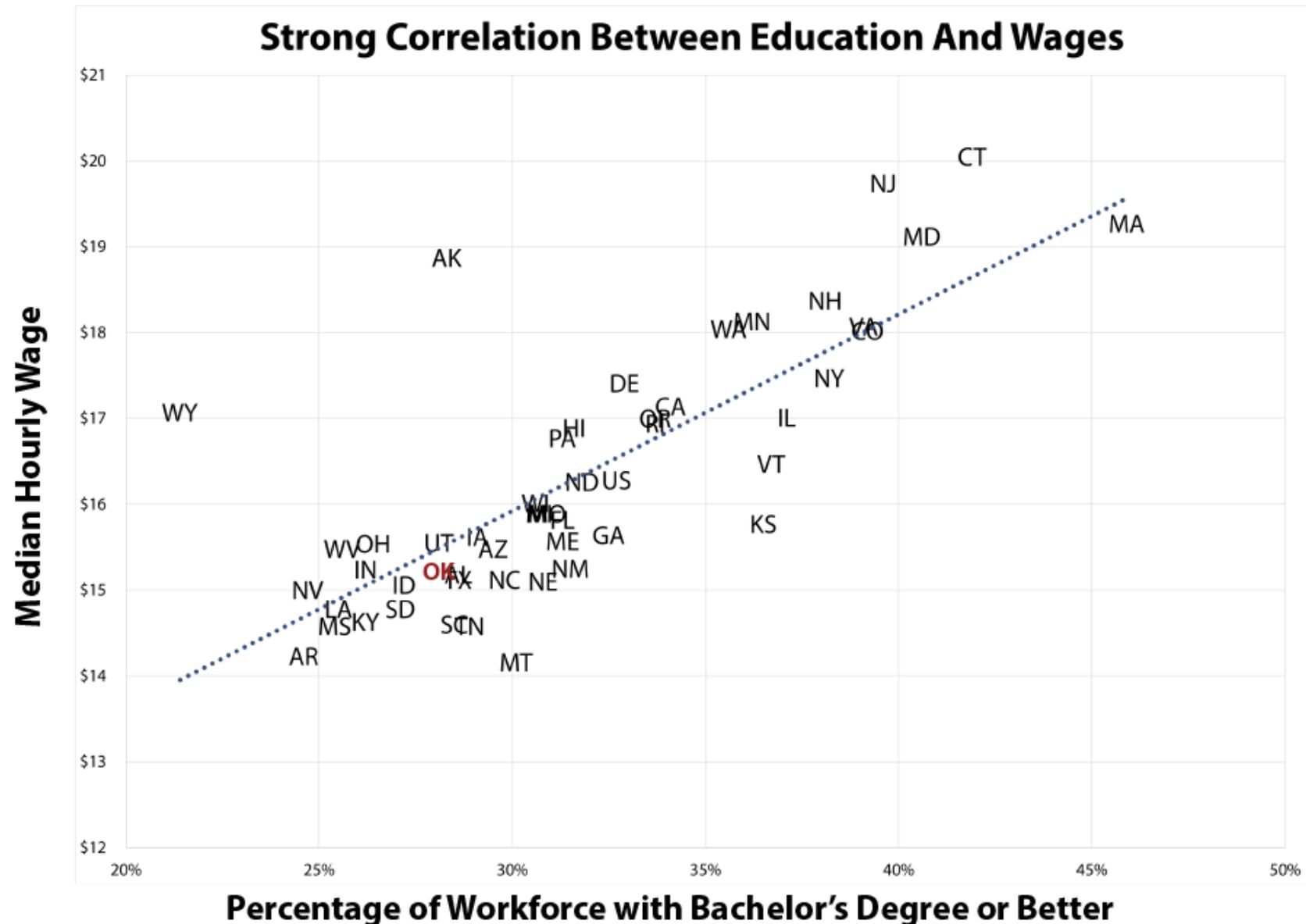
Bubbles can add more variables to scatter plots.


Oklahoma Jobs (Q4 2013 - Q3 2014)
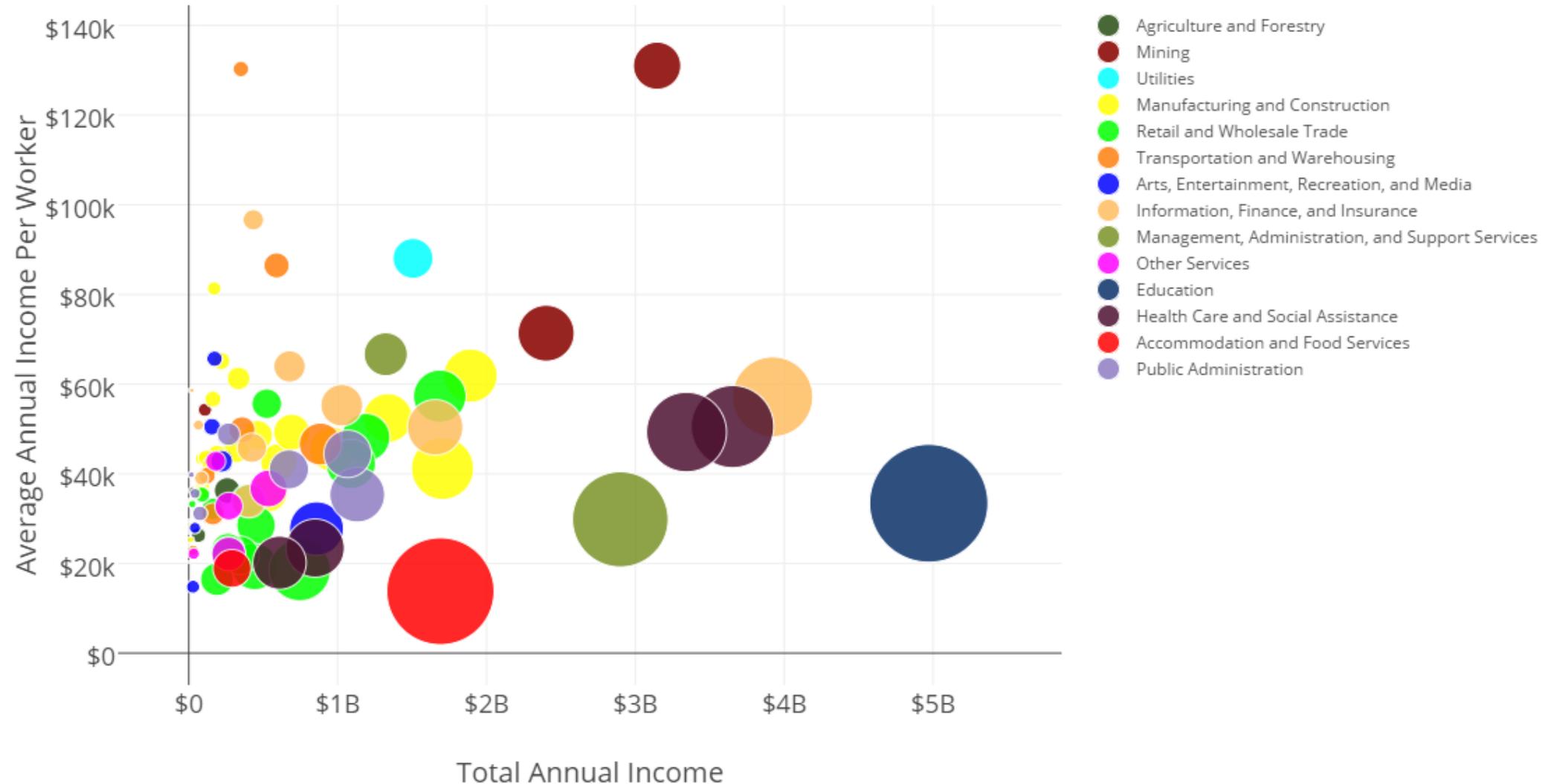
Get used to not just *seeing* or *looking at* visualizations but *reading* them. If someone hides data from you, it's probably because he has something to hide.

Less regulation =
More industry investment

$56 billion After regulations were relaxed

Following 1992 Cable Regulations

$14 billion

1993-1996   1999-2003
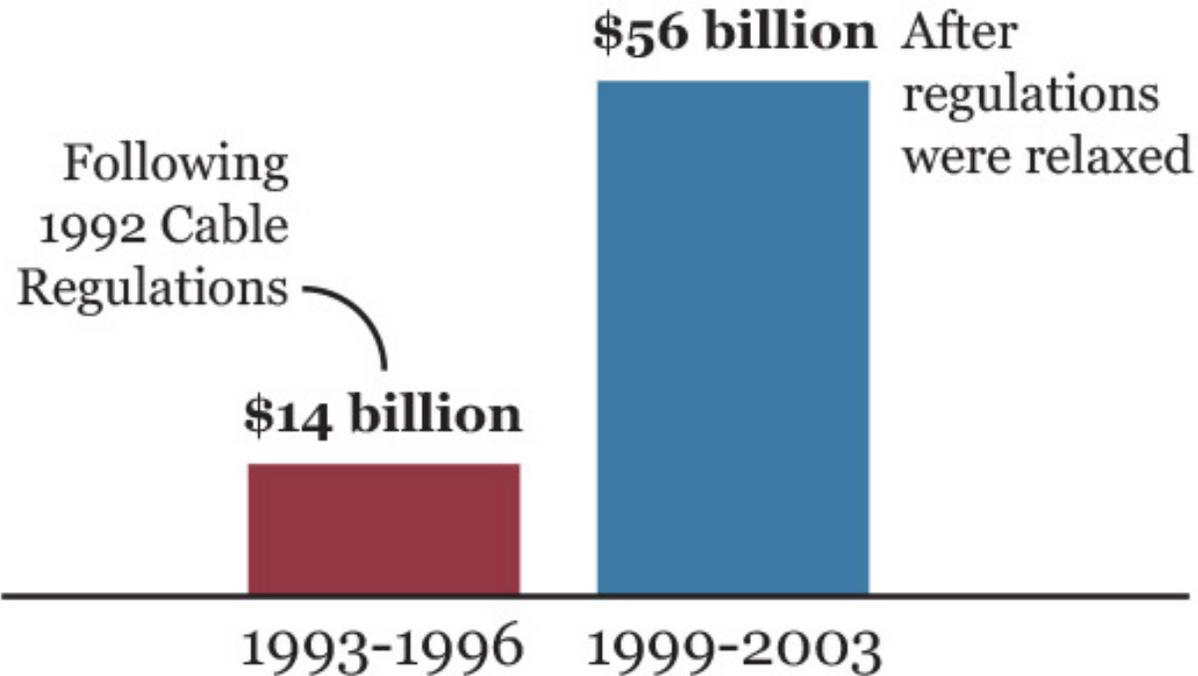
Source: Alberto Cairo, "The Truthful Art: Data, Charts, and Maps for Communication"

Get used to not just *seeing* or *looking at* visualizations but *reading* them. If someone hides data from you, it's probably because he has something to hide.

Less regulation = More industry investment

$56 billion After regulations were relaxed

Following 1992 Cable Regulations

$14 billion

1993-1996   1999-2003
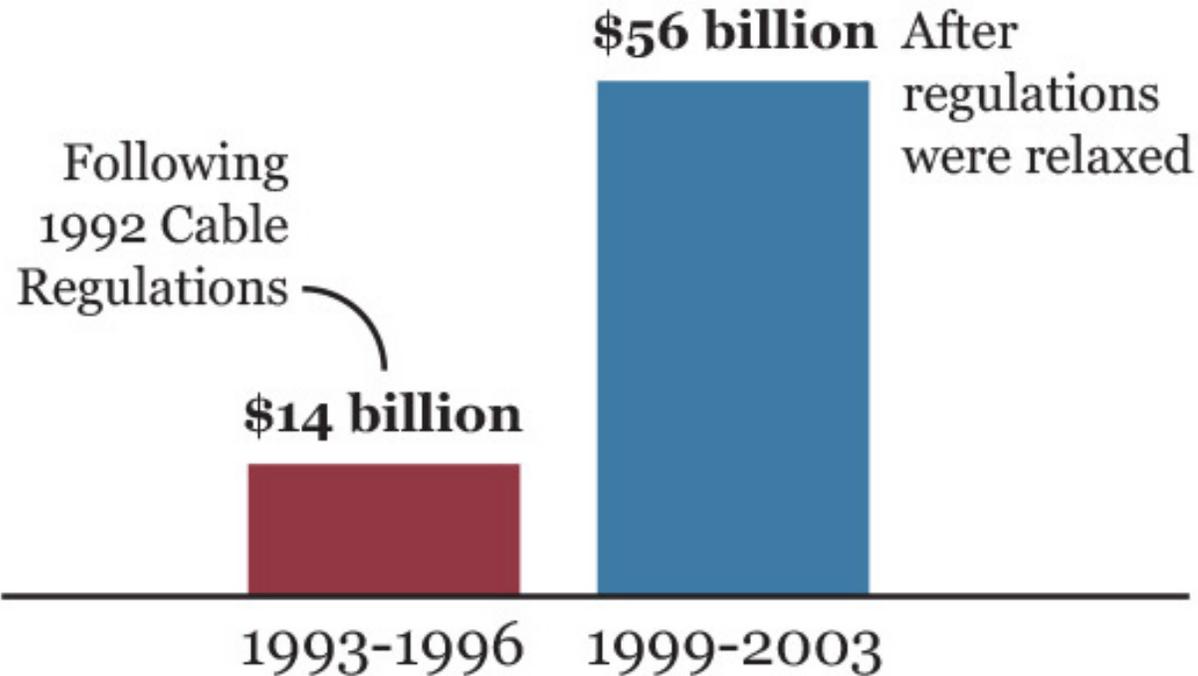
Cable Industry Infrastructure Expenditures

In billions

$16

$12

Cable Television Consumer Protection and Competition Act (**"Regulation"**)

$8

$4

Telecommunications Act is passed (**"Deregulation"**)

$16

1990 92   96   98   00   02   04   06   08   10   2013
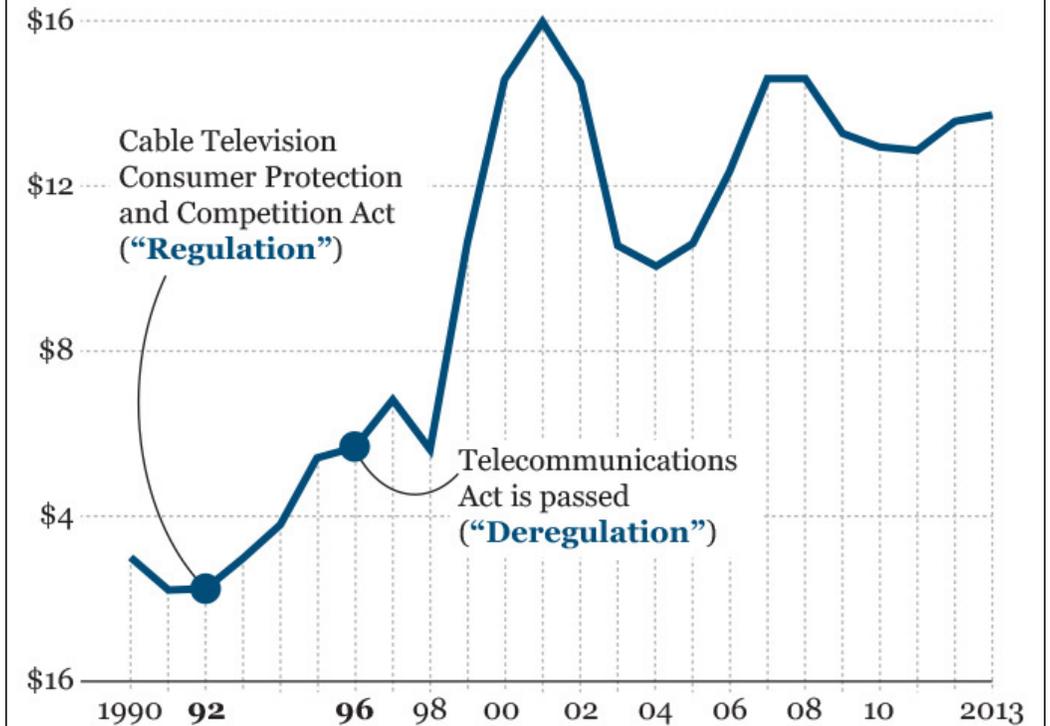
Source: Alberto Cairo, "The Truthful Art: Data, Charts, and Maps for Communication"

Be creative, but don't let design interfere with comprehension.
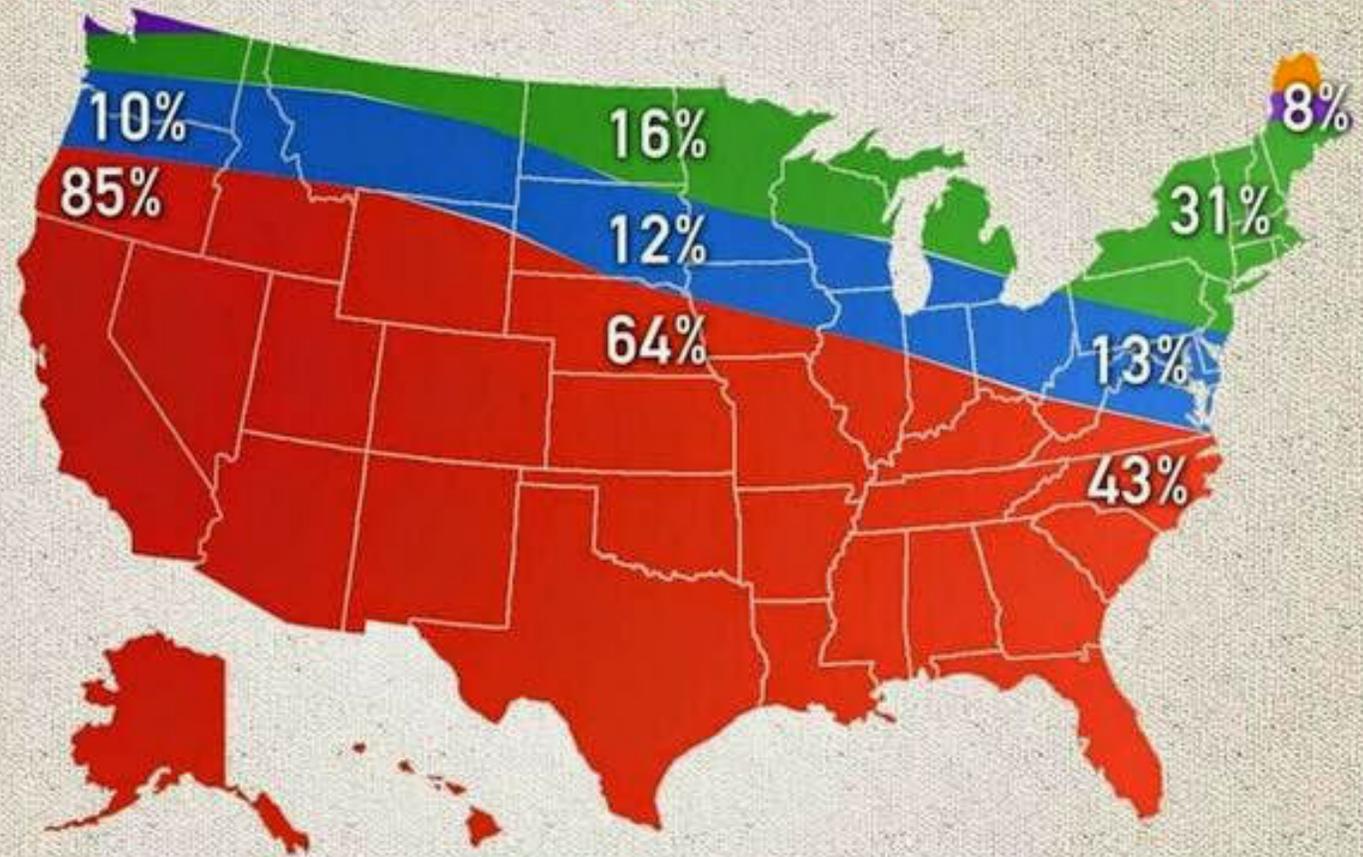
Source: Flowing Data, http://flowingdata.com/2014/04/16/weird-stacked-area-map-thing/

Be creative, but don't let design interfere with comprehension.

Source: XKCD.com

https://www.dropbox.com/s/ryns4kw0y2c8art/death-penalty.xlsx?dl=0

Digging Deeper:
- Flowing Data - http://flowingdata.com/
- The PolicyViz Podcast - http://policyviz.com/
- The Functional Art - http://www.thefunctionalart.com/

Tools:
- FRED Economic Research - https://fred.stlouisfed.org/
- Plot.ly - https://plot.ly/
- Mapbox - https://www.mapbox.com/