

Visualizing Data: An Economists' Guide to Presenting Data

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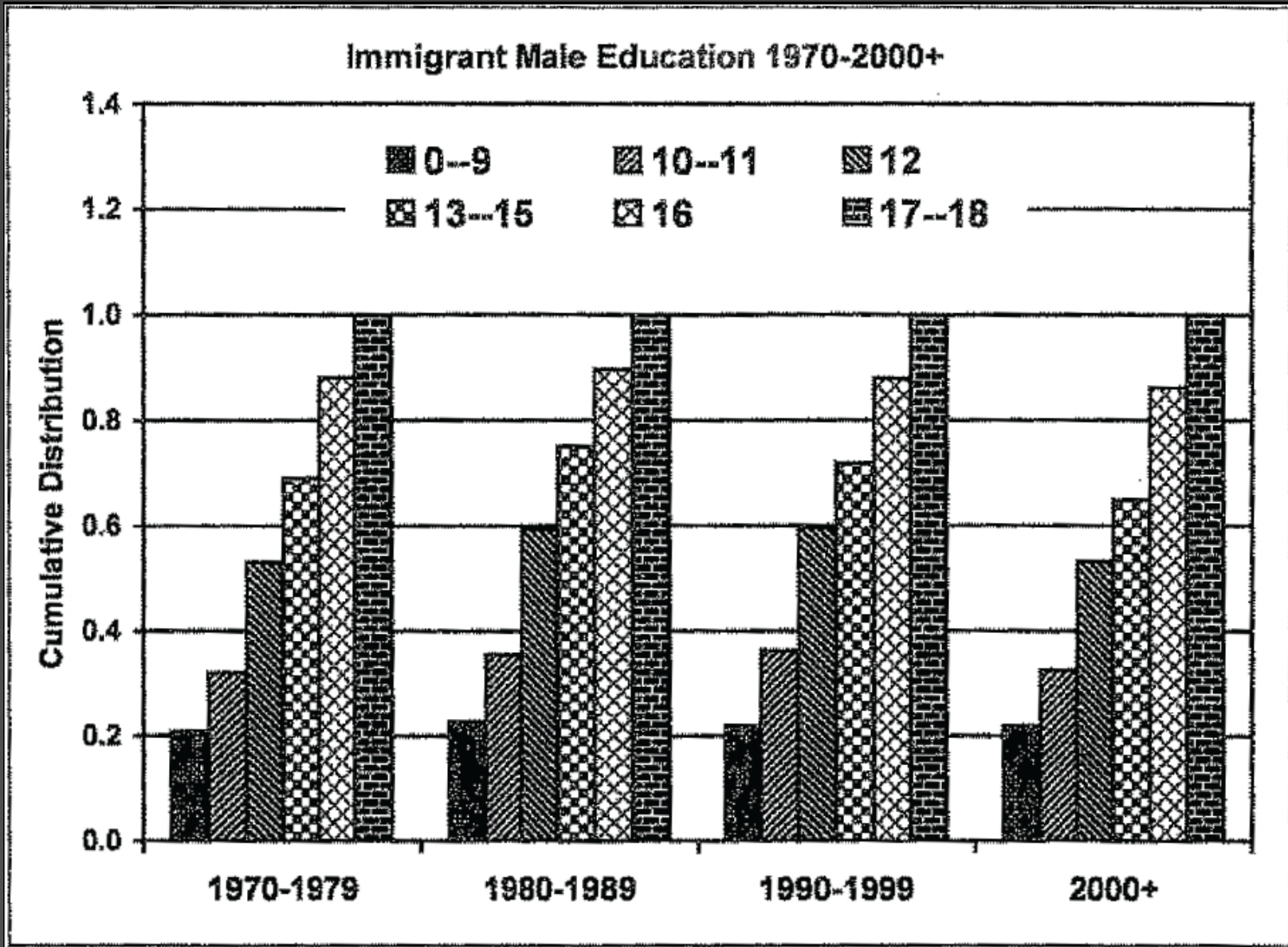
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Note: All images and logos in this presentation are linked.

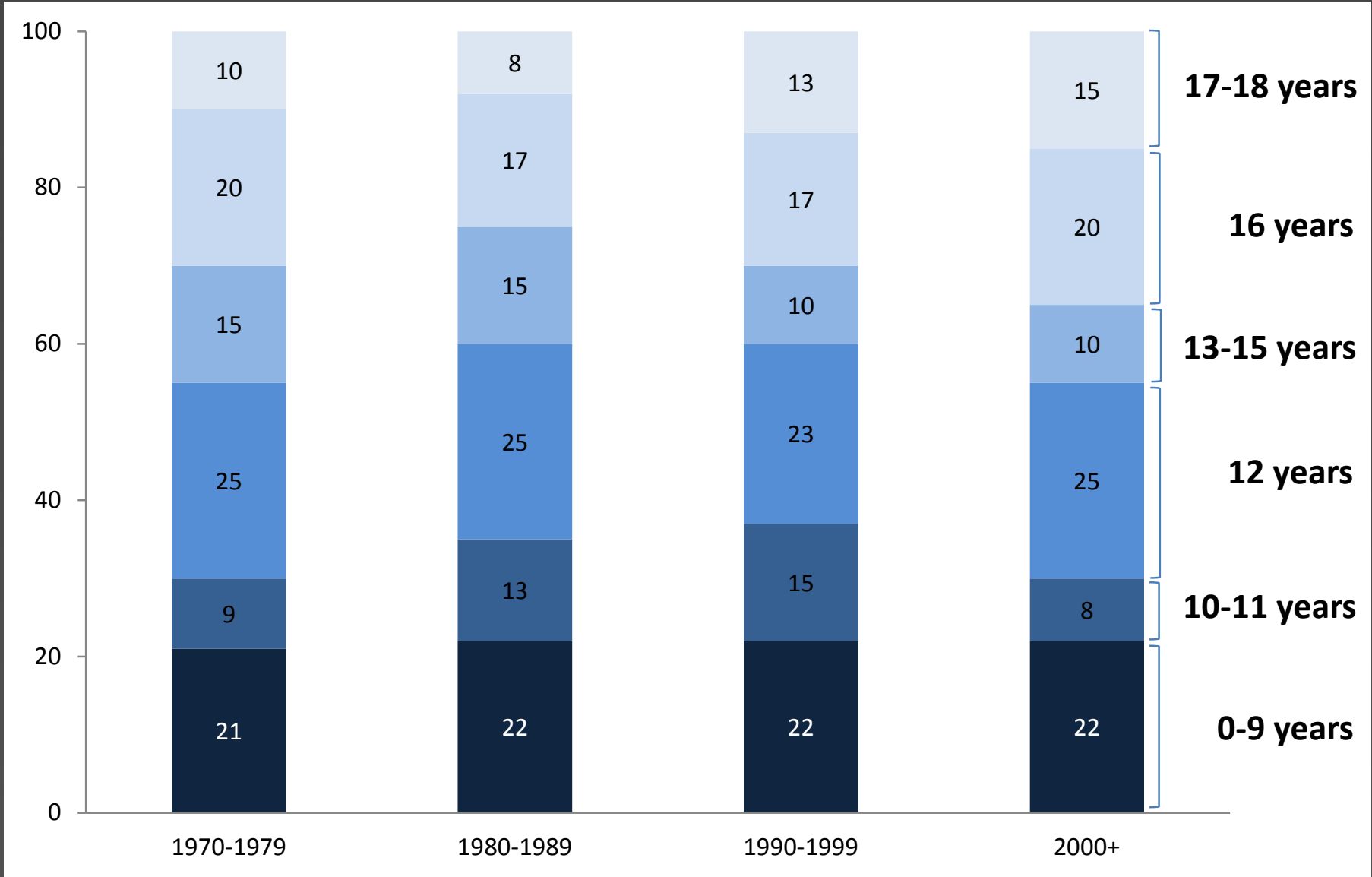
Data Visualization: An Emerging Field

- As analysts and economists, we are used to graphical representations of our work
- People tend to spend a lot of time on the analysis and the words, but less time on thinking about the best presentation of their work
- Data visualization is an emerging field where economists, statisticians, analysts, journalists, programmers, and graphic designers are coming together to present data in new, clear and informative ways

Improving Visualizations



Immigrant Male Education Distribution, 1970-2000+ (Percent)



CBO's Graphic Demographic

- **Member of Congress**

Wants to get specific information on a topic, a broad overview, quick facts, or bullet points.

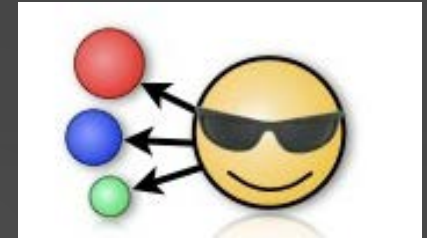


- **Congressional Staffer**

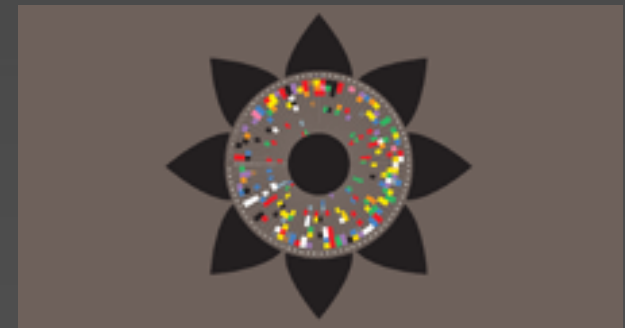
Wants to get data quickly. Might be briefing Member on topics outside usual areas of responsibility.

- CBO provides information about a lot of different subjects, but to discover that information, users must find the right report(s) and then read through a fair amount of text to find the relevant information

Leaders in the Field



WELL-FORMED DATA



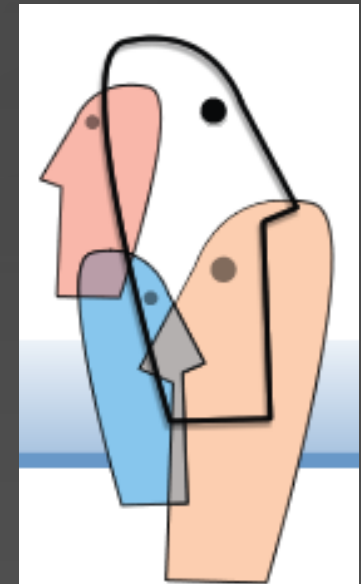
eagereyes



Visualization Showcase Websites

GOOD

visualizing.org



The Infographics Showcase

Available Tools—Production Software

- There are a **lot** of tools available
- Microsoft Office (Excel, Visual Basic, NodeXL, Word)
- **Adobe Creative Suite** (Illustrator, InDesign, Photoshop)
Fireworks, After Effects
Adobe Edge (Beta version)
Adobe Kuler (for color)



More Visualization Tools

- **Programming Languages**

HTML, HTML5, Flash, JavaScript, R, Python, Processing, d3

- **Mapping**

MapInfo, ArcGIS, StatPlanet, Stata

- **Software**

Tableau, Google Labs, HCIL at UMaryland



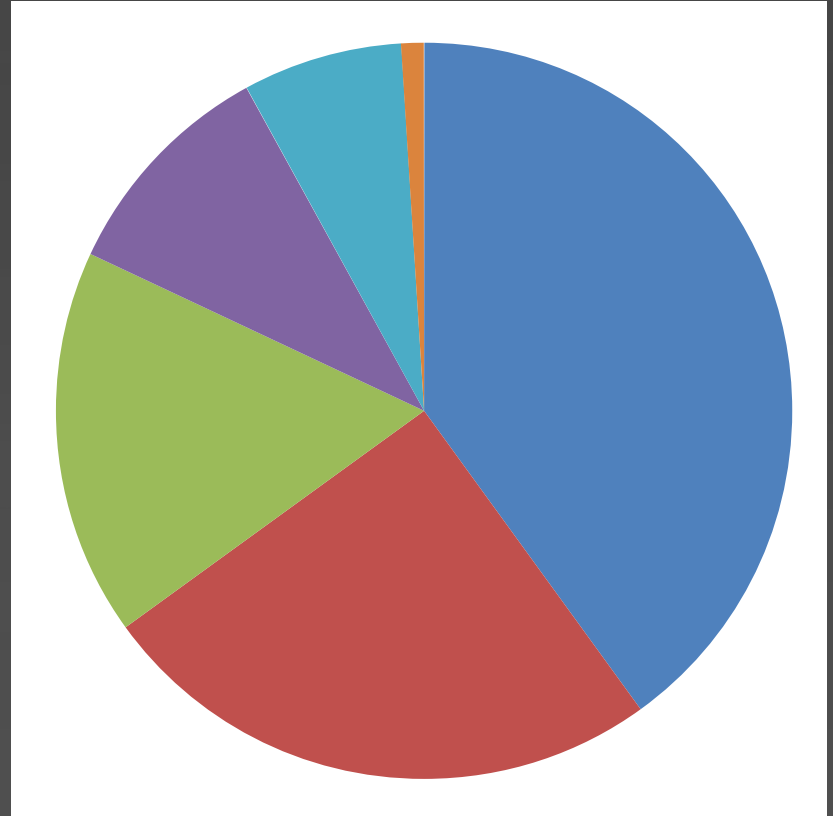
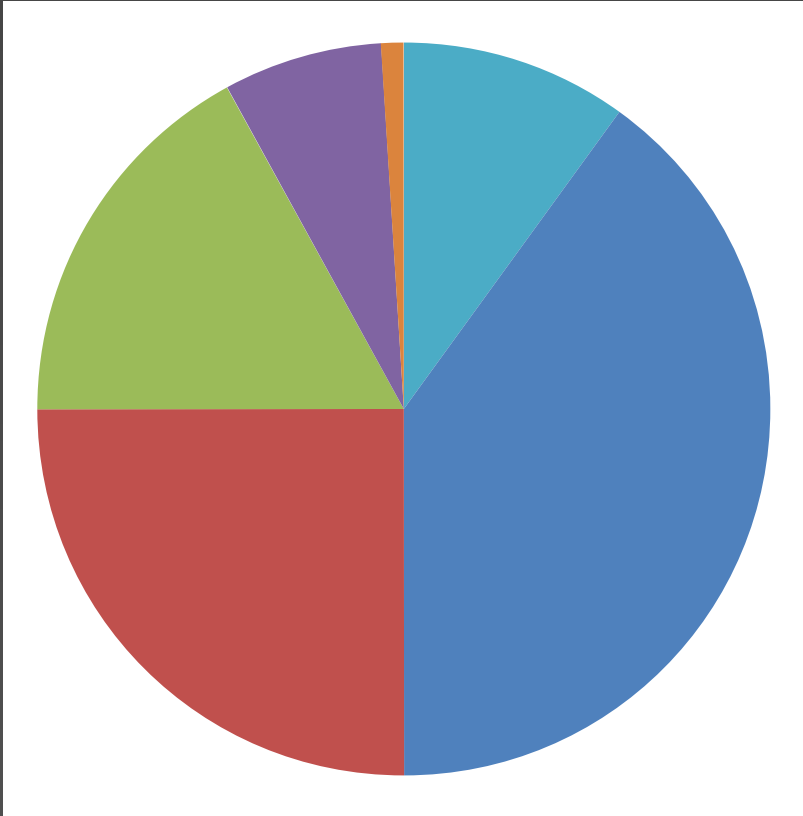
- **Color**

Adobe Kuler, ColorScheme Designer, Color Brewer

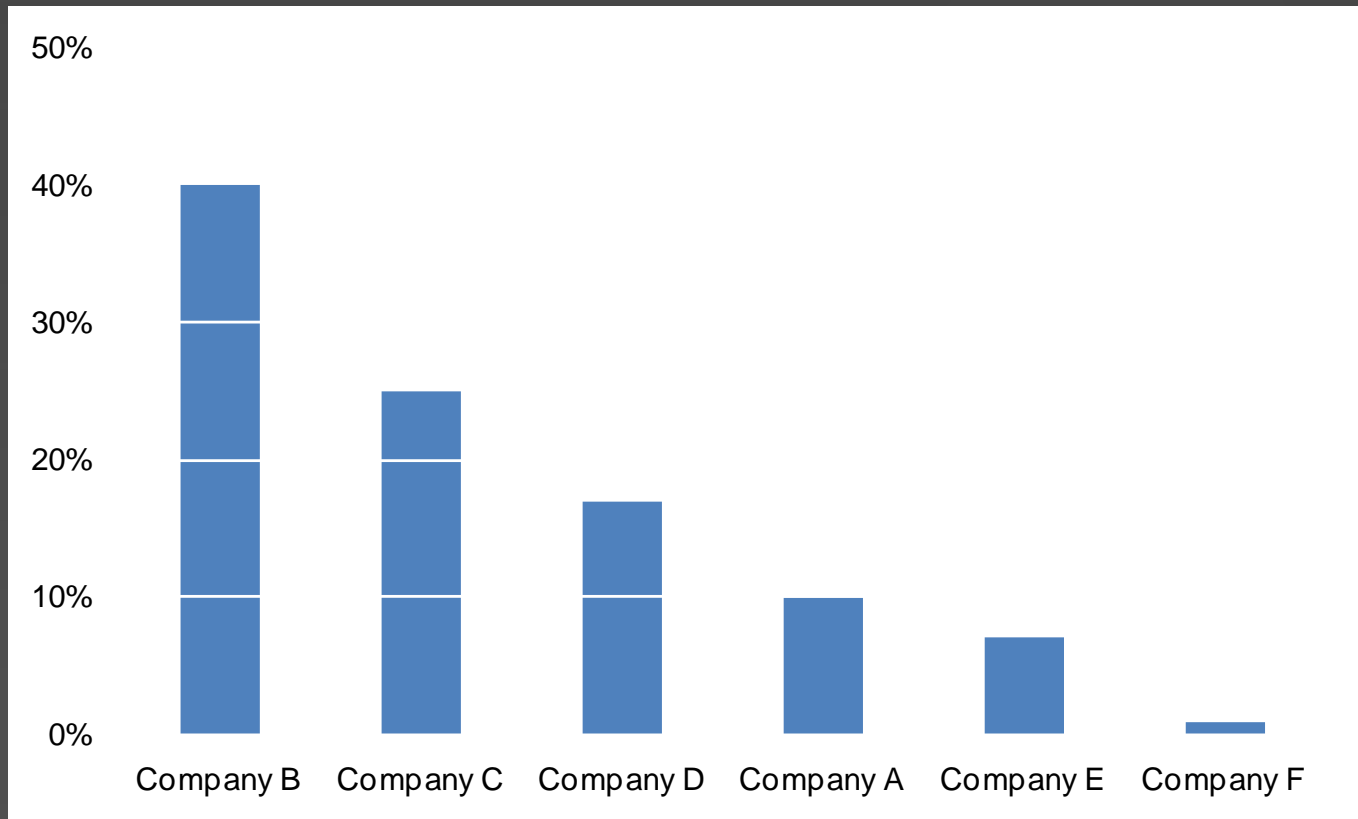
My Strategies

- First, I'm an economist, not a graphic designer
- What is the bottom line?
 - Tell the story concisely
- Simplify
 - But also try to use as many data elements as possible
- Reduce 'chartjunk'
 - No pie charts?
 - No 3D pie charts!
- Find unique ways to present data
- Colors and fonts

No pie charts?

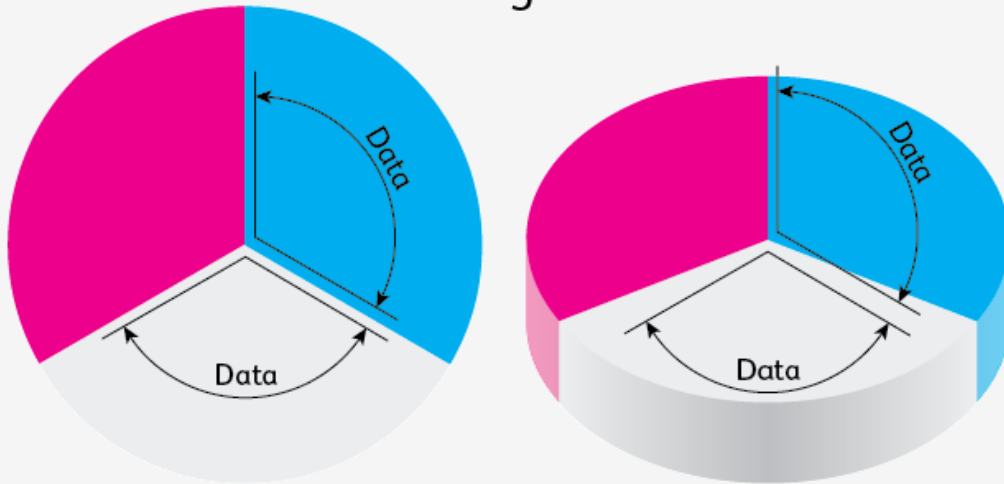


By comparison, column charts make comparing data easier

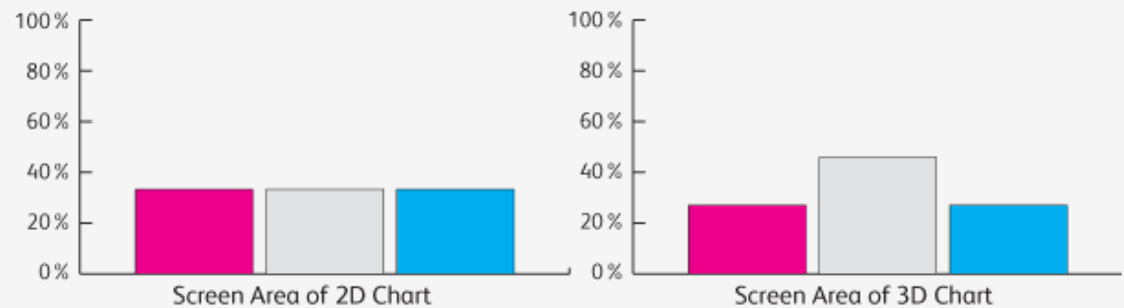


Definitely no 3D pie charts!

Angle



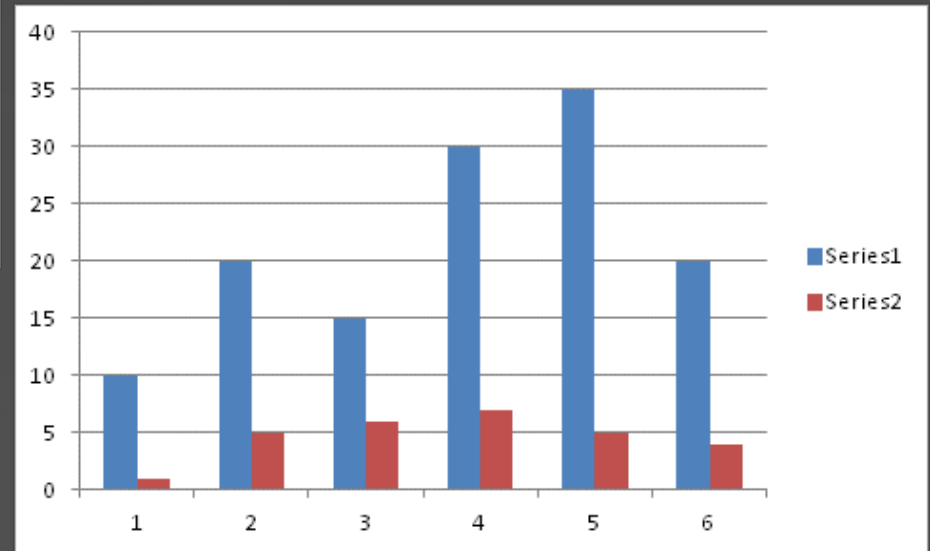
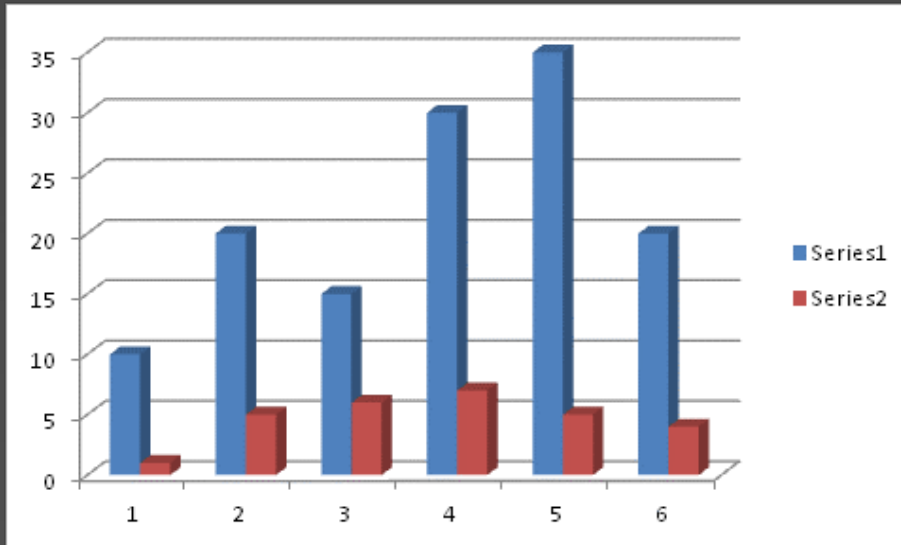
Area



Source: <http://blog.visual.ly/2ds-company-3ds-a-crowd/>

In fact, avoid 3D altogether

- Only use 3D charts if you have 3 dimensions otherwise, turn 3D charts into 2D charts

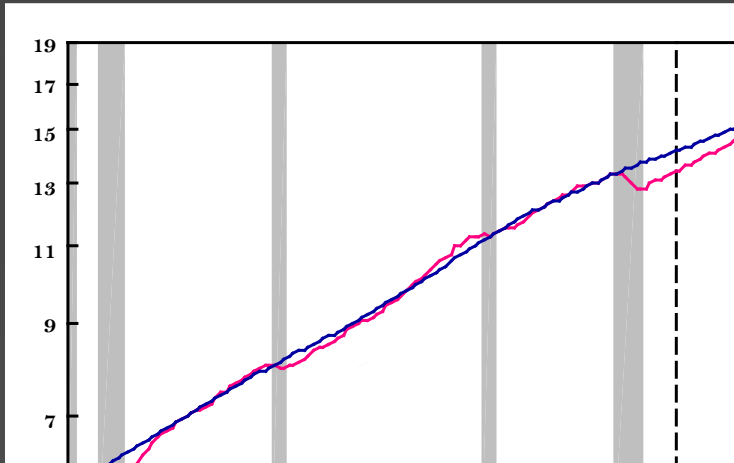


CBO Showcase

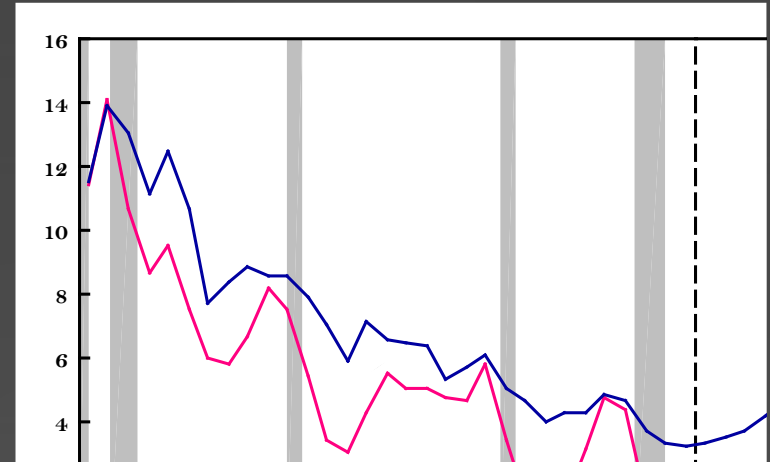
- Budget & Economic Outlook
 - August 2011 and January 2012
- Static Infographics
 - Social Security
 - Federal Budget
 - TARP
 - SNAP
 - Deforestation

Budget & Economic Outlook (August 2011)

Real Gross Domestic Product



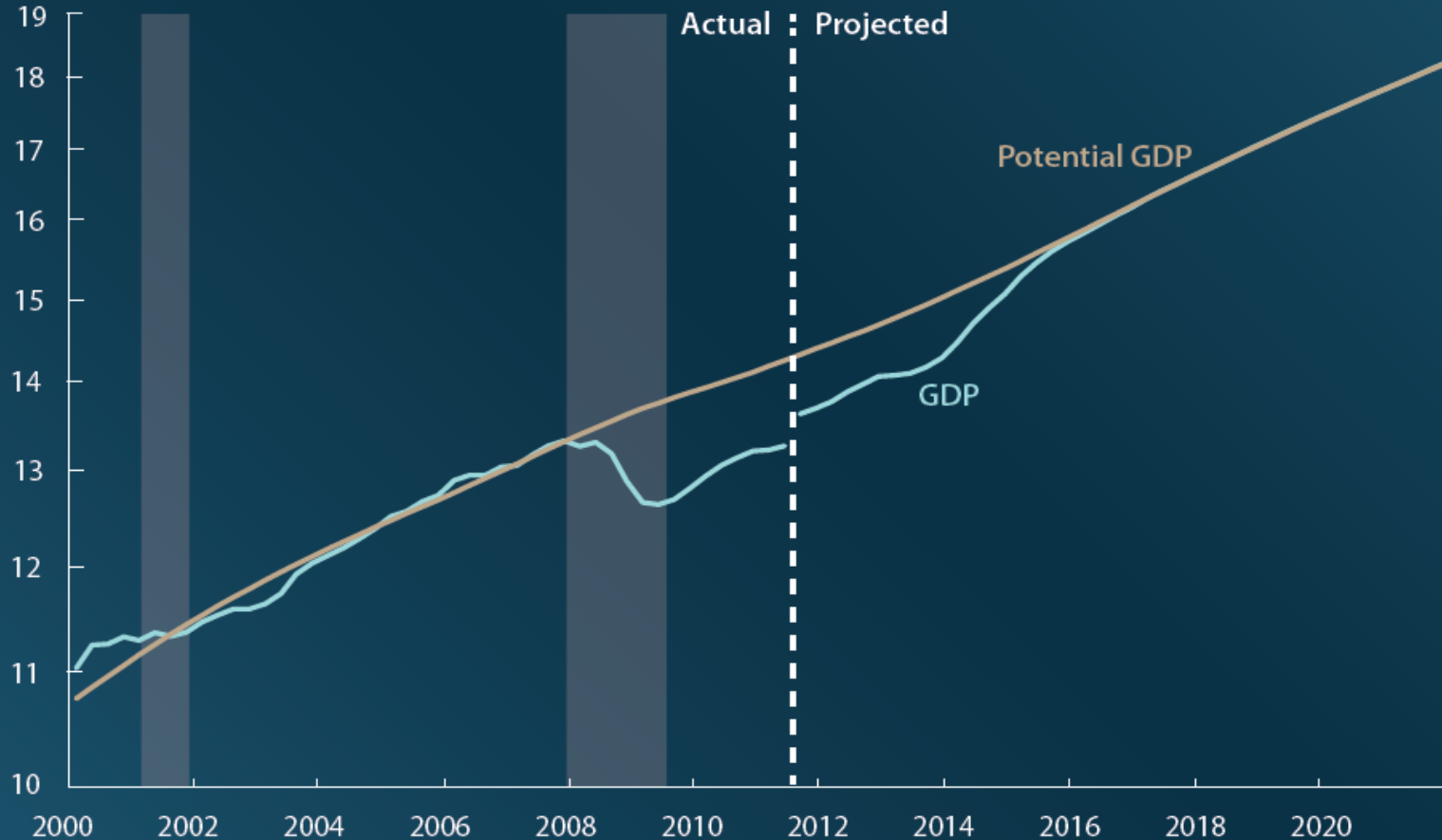
Interest Rates



Real Gross Domestic Product

(Trillions of 2005 dollars, logarithmic scale)

CBO expects that the economic recovery will continue but that real (inflation-adjusted) GDP will stay below the economy's potential—a level that corresponds to a high rate of use of labor and capital—until 2017.



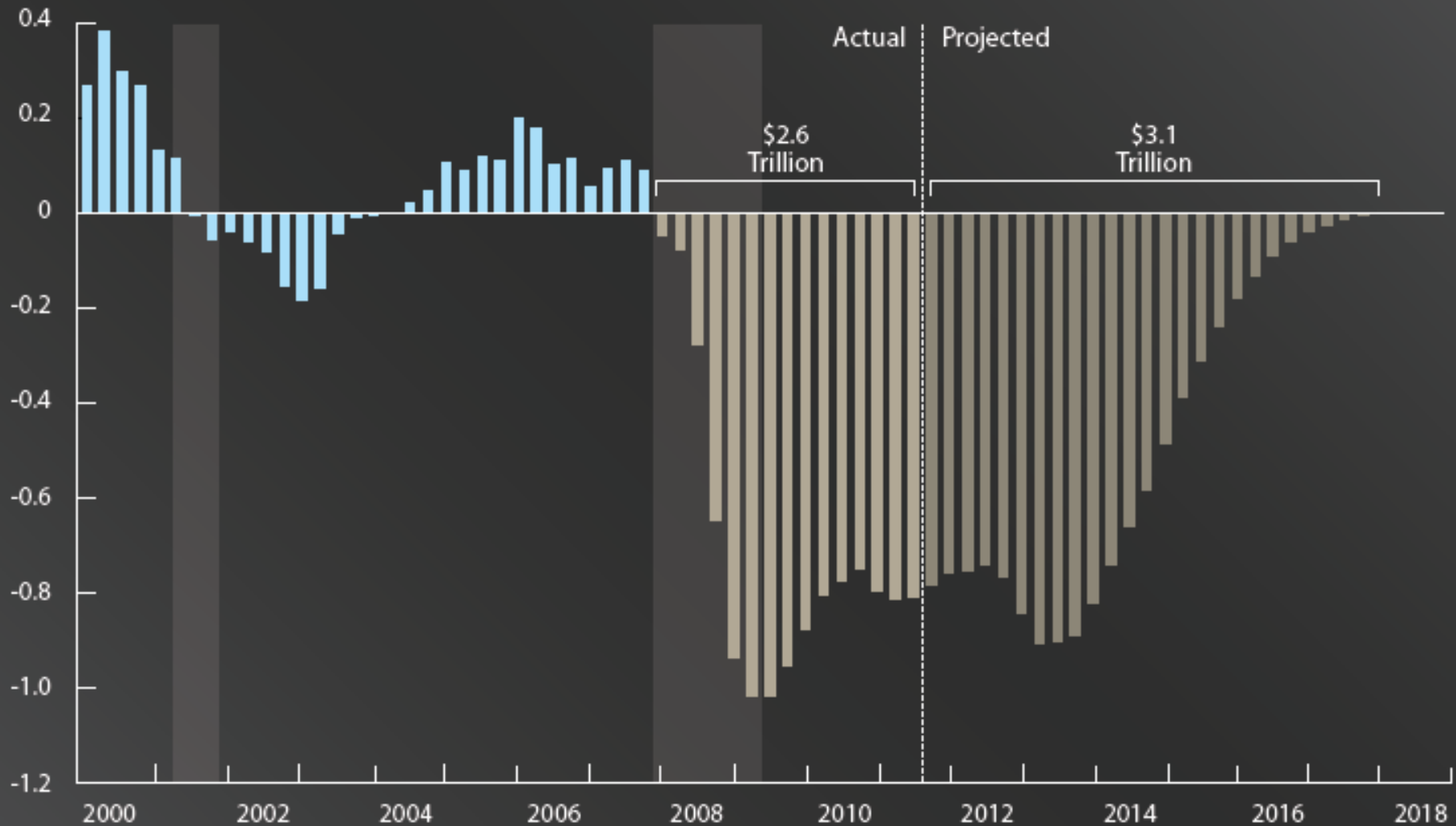
Sources: Congressional Budget Office; Department of Commerce, Bureau of Economic Analysis.

Notes: Real gross domestic product is the output of the economy adjusted to remove the effects of inflation. Potential GDP is CBO's estimate of the output that the economy would produce with a high rate of use of its labor and capital resources. Data are quarterly. Actual data for GDP, which are plotted through the second quarter of 2011, incorporate the July 2011 revisions of the national income and product accounts. Projections of GDP, which are plotted through the fourth quarter of 2021, are based on data issued before the revisions. Shaded bars indicate periods of recession.

Gap Between GDP and Potential GDP

(Trillions of 2005 dollars)

January 2011
<http://go.usa.gov/nf>

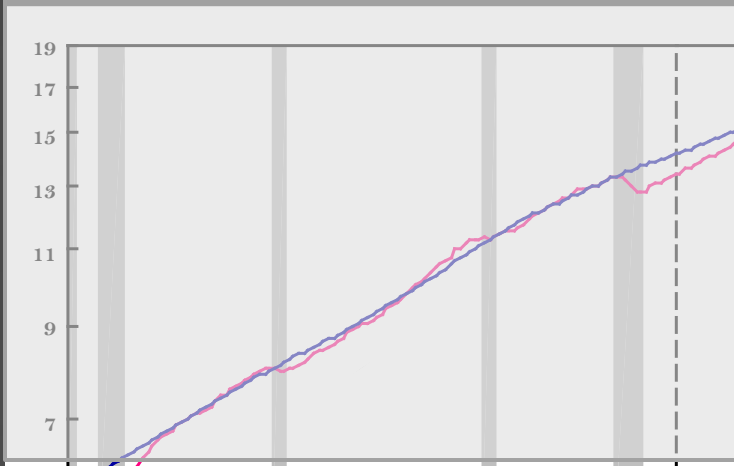


A large portion of the economic and human costs of the recession and slow recovery remains ahead. From the first quarter of the recession through the third quarter of 2011, the cumulative difference between GDP and estimated potential GDP amounted to

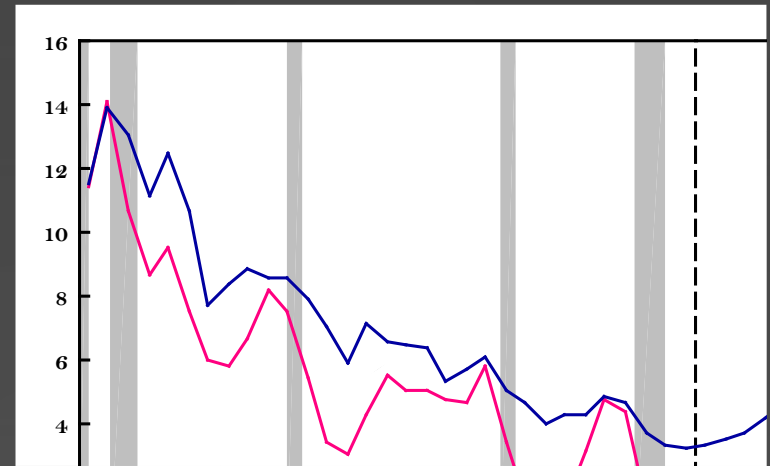


Budget & Economic Outlook (August 2011)

Real Gross Domestic Product



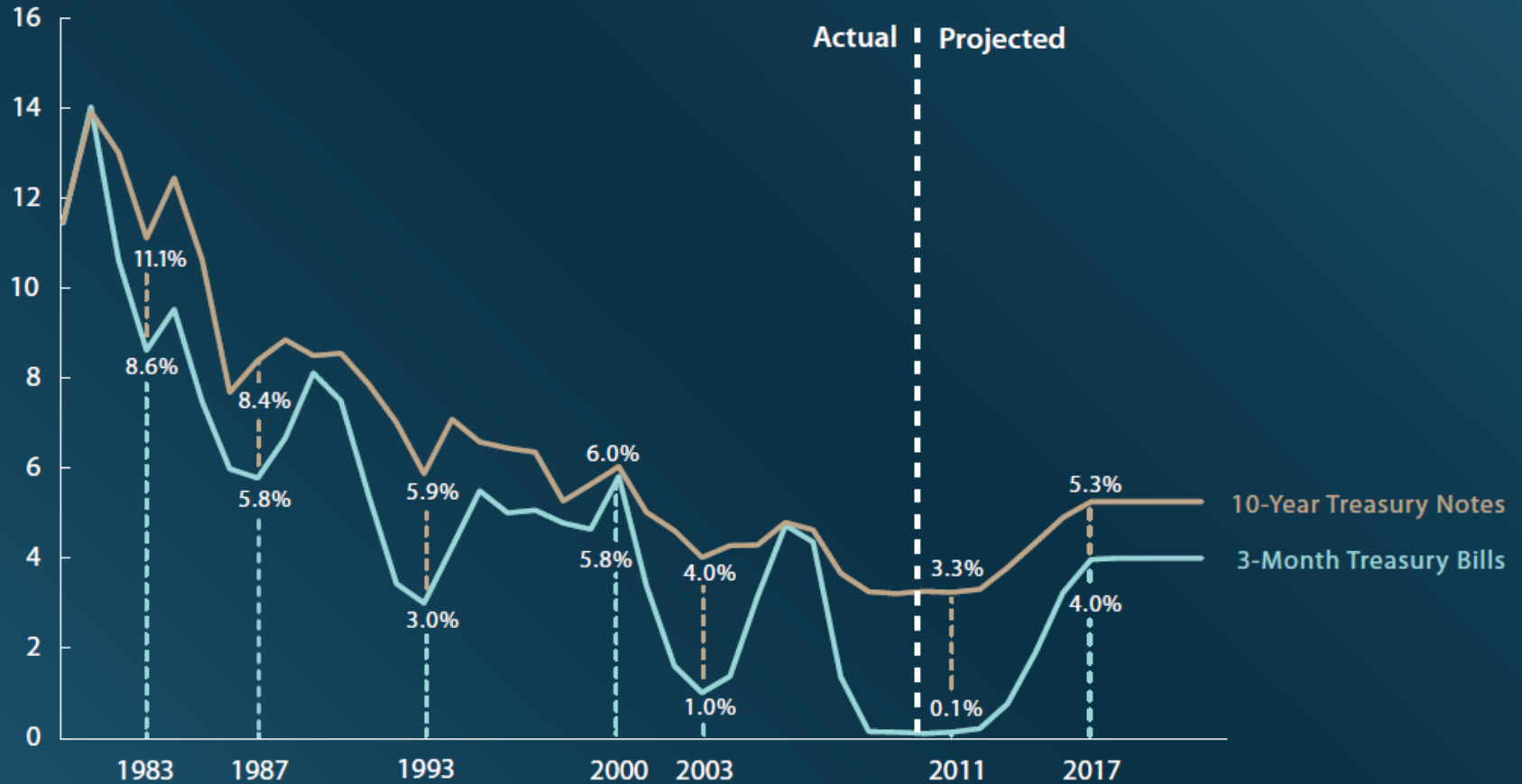
Interest Rates



Interest Rates

(Percent)

Consistent with its forecast of modest economic growth through 2013 under current law, CBO projects that interest rates will remain very low for the next few years and then rise to more-normal levels as output approaches its potential in 2017.



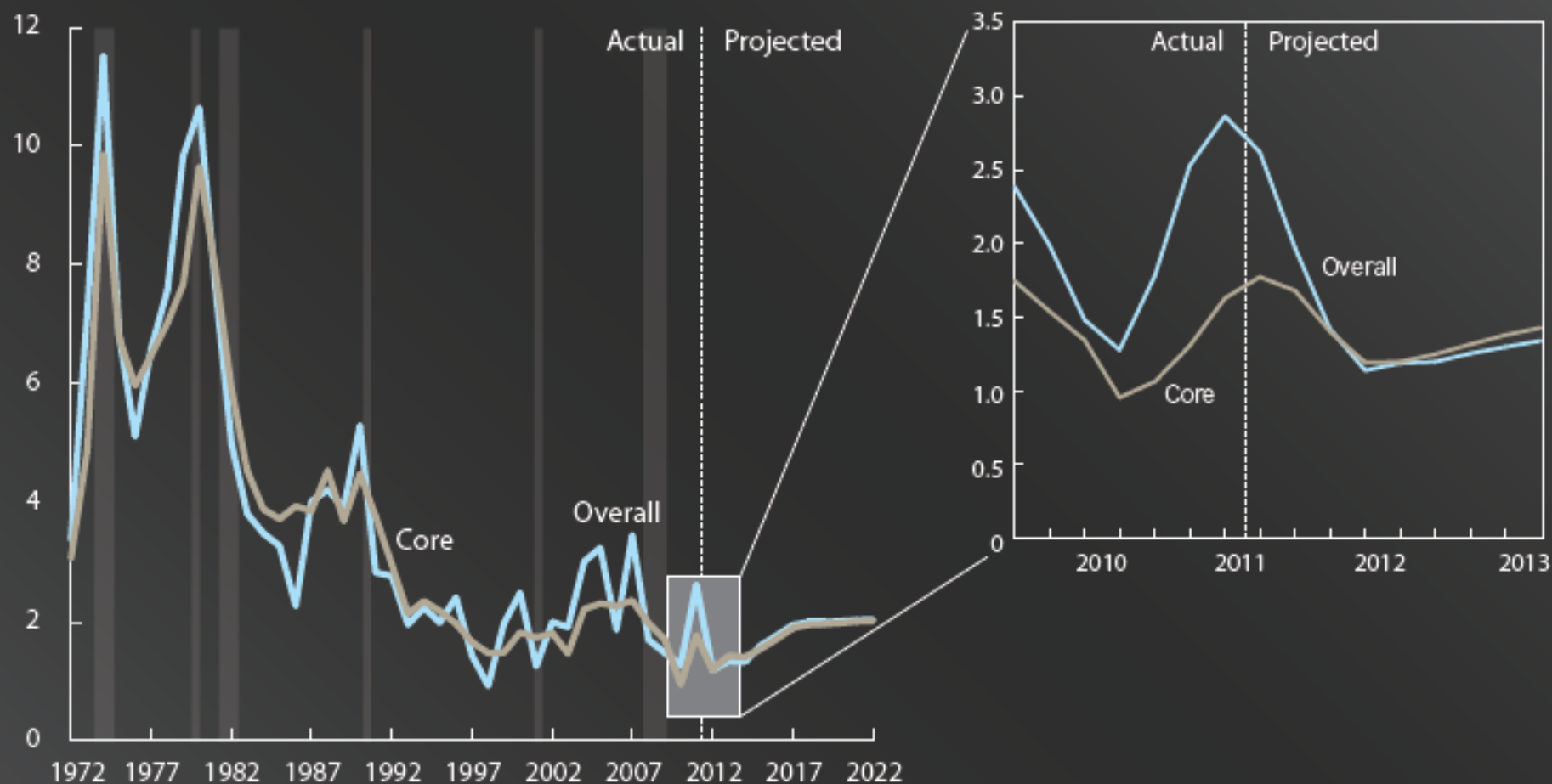
Sources: Congressional Budget Office; Federal Reserve.

Notes: Data are annual. Actual data are plotted through 2010; projections are plotted through 2021.

Inflation

(Percentage change in prices from previous year)

January 2012
<http://go.usa.gov/n>



According to the agency's projections, the price index for personal consumption expenditures (PCE) will increase by 1.2 percent in 2012 (as measured by the change from the fourth quarter of the previous year) and by 1.3 percent in 2013. The core PCE price index—which



CBO Showcase

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Social Security

Sources: Congressional Budget Office, Social Security Administration, Bureau of Labor Statistics, Bureau of Economic Analysis

For more information, see the following CBO publications:
CBO's 2011 Long-Term Projections for Social Security: Additional Information
CBO's 2011 Long-Term Budget Outlook
Social Security Policy Options

CBO's
Long-Term
Projections

SOCIAL SECURITY

Finances of the U.S. Social Security System

56 million

Number of people who will receive Social Security benefits this year, equal to 1/6 of the population

20%

Share of total U.S. budget spent on Social Security in 2010

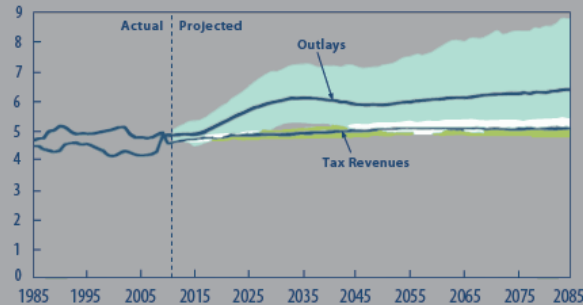
1.6 percentage points

Immediate and permanent payroll tax rate increase required for the Social Security system to be solvent over the next 75 years

19%

Cross-the-board reduction in payable benefits in the year after the exhaustion of the combined Social Security trust funds in 2038

Percentage of GDP



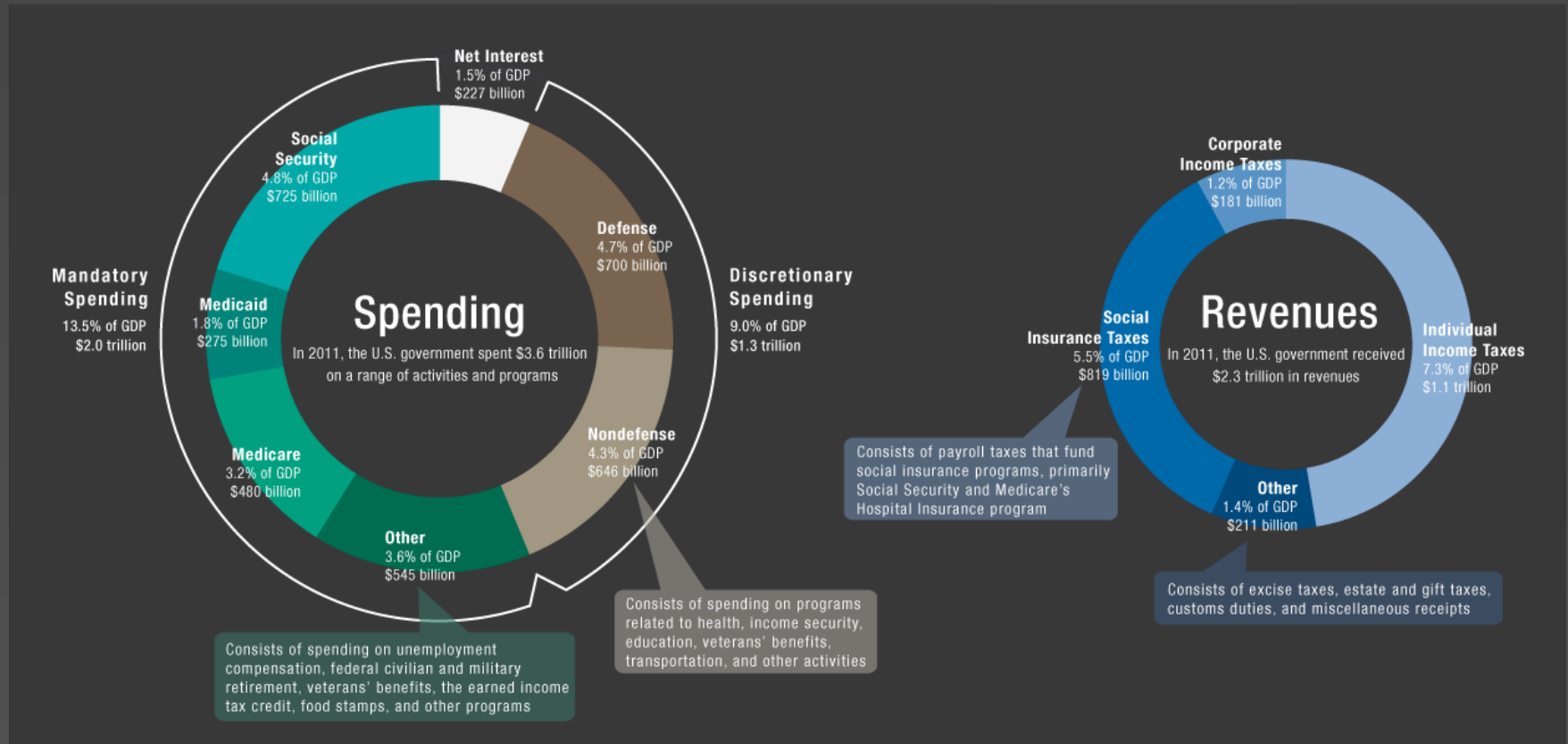
21% In 2010
grows to
36% In 2035

People 65+ as a share of the working-age population

4.9% In 2010
grows to
6.1% In 2035

Social Security spending as a share of GDP

Federal Budget



Mandatory Spending

Discretionary Spending

the
U.S.
FEDERAL
BUDGET

A Closer Look at Mandatory Spending

Primarily benefit programs for which lawmakers set eligibility rules and benefit formulas

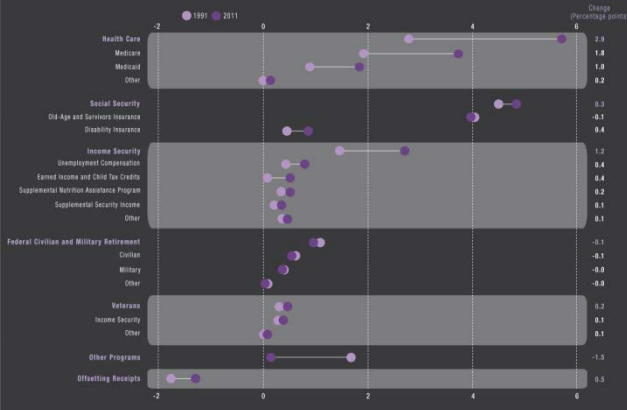


Mandatory Spending at a Glance



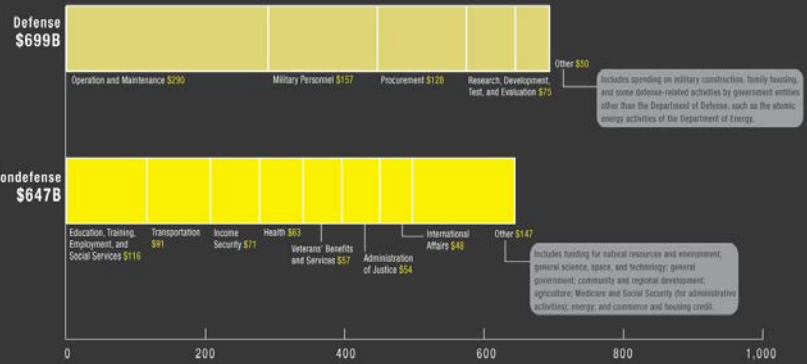
[Mandatory Spending in 1991 and 2011]

Percentage of gross domestic product



[BREAKDOWN of Discretionary Spending in 2011]

Billions of dollars

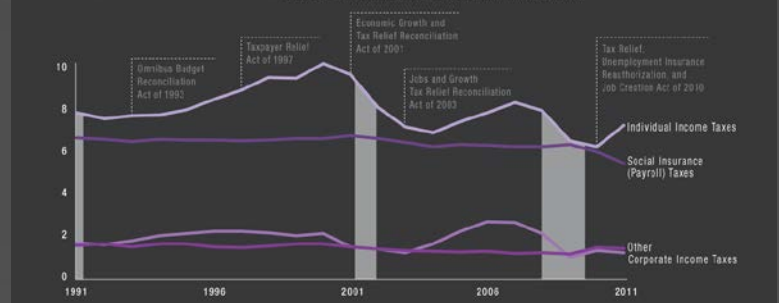


Includes spending on military construction, family housing, and some defense-related activities by government entities other than the Department of Defense, such as the atomic energy activities of the Department of Energy.

Includes funding for national resources and environment; general science, space, and technology; general government, community and regional development; agriculture; Medicare and Social Security (for administrative activities); energy; and commerce and housing credit.

[TRENDS in Revenues]

Percentage of gross domestic product | Shaded bars indicate periods of recession.



Revenues

TARP

Estimated Budgetary Cost

NET COSTS
\$32 billion

CBO's estimate of the cost of the TARP's transactions as measured on a present-value basis. (Present value is a single number that expresses a flow of current and future revenues or payments in terms of an equivalent lump sum received or paid today.)

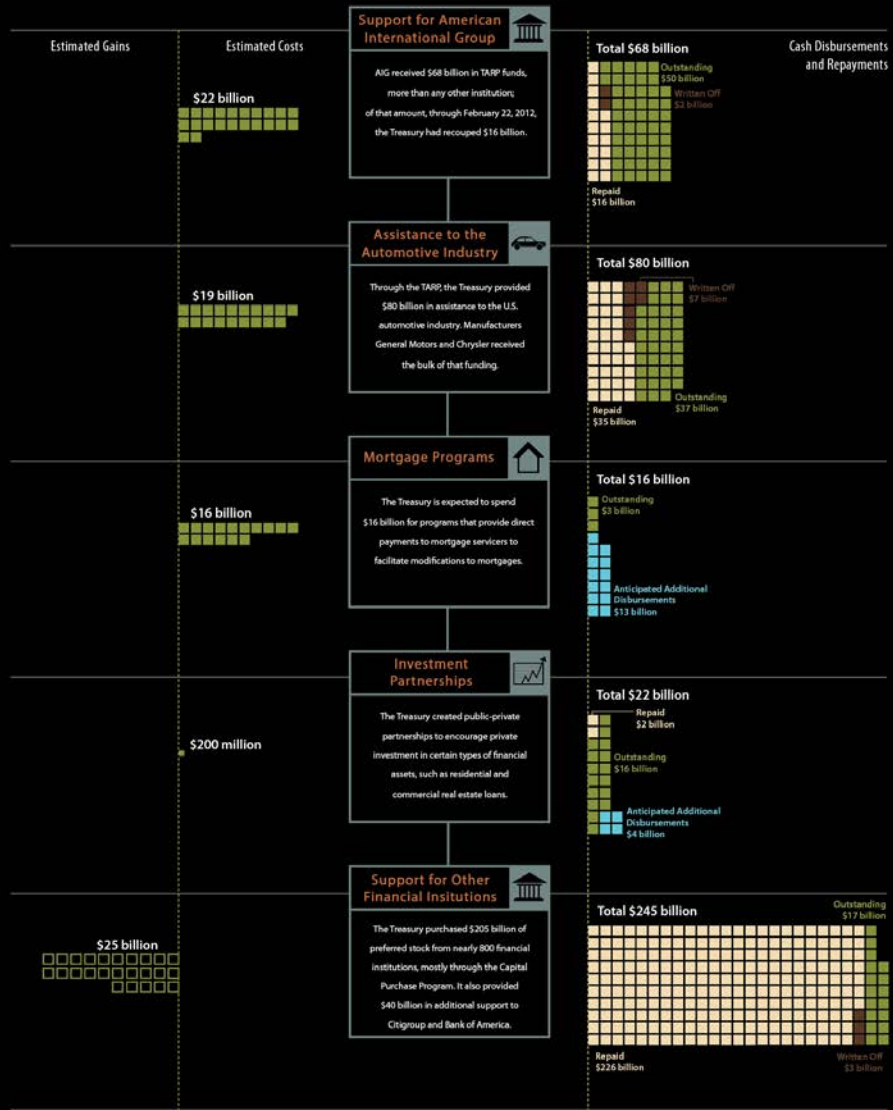
Troubled Asset Relief Program

For more information, see this CBO publication: http://www.cbo.gov/ftp/documents/07-12/TARP_07-12.pdf

Actual and Projected Cash Disbursements

TOTAL DISBURSEMENTS
\$431 billion

CBO's estimate of the total amount of money that will eventually be disbursed to businesses, financial institutions, and others. Most of these disbursements have been or will eventually be repaid. Total disbursements are expected to amount to about 60% of the \$700 billion that was initially authorized.



SNAP



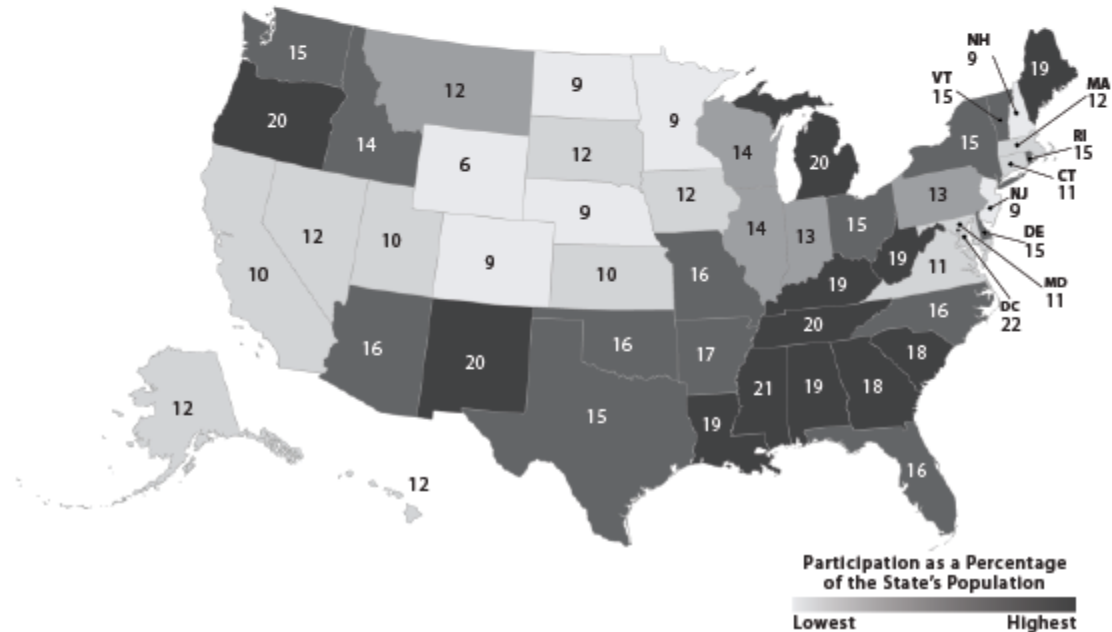
THE SUPPLEMENTAL NUTRITION ASSISTANCE PROGRAM

The Supplemental Nutrition Assistance Program (SNAP), formerly called the Food Stamp program, provides benefits to people in households with low income and few assets to help them purchase food to be eaten at home.

Today's SNAP Population at a Glance

45 million participants received \$134 per month, on average, in 2011

In 2011, 14% of Americans—about 1 in 7—received SNAP benefits



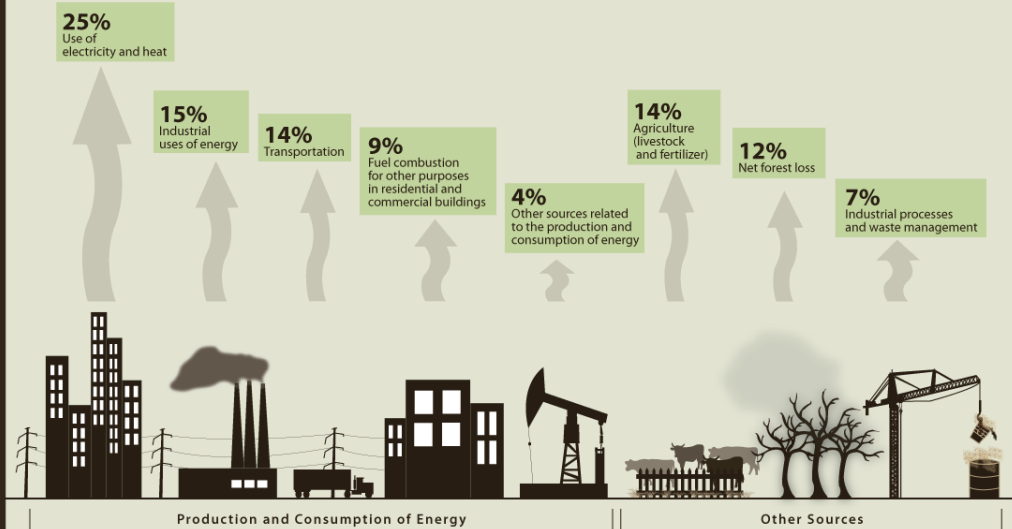
Deforestation

DEFORESTATION AND GREENHOUSE GASES

The destruction and degradation of forestland, caused mainly by expanded agricultural activity in tropical developing countries, currently accounts for roughly 12% of all greenhouse gas (GHG) emissions. Slowing or eliminating forest loss can potentially make a cost-effective contribution to an international effort to reduce global emissions, but that strategy faces a number of challenges.

GLOBAL EMISSIONS OF GREENHOUSE GASES

GHG emissions caused by human activity contribute to climate change. The use of electricity and heat, for example, is responsible for 25% of global GHG emissions. The destruction and degradation of forests contribute roughly 12%.



To wrap up

- We are in the business of presenting information to policymakers and the public
- It does not take a lot of skill or expensive software to make your standard graphs look much better
- Infographics offer a **complementary** way to present information to our constituents
 - They are not meant to replace thorough, in-depth research, but can give the user an alternative perspective and interface and perhaps an introduction into a topic