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THE USES AND MISUSES OF BUDGET DATA

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ABSTRACT

ALTERNATIVE PRESENTATIONS OF the same budget data tend to offer very different impressions, creating opportunities for a deeper understanding of fiscal health. However, these measures sometimes reflect hidden assumptions about government finances, so even a seemingly neutral way of presenting data often isn't so neutral. The ability to give different impressions with the same budget data creates the opportunity for policy mischief, as one can tell very different stories about fiscal policy depending on the measure used. We can assess the appropriateness of various spending adjustments by understanding the underlying assumptions in the measures, how to use the measures analytically, and how they might be used strategically. The paper looks at measures of government spending over time, as well as budget forecasts, to demonstrate this logic in practice. It concludes with a case study of President Obama's fiscal year 2014 budget.

I N DEBATES OVER budgets and new government programs, we are often inter-ested in knowing whether spending, taxes, and deficits are going up or going down. What's noteworthy is not the existence of a debate, but rather that you can use *exactly the same data* and reach opposite conclusions, as recent research about the Affordable Care Act's fiscal consequences shows.[1] Whether you support or oppose the president's health care law, that the same data can be used to reach oppo-site conclusions demonstrates the importance of understanding how the assump-tions we make in budget analyses matter.

To illustrate this phenomenon visually, consider figure 1, which depicts govern-ment spending in four countries. The "United States" line depicts the remarkable growth of US federal government spending since the 1950s. The line for "Country X" shows a less dramatic increase during the same time period. The line for "Country Y" reveals still less dramatic spending increases, with a leveling-off in the 1990s. The line for "Country Z" reflects, comparatively speaking, a much less dramatic rise in government spending, with a steep drop-off in the 1990s.

All these lines are accurate representations of actual government spending data, except all refer to federal spending in the United States. They differ only in how spending is measured. The "United States" line represents absolute dollars, the "Country X" line adjusts the data for inflation, the "Country Y" line adjusts for pop-ulation and inflation, and the "Country Z" line reflects spending as a percentage of economic output (gross domestic product, or GDP).[2]

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1. Charles Blahous, "The Fiscal Consequences of the Affordable Care Act" (Mercatus Research, Mercatus Center at George Mason University, Arlington, VA, 2012), http://mercatus.org/publication/fiscal-conse quences-affordable-care-act.
2. Inflation adjustments are in 2005 dollars and were calculated by the authors of the fiscal year 2014 budget as follows: "The adjustments to constant [inflation-adjusted] dollars are made by applying a series of chain-weighted price indexes to the current dollar data base. The composite total outlays deflator is used to deflate current dollar receipts to produce the constant dollar receipts." Office of Management and Budget, "Historical Tables," in *Budget of the US Government*, Fiscal Year 2014 (Washington, DC: Government Printing Office, 2013), 16. Formally, let unadjusted spending in time t be x, the inflation deflator in time t be a, and the inflation deflator in the base year 2005 be b. Then, inflation-adjusted spending in year t is $(x/a) \times b$. The adjustment for population and inflation uses the inflation-adjusted dollars and accounts for population changes by calculating per capita spending in each fiscal year and

FIGURE 1. GOVERNMENT SPENDING IN FOUR COUNTRIES, 1951–2012
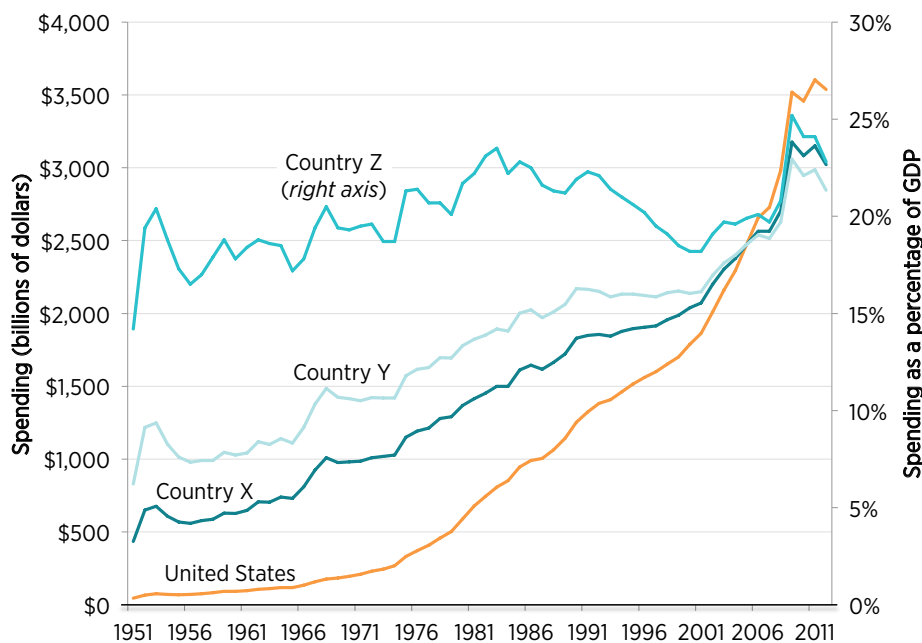
Sources: Office of Management and Budget, "Historical Tables," in Budget of the US Government, Fiscal Year 2014 *(Washington, DC: Government Printing Office, 2013); supplemented by population data from the US Census Bureau, Population Division, table 1, "Intercensal Estimates of the Resident Population by Sex and Age for the United States: April 1, 2000 to July 1, 2010 (US-EST00INT-01)," 2011, http://www.census.gov/popest/data/intercensal/national/nat2010.html, and US Census Bureau, Population Division, table 1, "Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2012 (NST-EST2012-01)," 2012, http://www.census.gov/popest/data/state/totals/2012/.*

We can learn three lessons from this figure:

1. Alternative presentations of the same budget data can create very different impressions, leading to opportunities for a deeper understanding of fiscal health.

2. Budget numbers allow for much mischief. One can tell very different stories about fiscal policy depending on the measure used.

3. Each measure reflects hidden assumptions about government finances. Even seemingly neutral data often are not so neutral.

Edward R. Tufte, considered by many to be the father of information design, laments in his classic *The Visual Display of Quantitative Information* that "the

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then assuming that the population was at the 2005 level in all years. Formally, let inflation-adjusted spending in year t be x', population be y, and 2005 population be z. Then population-adjusted spending in year t is $(x'/y) \times z$. In both calculations, the choice of a base year does not matter for assessing the trends in spending, as long as the same base year is used in all calculations and for all years.

display of government spending and debt over the years . . . nearly always create[s] the impression that spending and debt are rapidly increasing."[3] He calls instead for the presentation of "deflated and standardized" units of monetary measurement, which tend to create a "more accurate" picture of government spending over time.[4]

   "Accurate" is not the best choice of words here. The representations of the US federal budget in figure 1 are all accurate; none is "more accurate" than another. As with models and maps, one should evaluate budget information based on its usefulness for a specific purpose.[5] We can assess the appropriateness of various spending adjustments by understanding the underlying assumptions in the measures, how to use the measures analytically, and how they might be used strategically. The following analysis focuses on government spending, but the analysis also applies to other budget calculations, such as tax revenues and government debt.

Inflation Adjustments

A US dollar in 1975 had a different underlying value than the same US dollar in 1995. Inflation adjustments allow comparisons across years by accounting for these differences, thereby creating a consistent unit of measurement. In many cases inflation adjustment is sensible, and in fact, the remarkable slope in figure 1's inflation-adjusted "Country X" line is perhaps more convincing evidence of government's growth than the unadjusted "United States" line.[6] One challenge in using inflation-adjusted spending is that there are many ways to measure inflation,[7] but this method is usually superior to assuming that inflation is zero (which is what unadjusted spending implicitly does).

Population Adjustments

Population-adjusted spending is usually calculated by dividing total spending by population, creating a measure referred to as per capita spending. It is also possible to calculate such an adjustment by treating population growth like inflation and

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3. Edward R. Tufte, *The Visual Display of Quantitative Information* (Cheshire, CT: Graphics Press, 2001), 65.
4. Ibid.
5. Kevin A. Clarke and David M. Primo, *A Model Discipline: Political Science and the Logic of Representations* (New York: Oxford University Press, 2012).
6. I am not immune to the challenges of budget data presentation. In a 2012 *Los Angeles Times* op-ed, I reported on the increase in government spending over the past decade using the absolute dollars presented in President Obama's 2013 budget. Inflation-adjusted spending would have been a better choice. See David M. Primo, "Obama's Budget Blind Spot," *Los Angeles Times*, February 22, 2012, http://articles.latimes.com/2012/feb/22/opinion/la-oe-primo-micromanager-20120222.
7. Jeffrey Kling, "Using the Chained CPI to Index Social Security, Other Federal Programs, and the Tax Code for Inflation," Testimony Before the Subcommittee on Social Security, Committee on Ways and Means, US House of Representatives, April 18, 2013, http://www.cbo.gov/publication/44083.

adjusting accordingly; that is what the "Country Y" line in figure 1 represents.[8] Both approaches will result in constant adjusted spending as long as spending increases at the same rate as the population does. As a result, spending hikes below the population growth rate are not reflected as increases but rather as decreases in government spending. For instance, if government spending increases by 3 percent in 2013 and the population grows by 3 percent, population-adjusted spending will be unchanged. To give a specific example, from 1991 to 2000, spending increased by about 10 percent in inflation-adjusted terms. But, because population increased by about 12 percent, population-adjusted spending *declined* during that time period.

Analytically, this adjustment allows one to see how fast spending is growing relative to the population over time. It may also facilitate comparisons across states or countries that vary dramatically in population and population growth. Although the formulas to calculate inflation-adjusted and population-adjusted spending figures are similar, the resulting numbers mean very different things. An inflation adjustment simply makes the units of analysis across time comparable (making dollars in each year equivalent). Standardizing budget figures by population implies that government spending is not really increasing unless the government is spending more *per person.* The underlying assumption in population-adjusted data, then, is that spending should always increase proportionally with population.

In other words, there should be no economies of scale in government output; a 1 percent increase in the population should lead to a 1 percent increase in spending. This outcome is unreasonable in the case of a public good like national defense; a 10 percent population increase should not make it 10 percent more costly to defend the nation's borders. Similarly, a 10 percent population increase should not make running the Food and Drug Administration 10 percent more costly. Such a population increase may not even justify a 10 percent increase in education spending, if the school-age population is not increasing.

In this way, population adjustments allow for "hidden" spending increases, since a fast-growing population gives budget makers "free money" to work with before the data reflect a spending increase. Further altering incentives, increasing spending at a rate slower than population growth could be construed as a politically dangerous "cut" to spending.

Adjustments for the Size of the Economy

The final common budget adjustment compares spending to the size of the economy, typically measured as GDP. This adjustment produces identical results regardless of whether one also adjusts for inflation and population, since such adjustments apply to both spending and GDP and "cancel out" of the calculations.

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8. Suppose that population at time t is 100, and in the next year ($t + 1$) it is 105. Spending in time $t + 1$ can be adjusted to reflect population growth by multiplying spending in time $t + 1$ by (100/105).

Spending increases are not registered in this measure as long as they are smaller than the growth rate of the economy.

This measure is very common in economics, in part due to the work of Adolph Wagner, a German economist who in the 1800s proposed the "law of increasing expansion of public, and particularly state, activities," or the idea that as economies grew, demands on government would grow at an increasing rate.[9] In other words, the spending-to-GDP ratio should be increasing over time. Wagner offered many justifications for this law, including that cultural and welfare expenditures are what economists call "luxury" goods and therefore increase at a faster rate than wealth, and that an expanding economy would lead to more complexity, necessitating increased state intervention.[10]

Wagner wrote in the 1800s, when governments and economies were far smaller. He presciently noted that there is an upper bound on how big government can grow before it becomes "oppressive," writing, "There is thus a proportion between public expenditure and national income which may not be permanently overstepped."[11]

Analytically, the measure allows one to understand the weight of government on the private sector. As such, a particular spending-to-GDP ratio may serve as a useful ceiling, as Wagner implied, on the size of government. A related measure, the debt-to-GDP ratio, also helps us understand the size of government debt relative to the size of the economy. While there is debate about just how large such a ratio can get without hurting economic growth, no serious economist questions that there is some upper bound on this figure (though it may vary by country).[12] Spending-to-GDP and debt-to-GDP ratios are very common in current debates over the long-term fiscal health of the United States.

Despite the usefulness of this measure, adjustments for GDP may mask changes in the scope of government because increases are not registered until they satisfy Wagner's Law (i.e., government grows faster than the economy). This fact may bias the budget debate toward *more* rather than less spending by creating the impression that a jump in the economy necessitates a comparable jump in the size of government (or, if you agree with Wagner, a proportionally larger jump).

A decline in the ratio of spending to GDP is viewed as making the government smaller. Yet, if your income goes up by 10 percent and you spend 5 percent more

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9. Adolph Wagner, "Three Extracts on Public Finance," in Richard A. Musgrave and Alan T. Peacock, eds., *Classics in the Theory of Public Finance* (New York: St. Martin's Press, 1994 [1883]), 8.

10. Richard M. Bird, "Wagner's Law of Expanding State Activity," *Public Finance* 26 (1971): 1–26.

11. Wagner, "Three Extracts on Public Finance," 8.

12. For competing perspectives on whether there is a common debt-to-GDP ratio across countries above which economic growth is hurt, see Carmen M. Reinhart, Vincent R. Reinhart, and Kenneth S. Rogoff, "Public Debt Overhangs: Advanced Economy Episodes since 1800," *Journal of Economic Perspectives* 26, no. 3 (2012): 69–86; and Ugo Panizza and Andrea F. Presbitero, "Public Debt and Economic Growth in Advanced Economies: A Survey" (Working Paper No. 78, Money and Finance Research Group, January 2013).

eating out, it would be odd to say that you reduced your dining expenses. It would be more reasonable to say that such an increase is perhaps *affordable*. There is a difference between affordability and whether one ought to spend the money, however. A focus on spending-to-GDP ratios focuses the debate on whether we can afford to spend a particular amount, not on whether we ought to. Both debates are important.

BASELINE BUNGLING

JUST AS THE same underlying budget data can invite very different impressions depending on how they are presented, budget proposals are highly dependent on the starting point for assessing budget changes. This starting point is known in budget process jargon as "the baseline."

The Congressional Budget Office (CBO), which is responsible for analyzing budget proposals, is required to construct a "current law" baseline when constructing long-term budget estimates. This baseline assumes that "current laws generally remain unchanged, so that they can serve as a benchmark against which potential changes in law can be measured."[13] The CBO also calculates "alternative fiscal scenarios," sometimes referred to as "current policy" baselines, estimating "the effects on budget projections of some alternative assumptions about future policies."[14] These distinctions matter. For instance, in its 2013 budget outlook, the CBO's "current law" baseline must assume that Medicare's payment rates for physicians will be reduced beginning in January 2014. These payment adjustments, intended to control the growth of Medicare spending, are based on a "sustainable growth rate" mandated by a 1997 law. As the CBO notes, however, Congress has overridden those scheduled reductions every year since 2003.[15] As this paper goes to press, legislation to permanently alter the formula for physician reimbursement, thereby avoiding the need for a "doc fix" in the future, is under consideration by Congress.

So which baseline is appropriate, current law or current policy? Again, the answer depends on one's goal. Regardless, it is a mistake to treat either of these calculations as estimates of what will *actually* happen. After all, any policy is subject to change by Congress in the future and is subject to many economic assumptions. As the CBO notes, "Even if federal laws remained unchanged for the next decade, actual budgetary outcomes would differ from CBO's baseline projections, perhaps significantly, because of unanticipated changes in economic conditions and other factors that would affect federal revenues and spending."[16]

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13. Congressional Budget Office, "The Budget and Economic Outlook: Fiscal Years 2013 to 2023," CBO Publication No. 4649, 2013, 2, http://www.cbo.gov/sites/default/files/cbofiles/attachments/43907 -BudgetOutlook.pdf.
14. Ibid., 30.
15. Ibid., 31.
16. Congressional Budget Office, "Updated Budget Projections: Fiscal Years 2013 to 2023," CBO Publication No. 4722, 2013, 2, http://www.cbo.gov/sites/default/files/cbofiles/attachments/44172-Baseline2.pdf.

Both of these estimates model hypothetical worlds that we will never see in practice. The current law baseline ignores political realities such as Congress's likely unwillingness to reduce physician reimbursements under Medicare. A current policy baseline produces estimates of federal debt that show why the current political path is not feasible. The alternative fiscal scenario outlined by the CBO in 2011, for instance, projected that by 2085, federal spending will consume approximately 75 percent of the entire US economy.[17] The usefulness of this scenario is that it highlights that current policies are not sustainable in the long run. It is the scenario's sheer implausibility that gives it value as a tool for demonstrating the need for a change in the politics of budgeting.

Much ink has been spilled on the technicalities behind these calculations, and there is a never-ending battle between Democrats and Republicans over the definition of "cuts." These semantic debates are unhelpful, as spending almost always increases over time. In fact, federal spending has been cut in inflation-adjusted terms just eight times in the last 50 years, and spending never declined in two consecutive years during that time period. The last time that happened was in the 1950s.[18]

Rather than think in terms of cuts vs. increases, or in terms of one estimate being more or less "realistic" than others, it makes more sense to consider whether various scenarios increase, decrease, or keep constant the pressure of the federal budget on the private sector. This consideration moves the discussion away from cuts vs. increases (which have little meaning in a world in which spending is nearly always increasing) and toward a discussion of the budget's *sustainability*.

A CASE STUDY: OBAMA'S 2014 BUDGET

PRESIDENT OBAMA'S BUDGET proposal for the 2014 fiscal year provides 10 years of spending and revenue estimates, taking into account his vision for the direction of the federal government over the next decade. Figure 2 shows this budget in absolute dollars, inflation-adjusted dollars, inflation-and-population-adjusted dollars, and spending as a percentage of GDP. Depending on which set of values you look at, spending will either increase or slightly decrease over the next 10 years.

It would be difficult to argue that Obama's budget cuts spending to any significant degree. Yet, by comparing the proposal not with current spending but with beliefs about the trajectory of future spending (i.e., baselines), as figure 3 does (using percentage of GDP), it becomes possible to claim that the budget cuts, increases, or does very little to spending depending on the year and baseline used.

17. Congressional Budget Office, Data Underlying Scenarios and Figures for "2011 Long-Term Budget Outlook," CBO Publication 4277, 2011, http://www.cbo.gov/publication/41486. Data download available at http://www.cbo.gov/sites/default/files/cbofiles/attachments/2011-ltbo-supplemental-data.xls.
18. These results are based on calculations using data from OMB, "Historical Tables," in *Budget of the US Government, Fiscal Year 2014* (Washington, DC: Government Printing Office, 2013), http://www.white house.gov/sites/default/files/omb/budget/fy2014/assets/budget.pdf.

FIGURE 2. THE FISCAL YEAR 2014 OBAMA BUDGET
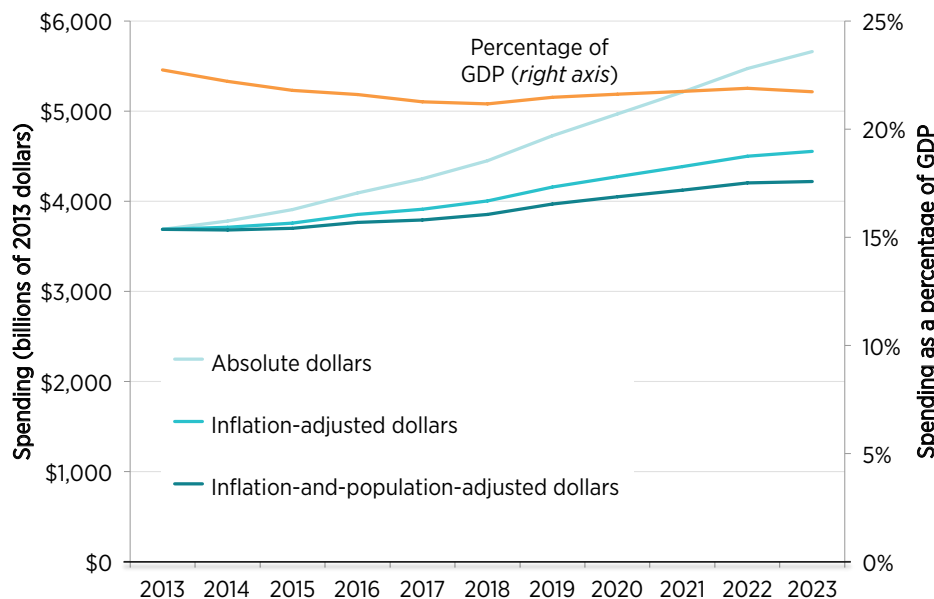
Sources: Spending and GDP estimates are from OMB, Budget of the US Government, Fiscal Year 2014. *Inflation estimates are from CBO, "Baseline Economic Forecast—February 2013 Baseline Projections," http://www.cbo.gov/publication /43902. Population estimates are from US Census Bureau, Population Division, table 1, "Projected Population by Single Year of Age, Sex, Race, and Hispanic Origin for the United States: 2012 to 2060," 2012, http://www.census.gov/pop ulation/projections/data/national/2012/downloadablefiles.html.*

   Not surprisingly, then, the debate between Republicans and Democrats over whether the president's budget increases or reduces government spending often revolved around disputes about baselines. For instance, the conservative Heritage Foundation published on its blog, "CBO Shows $1 Trillion Tax Hike, Fake Spending Cuts," with the latter referencing how the president would replace sequestration-related spending cuts with other cuts, leading to zero net change in spending (if you take the sequester as a credible statement of policy moving forward).[19]

   None of these analyses is wrong, *if you accept the assumptions underlying the analyses*. In other words, by changing the assumptions, one can paint very different pictures of an identical budget. When these analyses become problematic is when the underlying assumptions are hidden, or when media coverage does not explain these nuances. To the extent that these debates influence budget outcomes, the arcane-seeming assumptions become vitally important.

   But even these debates miss another crucial assumption in budgeting: the 10-year

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19. Romina Boccia, "Obama Budget: CBO Shows $1 Trillion Tax Hike, Fake Spending Cuts," *Foundry* (Heritage Foundation), May 17, 2013, http://blog.heritage.org/2013/05/17/obama-budget-cbo-shows -1-trillion-tax-hike-fake-spending-cuts/print/.

FIGURE 3. BUDGET FORECASTS, 2013–2023
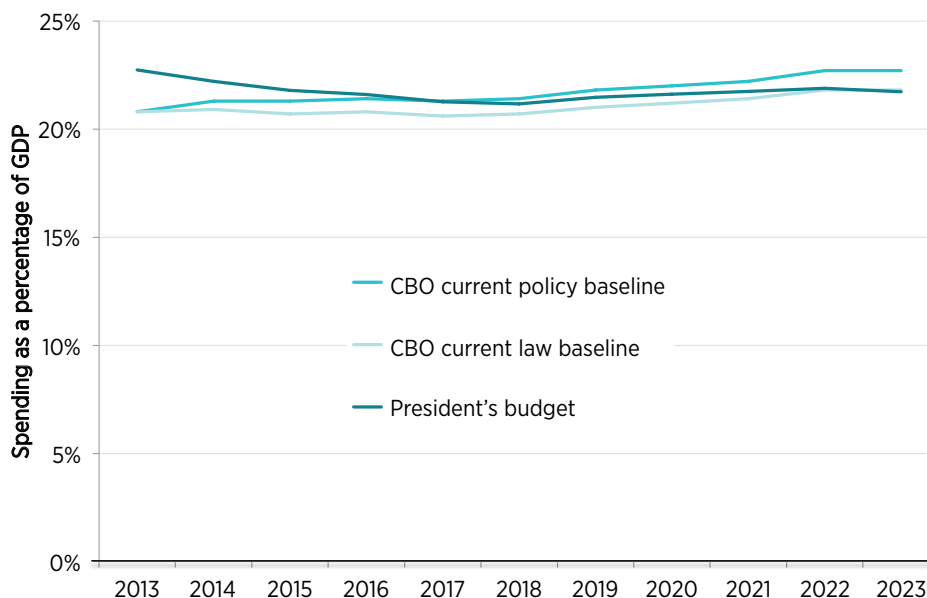
Sources: CBO, "Baseline Economic Forecast—February 2013 Baseline Projections," http://www.cbo.gov/publication /43902; Office of Management and Budget, "Historical Tables," in Budget of the US Government, Fiscal Year 2014 *(Washington, DC: Government Printing Office, 2013).*
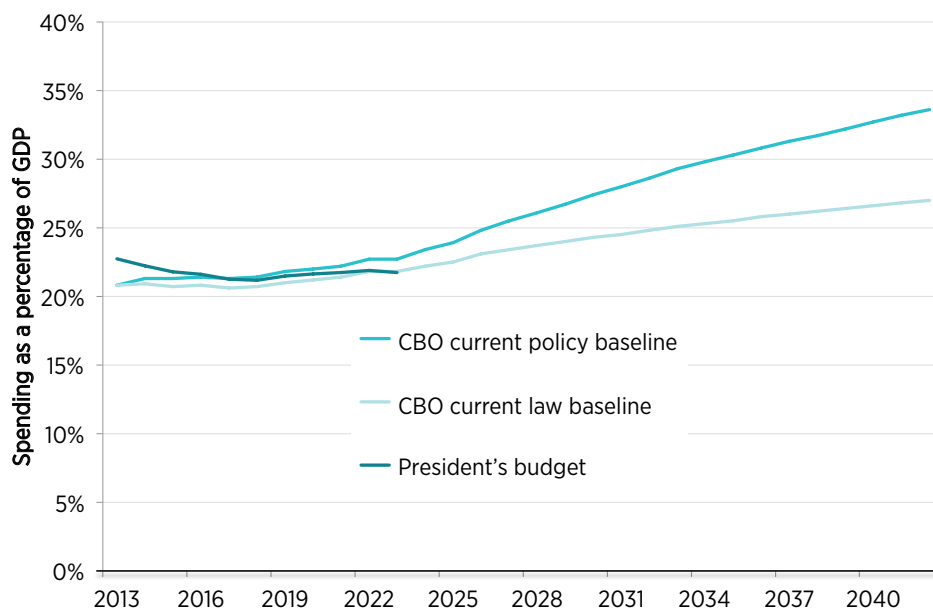
window. As Tufte writes, "Graphics must not quote data out of context."[20] The context in this case is the increasing pressure that entitlement spending will place on the federal budget beyond 2023, as figure 4 demonstrates.

A 10-year budget window is not appropriate for thinking about the long-term implications of budget decisions being made today (or, in the case of entitlements, not being made today). It's like assessing the consequences of a 15-year-old's smoking habit by looking at the effects over the next 10 years and assuming that he will quit at 25. Just as the decision to start smoking at 15 cannot be assessed by assuming you will quit at 25, a new spending or tax program enacted today cannot realistically be expected to end in 10 years.

Yet the current budget process typically proceeds using a 10-year window. Even worse, the costs of legislation are typically measured ("scored," using the language of budgeting) for 10 years after enactment. In addition to being incomplete, this method of scoring invites manipulation. For instance, if legislators want to make a new program seem less costly, they can create benefits that do not take effect until 11 years after the law's enactment. Senator Jeff Sessions, R-AL, claims that this sort of manipulation was

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20. Tufte, *Visual Display of Quantitative Information*, 77.

FIGURE 4. BUDGET FORECASTS, 2013–2042

used to make the costs of an immigration bill seem smaller by delaying "illegal immigrants'" eligibility for programs like Medicaid and food stamps.[21] On the tax side, similar criticisms were leveled against how budget estimates portrayed the Bush tax cuts.[22] President Obama's health care reform legislation, the Affordable Care Act, has also been criticized for being dubiously advertised as deficit-reducing in its first 10 years.[23]

CONCLUSION

TUFTE WRITES THAT graphics should "avoid distorting what the data have to say."[24] While distortions are of course problematic, this dictum should be modified, since

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21. United States Committee on the Budget, Republicans, "Ranking Member Sessions Comments on CBO Score of Immigration Bill," press release, June 18, 2013, http://www.budget.senate.gov/republican /public/index.cfm/press-releases?ID=4721ee89-5503-4c00-a9a0-5fcfb92b631c.

22. See David S. Broder, "Trillion-Dollar Gimmick: Extending Bush's Tax Cuts through Sleight of Hand," *Washington Post*, February 19, 2006, http://www.washingtonpost.com/wp-dyn/content/article/2006/02 /17/AR2006021701848_pf.html.

23. See Douglas Holtz-Eakin, "The Real Arithmetic of Health Care Reform," *New York Times*, March 20, 2010, http://www.nytimes.com/2010/03/21/opinion/21holtz-eakin.html; and Blahous, "Fiscal Consequences of the Affordable Care Act."

24. Tufte, *Visual Display of Quantitative Information*, 1.

it implies that data have a message independent of their construction. As this paper has shown, what the data say depends on both how they are constructed and how they are used. The message implied by a "neutral" reading of certain data may itself be a distortion.

Budget data and models are *tools*, and as such, as you consider which measures to use in any assessment or analysis of budget figures, the key is to understand what your purpose is and which measure can best help you achieve that goal. And, as you read the analyses performed by others, it is important to understand how the measures selected may influence the results.