# Budgeting for Fiscal Uncertainty and Bias: A Federal Process Proposal

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Balanced budget constraints have forced sub-national governments to anticipate and mitigate the adverse effects of fiscal shocks on budget balance, services, and tax rates. By contrast, the federal government responds to negative budget surprises with increased borrowing. That response is consistent with short-term economic stabilization, national security, and assisting those suffering loss. Nonetheless, an automatic default-to-debt response requires a routine means of restoring debt to planned levels. Otherwise, increases in public debt imply unplanned increases in future tax rates, reduced fiscal flexibility, lower income, and allocative inefficiency. We propose a procedural offset to debt drift from shocks and planning bias.

There is one sad fact about your baseline forecast: you will be wrong. Expect it and get used to it.
John Mikesell (2014), p. 584, advising aspiring budget analysts.

## INTRODUCTION

The current federal budget process is widely regarded as dysfunctional. In fact, the Congress often is unable or unwilling to adopt a budget resolution; appropriations are frequently enacted after the beginning of the fiscal year; self-imposed government shutdowns are a recurring threat; long-term budget projections show debt as a share of GDP rising without limit; budget outcomes are often inconsistent with the objectives of stability, efficiency, and equity. Despite this systemic failure, we offer a proposal that would establish only a routine procedure for correcting systematic annual errors in the budget deficit. Our proposal therefore is disproportionate to the scale of required reform. Nonetheless, we claim that small changes in process are a potentially fruitful path to an improved process because, absent a grand bargain to fix everything, no alternative exists to marginal, piecemeal change. And, the process of making modest

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adjustments may enable participants to learn to make bigger ones.

**APPLICATIONS FOR PRACTICE**

- Virtually all budget outcomes are uncertain and will differ from planned values.
- Budget professionals should routinely monitor and record differences between planned and actual budget values.
- "Errors" should be analyzed systematically as to cause for use in:
  - explaining variances to policymakers and the public;
  - testing for and correcting bias in budget plans;
  - identifying likely ranges of favorable and unfavorable future outcomes; and
  - developing contingency plans for those eventualities.

*Budgeting and Uncertainty*

Budgeting is a sub-function of the planning process, which requires full use of relevant, forward-looking information. One datum to that process is uncertainty: budgets will inevitably entail errors because events will not unfold precisely as expected.[1] Stated differently, budget results consist of two components, expected and stochastic (Burman and Phaup 2012). The stochastic element is driven by unpredictable, even improbable, Black Swan events including financial system breakdowns, defense emergencies, natural disasters, and the emergence of unanticipated policy developments such as the Veteran Affairs Department medical care scandal and the zero-interest lower bound on monetary policy (Talib 2010).

An *additional* but closely related source of budget error is human bias toward optimism. Because visualizing a plan's success is cognitively easier than anticipating the large number of specific adverse events that could derail it, budget framers are inclined to underweight the probability of revenue shortfalls and outlay overages. In fact, most plans, including budgets, are close to best-case scenarios, rather than realistic expectations. Kahneman (2011) refers to this tendency to anticipate favorable outcomes as the "planning fallacy." He also acknowledges that not all over-optimism in planning is innocent; it may be intended to rally support for the proposed plan.

Depending on the source, budget errors *may* be consistent with the objectives of budgeting. Those errors that result from a planned, automatic response of policy to contingent events, both favorable and adverse, are likely welfare enhancing. For example, unexpected budget deficits or surpluses from recessions or rapid economic expansions, are consistent with the goal of short-term economic stabilization. Similarly, plan errors in outlays, revenues, and the deficit from natural disasters, public health or defense emergencies—or their absence—are contingent short-term responses to unpredictable events. Those responses, both automatic and discretionary, correspond to the explicit intent of policy makers.

By contrast, budget errors that result from the systematic under-allowance for adverse events are likely inconsistent and inefficient with respect to policy goals.

In both cases, systematic budget error in deficits moves the national debt away from its long-term target path. Although in concept this could result in a debt that is too small, the more

1. Auerbach (2014), "Fiscal Uncertainty and How to Deal with It," which treats many of the issues addressed here, became available after this paper was in final edit. Auerbach's paper, with commentary by Peter Diamond and Charles F. Manski, alternative views by Henry Aaron, and related presentations are at http://www.brookings.edu/events/2014/12/15-long-run-outlook-federal-budget.

probable and politically difficult-to-address risk is toward a debt that is too large relative to the long-term or inter-temporal budget constraint. Budget errors from bias toward over-optimism contribute unequivocally to upward drift in the debt.

The risk of systematic bias toward deficits and debt from budget errors can be managed by monitoring budget results and adopting a routine correction in the budget process. This paper estimates the distribution of annual U.S. federal budget errors over the last three and a half decades and disaggregates them by source: random fiscal shocks and all other, including cognitive bias. We also assess the extent and direction of bias and propose a procedural remedy for both types of error. For the period prior to the 2008–9 recession and the unusually slow recovery that followed, we find no evidence of bias in budget errors due to random shocks. However, planning bias appears to have added an average of $25 billion per year in unplanned increases to the national debt during a period of relative fiscal stability that ended in late 2007 and over $100 billion per year following the onset of the "great recession."

## MEASURING FEDERAL BUDGET UNCERTAINTY AND BIAS

Budgeting for uncertainty requires a quantitative description of the degree to which budget results are likely to differ from budget plans. One way of obtaining and using this information is by estimating a probability distribution of budget deviations or errors from past differences between enacted budget plans and actual revenues, outlays and deficits. In the present case, because we are interested in distinguishing random uncertainty in budget outcomes from systematic errors that result from excessive optimism by budget framers, we need one distribution of total error for the budget plan and another for the minimum or purely unpredictable errors that result from stochastic shocks.

Our estimates of those distributions benefit from the earlier work of the Office of Management and Budget (OMB) and the Congressional Budget Office (CBO) in calculating distributions of deviations of actual budget numbers from their winter[2] baseline projections for the budget year (and the following four years [since 1996, following ten years]) (CBO 2007, 2008a,b,c; OMB 2014).[3] Both budget agencies have used historical data on budget errors to characterize the uncertainty of budget projections by depicting confidence intervals around their baseline projections for the deficit.[4] Those studies show that federal budget errors are consistent with a normal distribution and that the mean of errors is sufficiently close to zero that, given relatively large variances, the hypothesis of a population mean of zero cannot be rejected at any reasonable

2. These projections for the fiscal year beginning October 1 are usually prepared by OMB in the previous November and by CBO in the previous December–January.

3. We also benefit from earlier research aimed at increasing accuracy in revenue forecasts (Auerbach 1999; Penner 2008), demonstrating that national governments can save surpluses for future use (Posner and Gordon 2001), and improving management of and budgeting for losses from natural disasters (Cummins, Suher and Zanjani 2010; Phaup and Kirschner 2010).

4. See, for example, *Analytical Perspectives*, Budget of the U.S. Government Fiscal 2015, Chart 2–4, p. 19 www.whitehouse.gov/sites/default/files/omb/budget/fy2015/assets/econ/analyses.pdf.

confidence level. They also confirm that the largest budget deficit errors in the last several decades have resulted from downturns in economic activity.

While errors from the winter baselines can be useful indicators of budget uncertainty early in the process, those projections are prepared using the information available at the beginning of budget formulation; they do not constitute an enacted budget nor are they likely to be as accurate as the projections prepared after the planning process is complete.

Calculating errors from an enacted U.S. budget plan, however, faces major hurdles, including, as often noted, the U.S. does not have an ex ante enacted budget. The President's budget is a proposal and the Congressional Budget Resolution is a plan that is used only by the legislative branch. Nonetheless, the Congressional concurrent resolution is the closest that the U.S. government comes to producing an enacted "budget" plan. The resolution's claim to that status would be stronger if the resolution were "joint" and signed by the President, which is required to enact the laws necessary to execute the plan. Further, for seven of the last 16 fiscal years (FY 1999, 2003, 2005, 2007, 2011, 2012, 2013), the Congress failed to adopt a concurrent resolution on the budget.

Despite those shortcomings, the absence of a more suitable alternative leaves little choice but to treat the concurrent resolution as the final stated intent of policy makers for the coming fiscal year for purposes of calculating total budget errors. For those years without a resolution, we use the numbers specified in the previously enacted resolution for the next budget year as a proxy for an enacted budget. That previous resolution remains enforceable until the Congress adopts another.

To approximate the smallest feasible budget errors, we use the CBO late summer (August–September) baseline projection for the budget year that begins October 1. We do so due to the absence of a better alternative and despite several limitations of this measure. For example, CBO is required to project spending and revenues based on current law rather than on legislation that Congress is likely to enact. If Congress has not completed action on appropriations bills for the next fiscal year, CBO must project appropriations for the budget year at the current year level adjusted for inflation. Despite its limitations, we expect this projection to have smaller errors than earlier projections because it includes the estimated effects of all budgetary actions taken by Congress and the President to-date and CBO's most recent economic forecast. In addition, the CBO projection is consistently available in a format that facilitates direct comparison with aggregate budget results. Also, of key importance, there is little evidence in the historical record to suggest that CBO's projection is affected by political or strategic considerations (Joyce 2011).

## RESULTS

We first report errors from the Budget Resolution. Then we use the CBO late summer errors to separate resolution errors into those due to random shocks to the economy and budget and those due to all other causes including over-optimism associated with the planning fallacy.

### *Congressional Budget Resolution Errors*

For the period 1976–2013, the Congressional Budget Resolution under predicted the actual deficit by an annual average of $83.3 billion (Table 1). The error consisted of an annual average

**TABLE 1**
**Average Annual Deficit Errors (1976–2013), Concurrent Budget Resolution, and CBO Late Summer Baseline ($ billions)**

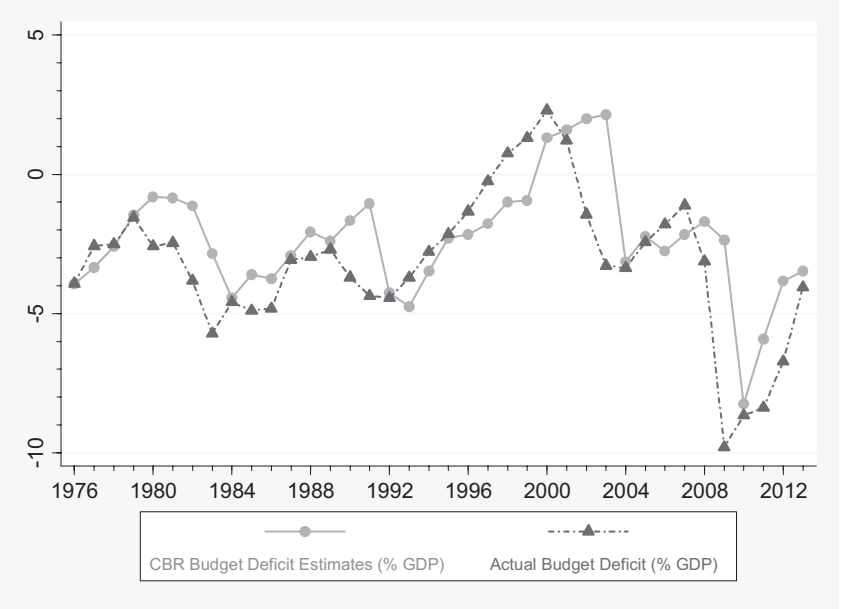
| Period | Budget resolution | CBO baseline | Difference |
|---|---|---|---|
| 1976–2007 | 25.0 | −0.2 | 25.2 |
| 2008–2013 | 380.7 | 263.3 | 117.4 |
| 1976–2013 | 81.2 | 41.4 | 39.8 |

*Source*: Authors' calculations.

overestimate of revenues ($52.7 billion) and an annual average underestimate of outlays ($30.6 billion). If we exclude the data for the most recent recession and slow recovery (2008–13), the annual average error for the deficit drops to $25 billion, virtually all of which is due to under-estimated outlays. (The average annual over-estimate of revenues was $20 *million*.) This suggests that any over-optimism on the part of budget framers during the first 30 years of the budget resolution—a period of exceptional economic stability—primarily affected expectations of outlays.

As evident in Figure 1, the Resolution's expected deficits lag turning points in the direction of change in the actual deficit, which is consistent with the unpredictability of fluctuations in the economy. Those lags also are expected for CBO's projections, even though CBO has the benefit of later readings on the economy.

**FIGURE 1**
**Concurrent Budget Resolution (CBR) Deficits and Actual Budget Deficits (1976–2013)**



*CBO's Late Summer Projection Errors*

Final budget projections for the next fiscal year by CBO have been quite close to actual outcomes on average.[5] For the entire period 1976–2013, CBO's deficit projections have underestimated the actual budget deficit by an average of $41.4 billion, or about 2.5 percent of average annual outlays or 0.5 percent of average GDP. [6] The average error is due to an average annual $46.7 billion over-projection of revenues, offset partly by an annual average $5.3 billion overestimate of total outlays.

If we exclude the great recession of 2008–2009 and the slow recovery that has followed, CBO's projections are much closer to actual results. For fiscal years 1976–2007 inclusive, CBO's average deficit error is an overestimate of $0.2 billion. That error resulted from an average annual overestimate of revenues of $4.4 billion, offset by an average annual overestimate of outlays of $4.6 billion.

Further, if we remove the recession years (1980, 1982, 1991, and 2001) from the 1976 to 2007 data, the overestimate of revenues becomes an underestimate. Including only the good years, CBO on average underestimated revenues by $3.0 billion, overestimated outlays by $6.9 billion, and overestimated the deficit by $9.9 billion.

Compared with the errors from the Concurrent Resolution, CBO's errors are usually smaller, but generally exhibit the same inability to anticipate changes in economy activity, which are the primary driver of deficit errors (Fig. 2).

*Statistical and Economic Significance*

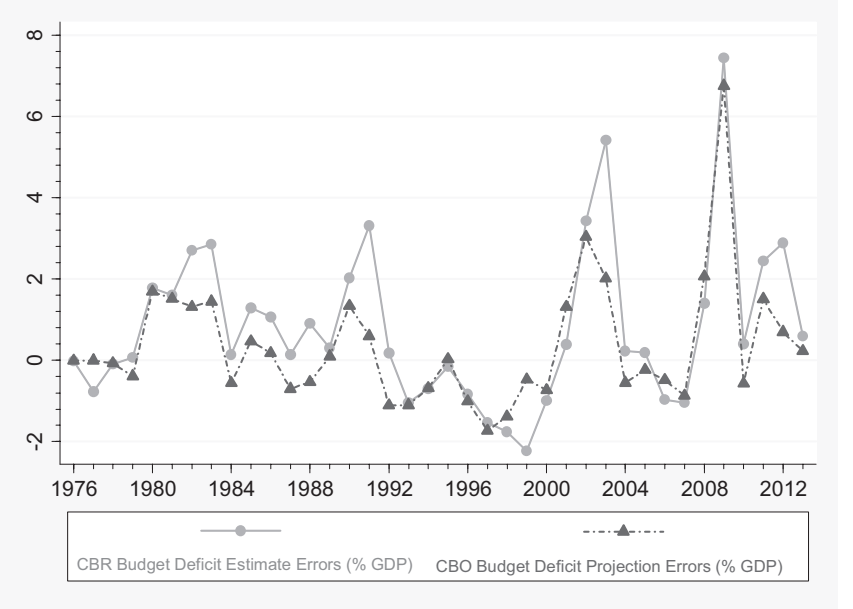
Although the sample means of deficit errors ($41.4 billion for CBO, $81.2 billion for the budget resolution) are substantial, the variances are also large. For the entire estimation period, the SDs are $191.1 billion and $237.9 billion, respectively. Thus, consistent with CBO and OMB findings, we cannot reject the null hypothesis that the means of the distributions are zero. One might argue from this result that no need exists to budget for uncertainty because deficit errors may eventually offset.

Several factors, however, caution against treating this statistical result as dispositive. First is the likelihood that the most recent, severe recession and the slow recovery is not a one-time event. Our sample period consists of only a few decades and those were characterized for the most part by economic stability, including most notably, the "Great Moderation." The turbulence of a longer economic history provides ample reason to expect that severe, unpredictable economic contractions will recur, without the surety of an offsetting "Great Expansion."

5. For FY 2013, CBO did not produce a summer baseline projection in part because the winter baseline was delayed until early May. Nonetheless, the CBO May projection was close to actual results. CBO revenue projections were $39 billion higher than actuals, while projected outlays were $1 billion lower than actual. On balance, CBO's deficit projection, therefore, was $38 billion below the actual deficit of $680 billion.

6. OMB's average deficit error for 1982–2013 was an underestimate of 0.5 percent of GDP with a standard deviation of 1.9 (OMB 2014).

**FIGURE 2**
**Concurrent Budget Resolution (CBR) Deficit Errors versus CBO Deficit Projection Errors (1976–2013)**




Second, even if the null hypothesis of zero mean cannot be rejected at standard confidence levels, debt held by the public rose from $ 477.4 billion (25.4 percent of GDP) in 1976 to $12.0 trillion (72 percent of GDP) in 2013. Over $3.0 trillion of that increase was due to budget errors, and only about half of that total can be explained by pure stochastic shocks, which we have approximated using the errors from CBO late summer projection. The other $1.5 trillion of the increase in debt is due to sources of error unique to the budget resolution, including excessive optimism by the framers.

Third, while all increases in debt impose costs on future generations, increases due to budget errors are especially problematic because, by definition, they are unplanned and lack salience for current budget decisions. They are not routinely monitored or reported explicitly to framers of the budget in a form that would facilitate use of this information in developing new budget plans. We therefore offer procedural means through which the risks of uncertainty can be recognized and managed by federal policy makers.

## PLANNING AND BUDGETING UNDER UNCERTAINTY

Economic uncertainty is not unique to the federal government. Households and firms are subject to unpredictable variations in income and circumstance which force adjustments in

planned spending and debt. But consistent with Mikesell's advice, many have learned to expect it, gotten used to it, and plan for it. During good years, forward-looking entities repay outstanding debt and save to increase the availability of resources for use in bad years. In doing so, they smooth the temporal effects of shocks on consumption, maintain long-term financial balance, and improve their access to credit when unexpected shortfalls or demands for resources occur.

Most state and local governments have also heeded Mikesell, in part because they are required by constitution or statute to maintain budget balance between annual revenues and annual operating outlays. This constraint severely limits their ability to smooth outlays by borrowing in the face of a shortfall in revenues. The absence of appealing financing alternatives has prompted states to save financial resources in "rainy day" or budget stabilization funds during normal times for use during economic slowdowns.[7]

A robust finding of research in public budgeting is that state and local budget stabilization funds, in conjunction with other measures such as drawing down general fund balances, are useful in enabling governments to continue service levels during recessions without increasing tax rates or issuing general obligation debt (Bohn and Inman 1996; Sobel and Holcombe 1996; Douglas and Gaddie 2002; Wagner and Elder 2005; Marlowe 2005; Hou 2006; Hou and Moynihan 2008; Hou and Duncombe 2008; Hendrick and Crawford 2014). State budget stabilization funds could be more effective, however, if the amounts reserved were more closely related to the variance of fiscal shocks or revenue volatility and, more generally, if they were larger (Joyce 2001; Wagner and Elder 2007). Hou and Moynihan (2008) also recommend that states allocate more resources to developing a counter cyclical fiscal capacity (CCFC) and further suggest that evidence of such capability might be a useful indicator of management competence.

The lesson from the state and local experience seems clear: anticipating and saving for unpredictable revenue shortfalls and urgent demands for increased spending can improve the ability of government to plan the level and allocation of resources efficiently over time and alternative uses. The federal government, in contrast to state and local government, has taken only a few tentative steps toward anticipating and budgeting for fiscal uncertainty. Indeed, the Budget Enforcement Act of 1990 envisioned that unexpected spending, designated as responsive to an "emergency," was to be exempt from existing budget ceilings. Thus, unplanned spending in response to unforeseen developments is accommodated by increases in existing budget caps. Accordingly, the source of financing routinely defaults to borrowing and increasing the deficit

7. State and city governments have also been found to deliberately under-forecast revenues to provide a cushion against downside errors or to create opaque re-budgeting opportunities for the executive (Caiden 1981; Rodgers and Joyce 1996; Williams and Onochie 2013). They also have used budget accounting gimmicks to report balanced annual budgets while effectively increasing outstanding debt (Bifulco et al. 2012) Evasive accounting practices provide one explanation for insolvency of some political subdivisions that were ostensibly adhering to an annual balanced budget rule. Budget gimmicks are also commonly observed in the federal government, despite the absence of an annual balanced budget requirement. See, for example, Committee for a Responsible Federal Budget (2014): http://crfb.org/blogs/everything-you-need-know-about-budget-gimmicks-8-charts.

and debt[8]. The net effect of past economic shocks combined with the political appeal of tax reductions and increases in spending have resulted in increased deficits and debt relative to planned, expected values.[9]

Current policy provides decision makers with maximum short-term flexibility and discretion to tailor the budget response appropriately to unforeseen and unforeseeable events. However, there are no processes in place to repay the new unplanned debt, once the emergency has passed. Nor is there any routine mechanism that would encourage saving in advance for the costs of future adverse events.

This missing element weakens the ability of government to respond fully to shocks. One example of this dampening effect on the scale of response is the current public policy clash over the budgetary response to the slow economic recovery. When it is generally known that recession-induced increases in government debt are unlikely to be offset after recovery, lawmakers and the public are rationally concerned about the unaddressed risk of "excessive" debt issuance (Saad 2009 on public opinion; Krugman 2010 on the inadequacy of short-term stimulus; Hooper 2011 on the opposition of members of Congress to additional stimulus). Former Federal Reserve Chairman Ben Bernanke noted this effect in his January 3, 2014 speech to the annual meeting of the American Economic Association, in which he described fiscal policy as having been "quite restrictive" since 2010. He went on to cite the CBO estimate that this fiscal tightness may have reduced output growth in 2013 by as much as 1.5 percentage points.

Failure to address the upward drift in public debt also threatens society's need for longer-term flexibility. That is, flexibility in fiscal affairs is necessary to address secular change as well as short-term shocks. Governments need to be able to adjust to changing social, political, economic, and natural conditions even though these occur slowly: to the growing proportion of the population made up of the very old and the changed composition of immigration; to the shifting demands of labor markets and increased need for early childhood education; to technological change as it affects the usefulness and productivity of alternative infra-structures, including transportation; to respond to shifting international alliances and threats; to maintain the life support system of our planet. Yet that flexibility is severely constrained by rising national debt and current spending and tax policies that have already committed the nation to spend more than the tax system is expected to produce in revenues (Steuerle 2014).

8. This federal-state difference has prompted proposals for the federal government to increase its use of counter-cyclical grants to state and local governments, financed by federal debt, during recessions. Indeed, a significant portion of the stabilization funds provided under the American Recovery and Reinvestment Act of 2009 consisted of countercyclical aid to states. This approach has the advantage of avoiding personnel layoffs and program cutbacks by states that increase the severity of economic downturns. However, this policy may be subject to moral hazard: it has the potential to reduce incentives for state and local governments to anticipate and prepare for future downturns by accumulating fiscal reserves and adopting other counter-cyclical capabilities. This adverse effect can be offset by such measures as making eligibility for grants contingent on minimum budget stabilization fund efforts (Hou 2006; Mattoon, Haleco-Meyer, and Foster 2010).

9. This upward drift in the debt adds to the ongoing accumulation of indebtedness as a share of GDP caused by the U.S. structural deficit (CBO 2014a, b). Such growth is unsustainable and threatens long-term economic stability and prosperity (Peterson-Pew 2009; Bipartisan Policy Center 2010; Burman et al. 2010; National Commission on Fiscal Responsibility and Reform 2010; Palmer and Penner 2012; Bhatti and Phaup 2013; among many others).

The failure to anticipate and budget for the expected costs of uncertain events has not been due to an absence of proposals for doing so. Previous proposals that have aimed especially at the abusive designation of supplemental appropriations as "emergencies," include President Clinton's proposal in his 1998 budget for the establishment of a disaster contingency fund. Specifically, he requested an appropriation equal to the previous seven-year average of emergency disaster spending to be made available for use when amounts provided in regular appropriations proved to be insufficient for natural and man-made disasters. (For additional detail about this and related proposals, see Peterson-Pew 2011).

Douglas Holtz-Eakin (2005). Director of the Congressional Budget Office, in testimony on the budgetary effects of Hurricanes Katrina and Rita, also urged the Congress to consider "planning for such events in the regular budget process."

One of the broadest proposals to plan for uncertain future costs was offered by President Obama in his 2010 budget. Citing the threat to long-term economic stability and prosperity from excessive growth in the national debt, he proposed budgeting for the anticipated cost of defense emergencies, including the conflicts in Iraq and Afghanistan, disasters, and a reserve for measures that might be needed to further stabilize the financial system.

The Peterson-Pew Commission (2011) also developed a detailed proposal to budget in advance for the expected cost of all spending previously categorized as "emergencies." Recognizing these estimated costs in budget plans, as proposed by President Obama and the Peterson-Pew Commission would enable decisions about public expenditure and financing to be based on more accurate information about the future availability of and demand for fiscal resources. Specifically, this information might prevent overspending in good times so that resources would be available for counter-cyclical measures or to meet other unexpected needs without permanently raising debt above target levels. It would also correct the systemic over-optimism in the Congressional budget resolution.

Legislative action to improve the government's ability to budget for unpredictable future adverse events and its own planning bias has been rare and wan. The Budget Control Act of 2011 attempted to directly limit the use of the "emergency" designation, but only for disaster relief. Under the Act, funds appropriated for that purpose and exempt from the existing caps are limited to the 10-year moving average of past relief spending. Amounts in excess of this limit are to be paid for by cuts in other spending or tax increases.

## A PROPOSAL: BUDGETING FOR UNCERTAINTY AND BIAS

A number of procedural methods could enable policymakers to incorporate uncertain adverse events into budget planning. Our proposal, inspired by the successful state and local approach and leavened by cautionary advice to avoid overreach, is a combination of the Peterson-Pew and Obama Administration proposals broadened to include all sources of budget error. We also draw on behavioral studies showing that the context in which decisions are made and positive "nudges" ("choice architecture") can affect the ability to make choices more consistent with

expressed preferences. (Thaler and Sunstein 2009; Kahneman 2011; Congdon, Kling, and Mullainathan 2011).

The essence of our proposal is to: (a) recognize a cost (budget authority and outlays) in the budget resolution for the expected annual deficit error; (b) monitor, reconcile, and report actual budget errors at the end of the fiscal year; (c) and tally and report the cumulative value of net annual provisions for budget errors over time. Specifically, we propose to initiate budgeting for uncertainty through the following procedural steps.

1. CBO, in consultation with OMB, would annually re-estimate the probability distribution of deficit errors from the Congressional budget resolution. CBO would also disclose, consistent with current practice, sufficient information to permit replication of its estimates by others. The expected value of the distribution, plus any fund re-balancing adjustments indicated by re-estimates, would be included as a discretionary expenditure in the budget resolution, scored against the aggregate ceilings for budget authority and outlays, and credited to a below-the-deficit-line Contingency Reserve Fund. This accounting monetizes and makes salient the expected value of errors in the budget deficit without increasing—and possibly decreasing—borrowing from the public. It does so by adding a new cost above the deficit line and a new element, Contingent Reserve Account, to the section of the budget that reports how the deficit is financed.[10] In addition, to further enhance the salience of this information for budget decisions, CBO should also relate the expected error and the planned deficit to long-term fiscal imbalance. One way to do this would be to report the net effect of planned budget deficits and deficit errors over the previous 10 years on the current ratio of debt/GDP or on the fiscal gap.
2. At the end of each fiscal year, CBO would issue a report on resolution errors for that fiscal year, giving emphasis to the current balance in the Contingent Reserve Fund. This report should also include a statement reconciling the actual with the planned deficit, much like the reconciliation of net cost with the budget deficit in the Financial Statement of the U.S. Government.[11]
3. Actual budget deficit errors would either reduce or increase the Reserve Fund's balance depending on whether the error was greater or less than the expected allowance already credited to the account for the fiscal year. A severe recession might result in a negative Reserve Fund balance that would be corrected in subsequent fiscal years by annual credits of the expected value and catch-up adjustments as provided in the budget resolution. A finding by CBO of a change in the expected value of errors would trigger a change to the amount of the reserve allowance in subsequent resolutions.

10. Currently, those elements include changes in financial assets and liabilities that affect the amount of borrowing from the public other than the deficit: changes in Treasury operating cash balances and changes in other financial assets and liabilities, such as accrued interest on Treasury debt to the public. These accounts are shown in the President's budget in Summary Table S-13, Federal Government Financing and Debt. See http://www.whitehouse.gov/sites/default/files/omb/budget/fy2015/assets/tables.pdf.

11. http://www.fms.treas.gov/fr/13frusg/Financial-Statement-2013.pdf.

The budgetary mechanics of this accounting may be seen more clearly in a numerical example. If CBO has estimated that the expected deficit error is $25 billion and the budget resolution plan is for a deficit of $80 billion, exclusive of the reserve allowance, then the total planned deficit in the resolution would be $105 billion. Suppose the actual budget deficit is $100 billion, including the $25 billion outlay for the Contingency Reserve. In this case the budget error is $20 billion or $5 billion less than the expected value.

The actual deficit would be financed by all transactions that currently affect the amount to be borrowed from the public plus, in this case, a $20 billion reduction in the Contingency Reserve Fund. The $5 billion remaining balance in the Fund would be carried over to the next fiscal year and increased by the subsequent contingent reserve allowances in excess of actual errors.

The Contingent Reserve Fund has some conceptual similarities to a federal trust fund. As a budget account, it provides no resources directly to the government for meeting unanticipated fiscal demands or shortfalls. It exists only on the books of the government. Its function is to recognize the expected cost of uncertain future events and to monitor and track the effects of fiscal shocks on deficits and debt relative to planned provision for expected budget errors. In doing so, it also provides annually a means of saving by default for adverse shocks. It promotes fiscal balance by reconciling planned government spending and taxes with unpredictable but foreseeable future claims. To the extent that Congress establishes deficit targets independently of the expected deficit error, the allowance for deficit errors would reduce planned baseline federal borrowing compared with current policy.

This proposal harkens back to the balanced budget norm that governed federal budget policy for nearly two centuries. That fiscal regime permitted annually *un*balanced budgets, especially during wartime, but with the well-understood condition that debt issued during those extraordinary periods would be retired once hostilities ceased. By this means, the nominal *annual* balanced budget norm provided an effective constraint on cumulative long-term imbalances. (Hearn and Phaup 2014) Today, it remains clear that in times of extreme fiscal stress, brought on by recession, war, natural or man-made disaster, borrowing by sovereigns is not only permissible, it is likely welfare enhancing. Moreover, highly liquid, low-risk U.S. sovereign debt is a valued addition to many investment portfolios. For those reasons, the U.S. does not require a prohibition on public debt issuance. (Peterson-Pew 2010; National Commission on Fiscal Responsibility and Reform 2010; Holtz-Eakin 2014) Rather, what is lacking and required to control deficit drift from budget errors and improve fiscal performance is a salient and routine process for maintaining and restoring debt to a sustainable path.

Two features of this proposal are central to its enforcement: increased focus on and accountability for net budget errors and the statutory requirement for maintaining balance between resources (current reserve balance plus anticipated current law inflows) and expected outflows as estimated periodically by an analytically capable and independent central budget agency, such as CBO. This provision is consistent with the Federal Credit Reform Act of 1990, which provides for annual re-estimates and rebalancing of credit financing accounts, including those with contingent liability for the cost of defaulting federal guaranteed loans (Cuny 1991; CBO 2004). In a similar manner, a finding by CBO of financial imbalance resulting from a

change in the probability distribution of budget errors would prompt a change in the annual resolution allowance for deficit errors.

In considering this proposal, the Congress would be making a choice between, on the one hand, treating all future shortfalls of tax revenues and spending increases above plan as surprises, for which debt financing is the only available alternative and, on the other hand, anticipating and planning for those statistically predictable events. Choosing the latter would permit Congress to respond more appropriately to a costly event while continuing to manage its debt consistent with long-term stability. By recognizing the expected size and random nature of fiscal shocks and the associated budget errors, the Congress would self-insure effectively against the consequences of budget uncertainty and over-optimism in the budget plan. It could also moderate the impulse to spend the inflows from favorable shocks.

One gain expected from routine inclusion of errors in the preparation of the budget would be assurance to decision-makers and the public that unplanned automatic and discretionary fiscal responses to shocks would be paid for, either by earlier "rainy day" saving or by future reductions in borrowing. This additional fiscal discipline, ironically, could enable policymakers to respond more vigorously to unexpected adverse shocks. To constrain the impulse to over-respond to loss, policymakers might also pre-commit to provide assistance scaled to a measure of severity, such as the unemployment rate, dollars of loss, or the judgment of technical specialists.

It is important to note that the changes from current policy embodied in this proposal are almost entirely procedural and contextual rather than substantive. The proposed policy neither attempts to correct the current structural deficit; nor to offset past budget errors. The first of these has proven to exceed the reach of far more ambitious proposals and the second seems unnecessary for fiscal stability. Nor, does the proposal constrain annual nominal deficits except by more complete and salient disclosures.

In addition to its limited ambition, a number of arguments could be raised against this proposal. One is that it will be impossible for Congress to resist using the CRF reserve of "free money" for purposes other than smoothing the effects of fiscal shocks.[12] It may provide some comfort to note, however, that the same objection was raised to the proposal to finance federal direct loans and loan guarantees from nonbudgetary financing accounts. To our knowledge, there has not been a serious effort to raid those accounts, in part because such a diversion of funds would trigger a visible need to provide replacement resources to re-balance the funds.

Another is a related claim that a reserve fund would increase spending during crisis and emergencies. It is not clear that this is a disadvantage, especially if policymakers pre-commit to a scaled response. What is clear is that the discretion to spend above budget to meet true emergencies must be matched with an offsetting process that enables and encourages appropriate rates of pre- and post-emergency saving. A procedural requirement for mandatory saving calibrated by a technical authority to expected spending, given various alternative world states could provide such a counterweight. Moreover, that estimated offset is to be subject to ongoing review and re-estimate by both governmental and external analysts.

12. Kahneman (Kahneman 2011, p. 252) also cautions against reserve funds, specifically for infrastructure projects which he suggests construction contractors will see as "red meat."

A third argument is the claim that it is impossible for government to increase its saving while running a deficit. However, reducing the rate of government dissaving (net borrowing) tends to increase private domestic investment and income and reduce the inflow of foreign capital claims, unless private savings falls sufficiently to offset the decrease in government dissaving.[13] It can thereby increase domestic income and improve the government's financial condition compared with current policy, despite a continuing but smaller federal deficit.

The ability of government to save through the use of accounts in the means of financing section of the budget appears especially favorable relative to its ability to do so through on-budget trust funds including those used for Social Security and federal employees pension accounts (Nataray and Shoven 2004; Smetters 2004).

A fourth argument is that there are alternative mechanisms for increasing federal saving during good times that are simpler and likely more effective in promoting increased economic stability and fiscal balance. One such proposal was offered by an anonymous reviewer, who suggested a superior solution: "If governments would instead consciously adopt policies during [g]ood years that would offset the effects of [bad years], then the approach recommended by this paper would not be needed." We agree. Our only disagreement appears to be over the likelihood that government could do so "consciously" and whether our proposal would increase the likelihood of achieving the same result by avoiding some difficult, conscious decisions.

## CONCLUDING OBSERVATION

The current federal budget process ignores the stochastic nature of budgeting and its progeny, optimistic bias. Disregard of the difference between expected and actual budget results has added about 25 percent, or $3 trillion to the public debt over the past 40 years and limited the ability of government to respond to fiscal shocks and structural changes in the economy. Anticipating and budgeting for fiscal uncertainty and planning bias is both feasible and necessary for policy makers to make more informed budget decisions. Failure to do so may have some public policy value that eludes our understanding. But absent such a finding, current practice seems to be a denial of reality and an abdication of duty by both policy makers and budget process analysts.[14]

13. Domestic investment = private saving − government borrowing + net foreign capital inflows to the United States. See, for example, Huntley (2014).

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