# Fiscal Uncertainty and How to Deal with It

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"[B]asing policy on forecasts longer than that [the next decade] is kind of a crazy thing to do. If you take the confidence interval around the deficit forecast, not 20 years out, not a 95% confidence interval, but five years out, a 90% confidence interval. That confidence interval is 10% of GDP-wide. It is plus or minus 5%. If, with global climate change, people were telling us temperature change would be between -3° to + 6°, we wouldn't be acting on the problem. And so, we do not know what the long-run deficit is going to be."

Lawrence Summers, Wall Street Journal CEO Council, November 19, 2013

"We're going to face the most predictable economic crisis in history….. When the market moves, it doesn't move slowly; it moves rapidly and viciously. And I believe the markets will wake up one day and look at our country and say, 'You have a dysfunctional government addicted to debt, and the fiscal path this nation is on is not sustainable.'"

Erskine Bowles, InvestmentWatch, May 21, 2014

## *1. Introduction*

Economic and political controversy surrounds many, perhaps even most questions about U.S. fiscal policy. But few dispute that there is enormous uncertainty about future fiscal outcomes, particularly those beyond the next few years. This paper is about the magnitude of fiscal uncertainty and what we should do about it: how fiscal uncertainty should be measured and expressed, what its implications are for the well-being of current and future generations, what our policy responses should be, and when these responses should occur. This focus on fiscal uncertainty takes place against a backdrop of currently projected future fiscal imbalances that, if realized, would require some combination of substantial spending reductions and tax increases in the coming years. How uncertainty should influence our reactions to these projected imbalances is the key question this paper addresses.

These questions about long-run imbalances and uncertainty are largely distinct from those concerning the size and composition of government or the design of tax

structure, but there is some overlap. There is, in the extent to which different types of tax systems respond automatically to unexpected changes in economic performance and the built-in sensitivity of different components of spending to changes in economic outcomes. Likewise, although policy responses to long-run uncertainty seem distinct from the issue of short-run stabilization, the two elements of fiscal policy come together when governments must decide whether to defer responses to projected long-run fiscal imbalances during times of economic weakness. There has been much disagreement about this among policy makers and economists in the aftermath of the Great Recession, as leading developed economies experienced both accumulating national debts and slow economic recoveries.[1]

Although the emphasis here is on economics, not politics, confronting the questions raised involves more than measuring uncertainty and developing appropriate policy responses. Framing and presentation matter in shaping perceptions of the magnitude of the fiscal problems we face and the urgency of dealing with them. For example, the way we account for government entitlement spending commitments affects whether these commitments count as a "current" fiscal problem or a "future" one; and emphasis on expected outcomes may cause us to lose sight of the range of alternative plausible outcomes. The likelihood of making sensible policy decisions and implementing them in a timely manner depends not only on determining the facts, but also on communicating them.

[1] Among policy makers, there has been an especially marked contrast in recent years in Europe, with leaders such as David Cameron of the United Kingdom and Angela Merkel of Germany arguing for fiscal austerity and others, such as Mario Renzi of Italy, pushing back against such measures. Among economists, too, there has been a lively debate about the potential economic benefits of fiscal consolidation. See, for example, Alesina and Ardagna (2013, pro) and Blanchard and Leigh (2013, con).

The remainder of this paper begins with a discussion of how large U.S. fiscal uncertainty is, based on how forecasts have evolved over time. In light of this uncertainty, the discussion then turns to the economics of policy responses – the form they should take, how large they should be, when they should be adopted and implemented, and how the associated burdens (or benefits) of policy responses should fall on different generations. The paper concludes with some thoughts on policy as well as reform of the policy process, aimed at improving the conveyance of information and facilitating the adoption of appropriate policy responses.

It is important to stress that the focus here is on uncertainty and how policy should respond to it, not on the appropriate responses to projected imbalances themselves. I will suggest below that uncertainty about projections should generally elicit an increase in government saving, but that increase is relative to whatever the appropriate level of saving would be in the absence of uncertainty about the future. It would not be inconsistent to argue that we are saving too much in the very short run, given the state of the economy and projections of future imbalances, but also that we should save more than we otherwise would because of our uncertainty about future projections.

## 2. The Nature, Magnitude and Sources of Fiscal Uncertainty

Many government agencies issue medium-term projections of fiscal aggregates on a regular basis, perhaps most notably the Congressional Budget Office (CBO), which typically three times annually updates its ten-year projections for federal taxes, spending, and deficits.

### *A. Uncertainty in the Short and Medium Runs*

With each update, the CBO reports not only the changes from its previous forecast, but also reasons for the changes, breaking changes in forecast deficits into categories (e.g., revenues, outlays) and causes (legislation, economic, and "technical," i.e., not due to legislation or attributable to macroeconomic factors). The accumulation of all such changes over time starting from the initial forecast with regard to a fiscal year and ending with the end of that fiscal year measures the total forecast error for the particular fiscal year's deficit. Figure 1 displays such errors for fiscal years 2005-2014 (the full period for which 10-year forecast errors are available[2]) as a percent of fiscal-year potential GDP (also based on CBO estimates[3]). The figure shows initial deficit forecasts, actual deficits, and the extent of the difference attributed by CBO during the forecast period to changes in legislation. For example, the initial forecast made in January 1998 for fiscal year 2008 showed a *surplus* of $138 billion, which would have been 0.9 percent of 2008 potential GDP. Ten years later, the actual deficit was $458 billion, or 3.1 percent of potential GDP, with the difference of $596 billion accounted for by $1.101 trillion dollars from deficit-increasing legislation and $505 billion in deficit-decreasing economic revisions.

Several things stand out in this figure. First, the deficit forecasts made 10 years earlier exceeded actual deficits for fiscal years 2005-7 but fell well short of actual deficits in the years that followed, as the Great Recession took hold. Second, legislation contributed substantially to higher-than-forecast deficits in every year during the period, increasing the average year's deficit by 6.7 percent of potential GDP, a share larger than the deficit itself in

[2] For prior fiscal years, initial forecasts were made less than ten years before the fiscal year itself.

[3] CBO (2014a). The use of potential rather than actual GDP to scale the deficits provides a better picture of the underlying trend, given year-to-year fluctuations in GDP itself.

all but a handful of years during the postwar period! Although the direction of policy changes was always the same,[4] the explanation differs over the period. Tax cuts and spending increases during the pre-recession years were largely unrelated to the business cycle, unlike many of the changes that affected the deficits in the years that followed. Third, overall forecast errors are large. For this sample of ten fiscal years, the average absolute forecast error was 6.3 percent of potential GDP. Fourth, more than half of this average absolute forecast error is attributable to policy changes; excluding them, the average absolute forecast error is 2.9 percent of potential GDP. Finally, even over this short and very volatile period, the overall average error, excluding policy changes, was negative and relatively small, at -1.0 percent of potential GDP. That is, controlling for the effects of policy changes on the deficit, the average deficit during the period was about 1.0 percent of potential GDP lower than was initially forecast ten years earlier.

Finally, note that although the size of the deficit forecast errors subsided toward the end of the period, the many years of large forecast errors underestimating annual deficits had a very large cumulative effect on the fiscal-year 2014 *debt*, which was first forecast in January, 2004 to be $6.4 trillion and ended up at $12.8 trillion – *double* the initial forecast.

In summary, although there may not be any inherent bias – optimistic or pessimistic – in the process of forecasting the deficit there is considerable uncertainty about the

[4] This would not have been true for other historical periods, such as in the early- and mid-1990s when policy changes were more often in the direction of reducing deficits.

Also, it is important to keep in mind when considering the quality of forecasts that policy changes measure deviations from current law, and are not necessarily unanticipated in the same manner that changes due to economic performance might be. In recent years, for example, when the 2001 and 2003 Bush tax cuts were scheduled to expire, CBO projections incorporated the then current-law assumption that they would, even though many observers expected that at least a portion of the tax cuts would be extended indefinitely, as they eventually were. When the extension occurred, in January 2013, this showed up as a large tax cut because it was measured relative to current law.

deficit's magnitude just ten years in advance. This uncertainty relates not just to underlying economic uncertainty, but also to the policy process itself. While accounting for policy changes sometimes reduced the magnitude of the forecast error during this period (fiscal years 2005-2008 and 2014), on average they more than doubled the absolute forecast error.

An alternative way of expressing this uncertainty, which also provides a sense of how uncertainty is resolved over time, involves putting confidence bands around forecasts made at a particular date for different horizons. Figure 2 presents such a "fan chart," taken from CBO's own estimates (CBO 2008). The figure shows the actual deficit (as a share of GDP) in fiscal year 2007 and forecasts, as of early 2008, of the fiscal year deficits for 2008 – 2013 based on the assumption that then-current policy would be followed.[5]

The central series in Figure 2 represents CBO's official forecasts at the time, assuming no changes in policy (including, for fiscal years 2012 and 2013, the projection of budget surpluses). The bands around this series represent estimates of 50 and 90 percent confidence intervals around these forecasts – ranges within which CBO forecasters expected actual outcomes would fall 50 percent of the time and 90 percent of the time, respectively, if there were no policy changes, and therefore also ignoring the added uncertainty associated with such changes.[6] The estimated confidence bands grow quickly as the horizon lengthens, a familiar aspect of forecast uncertainty reflecting the fact that each successive year brings new changes in what might happen, which compound the

[5] A similar fan chart is presented in OMB (2014, p. 19) for fiscal years 2014-2019, along with average forecast errors for different horizons up to five years over the period since 1982.

[6] CBO (2007) lays out the methodology used to construct these estimates.

uncertainty that already exists.[7] Just five years out from the date of the forecast, in fiscal year 2013, the estimated 90-percent confidence band ranged from a deficit of nearly 5 percent of GDP to a surplus of roughly 5.5 percent of GDP, a range of over 10 percent of GDP – roughly half the size of the federal budget. Such accumulating uncertainty about the *deficit* is magnified if one considers the national *debt*, since the debt equals the sum of past deficits. As already discussed, the national debt in 2014 was double was predicted just ten years earlier.

Figure 2 also displays a series labeled "actual," representing the actual deficits realized in each year, as a share of GDP, with the cumulative impact of legislation between 2008 and 2013 (taken from CBO estimates over this period) subtracted, to produce a series comparable to the others in the figure. Note that in fiscal year 2009, the actual value of the deficit (after subtraction of the deficit-increasing countercyclical policy measures taken in 2008 and 2009) substantially exceeded CBO's prior estimate of the 95$^{th}$ percentile outcome, meaning that the actual deficit was viewed less than two years earlier to be very unlikely to occur – far less than one time in 20. Deficits in 2010-2012 fell within the broader 90 percent confidence interval, but still outside the narrower, 50 percent confidence interval.

[7] For example, to the extent that each year's productivity growth rate is uncertain given growth rates in previous years, the productivity level, which influences tax collections and hence deficits, will become more and more uncertain as the forecasting horizon lengthens. That is, even if there is no increase in uncertainty about the productivity *growth rate* as the forecast horizon lengthens, there is increasing uncertainty about productivity's *level* and things associated with it. On the other hand, there would be less uncertainty about the *average* productivity growth rate as the forecast period lengthens, as annual fluctuations would offset to some extent. See CBO (2005), Figure 8, which shows relatively constant confidence bands for productivity growth rates and declining confidence bands for average productivity growth rates.

As to deficit forecasts, not all elements of uncertainty compound in the way that the productivity level does; we might expect fluctuations in deficits due to business cycles to average out somewhat over time, for example. But the widening confidence band in Figure 2 indicates that elements of uncertainty that accumulate over the forecast horizon are dominant.

This string of four consecutive deficits lying outside confidence bands might call the accuracy of the bands themselves into question; perhaps the degree of uncertainty was actually larger than the bands indicated in 2008. However, one should keep two things in mind. First, forecast errors in successive years are not independent – a big forecast error in one year likely results from an economic surprise that won't immediately disappear. Thus, one shouldn't see the four successive very large deficits as distinct pieces of evidence about the validity of the confidence bands. Once a sharp recession was underway and the 2009 deficit had occurred, there was little chance of reversion to normal right away. Second, it is quite reasonable to suppose that what happened in 2009 fell outside the normal prediction range as of beginning of 2008. The Great Recession was the most serious economic decline that the United States faced since the 1930s, and in early 2008 there was little sense that the economy was even in recession at all.[8]

Even if forecast uncertainty is unavoidable, it places the agencies responsible for making forecasts in a difficult position, because the procedural mechanisms in place for policy making do not take such uncertainty into account. In particular, the "scoring" of revenue and spending provisions is based on the official forecasts themselves and provides no role for the degree of the uncertainty associated with the forecasts (or, for that matter, the economic consequences of the programs themselves). Improving the way in which uncertainty is conveyed in the policy process is a challenging and important issue, although one that is largely beyond the scope of this paper.[9]

[8] The official dating of the beginning of the recession to December, 2007 was not made by the National Bureau of Economic Research until December 1, 2008 (http://www.nber.org/cycles/dec2008.html). While there was considerable evidence of recession before December, 2008, this was not the case nearly a year earlier.

[9] See Manski (2013, 2014) for a careful analysis of this and related issues.

Given existing policy procedures, such as rules that require hitting an overall budget target, there may be pressure on forecasting agencies to modify their forecasts in a manner that reduces forecast accuracy. The problem relates to a key statistical property of a forecast based on all available information at a given time: how the forecast changes over time is unpredictable, because the forecaster immediately incorporates new information into the forecast as the information becomes available. But such unpredictable changes may challenge policy makers.

For example, new information may suggest that next year's deficit will be much higher than previously expected unless large tax increases or spending cuts are enacted, but this prediction will turn out to have been overly pessimistic about half the time if the forecast fully reflects current information when it is made. Thus, policy makers who respond fully to the pessimistic new information will eventually find the magnitude of their response to have been unnecessary about half the time. Of course, they will also find the response to have been inadequate about half the time, but if the political costs of adopting painful measures that turn out to be unneeded are higher than the costs of failing to adopt such measures fully when they are needed, then policy makers may wish to have forecasters mete bad information out gradually, rather than as soon as it becomes available, so that they can be more certain about the need to respond before having to do so. This policy environment may help explain why the successive updates of forecasts made by CBO as well as by the Office of Management and Budget (OMB) over the period 1986-1999 appear to exhibit positive serial correlation, although there could be other explanations as well (Auerbach 1999).

### *B. Uncertainty in the Long Run*

As is quite evident from the previous discussion, much of the uncertainty surrounding deficit forecasts over the short and medium runs relates to the business cycle. The enormous deficits experienced beginning in 2009 reflected the combination of a sharp economic contraction and the expansionary fiscal policy measures adopted to deal with it. Over the longer term, however, different sources of uncertainty loom larger, relating to such things as demographic and productivity growth trends.[10] This distinction is important, because it is the longer-term budget trends that largely determine the extent to which the United States is on a sustainable fiscal path.

Given the uncertainty surrounding projections even five or ten years out and the widening confidence bands as forecast horizons lengthen, one might think that forecasts beyond ten years would be almost meaningless. But about some things on which long-term budget forecasts are based, we have pretty good information. For example, the size of today's population of 37-year olds provides very accurate information about the population that will be eligible for early retirement Social Security benefits (at age 62) in 25 years. Still, there is more uncertainty about other determinants of Social Security benefits in 25 years, such as life expectancy, productivity growth (which affects wage growth), immigration patterns and labor force participation, so one may expect there to be broad confidence bands around long-term forecasts for the Social Security program.

The most familiar source of projections about the future revenues and expenditures of the Social Security system is the annual Trustees' Report. It provides overall

[10] Short- and long-run factors aren't always neatly distinct. For example, during the weak recovery since the end of the Great Recession, estimates of future potential GDP have been adjusted downward to reflect the view that the weaker growth indicates a lower level of potential output (e.g., CBO 2014a).

assessments of the system's fiscal standing as well as projections of spending and receipts for each year over a 75-year horizon from the time of the forecast. Figure 3 presents projections of the annual balance (spending less receipts) for the OASDI system for three representative future years, 2020, 2045, and 2070, taken from the Trustees' reports from 1997 through 2014. The first panel of the figure displays the evolution of the "intermediate" forecasts for each of the three future years, while the three remaining panels of Figure 3 display the forecasts for each of the three future years under the three scenarios provided in the Trustees' Reports, labeled "low" and "high" as well as intermediate.

These low- and high-scenario forecasts do not correspond directly to confidence bands, because they are estimates of what will happen under favorable (low) and unfavorable (high) realizations for several factors (e.g., mortality, productivity growth, interest rates, labor force participation) without an assessment of the probability of such combined realizations, rather than reflecting the likelihood of the associated overall outcomes, which could result from several combinations of the different factors. Nevertheless, the gap between the high and low scenarios does provide some indication of the degree of uncertainty surrounding the forecast.

For example, Lee and Tuljapurkar (1998), who constructed an alternative set of forecasts based on an explicit consideration of statistical probabilities, estimated a long-term actuarial deficit (over 75 years) – essentially a discounted average of the balances for individual years within that period – with a 95 percent confidence interval between 0.2 percent and 6.5 percent of payroll. The Trustees' low and high scenarios at the time were for a surplus of 0.5 percent and a deficit of 5.7 percent – slightly more favorable than the

confidence band but of similar size, 6.2 percent of payroll vs. 6.3 percent. On the other hand, the 2011 Social Security Technical Panel (Social Security Advisory Board 2011, Figure 5) found similar outcomes for scenario and statistical analysis at the high end and in the middle but a much wider range for the scenario on the favorable side.

Although actuarial forecasts for Social Security, like those just discussed, are often reported relative to payroll, it is useful to express them as a share of GDP to facilitate comparisons with other forecasts, such as the 10-year CBO forecasts previously discussed. Looking first at the top panel of Figure 3, we observe that the forecast balances for all three future years were negative throughout the period, although they have improved somewhat over time, reflecting not a single factor but rather a combination of different economic and demographic factors with effects in both directions. For example, the worsening of forecasts for 2045 and 2070 in 2002 reflected an increase in projected longevity (OASDI Trustees, 2002, p. 9); the improvement in the forecasts in 2008 for those two years resulted from a change in immigration projections (OASDI Trustees, 2008, p. 2); and the worsening for all three years in 2013 reflected the impact of the recession and an increase in longevity (OASDI Trustees, 2013, p. 3), with the first factor presumably having a greater impact for 2020 than the later years and the second factor having a greater impact in the later years.

Also, the forecasts become progressively more unfavorable as the date being forecast extends further into the future, with the imbalance in 2020 ranging between 0.4 and 0.9 percent of GDP and that in 2070 ranging between 1.2 and 2.3 percent of GDP. This worsening largely reflects the continuing increase in the old-age dependency ratio due to

improvements in life expectancy, which persists even after the baby-boom-induced spike in the dependency ratio subsides.

The remaining panels of Figure 3 show the evolution of all three scenarios for each of the years being forecast. Again, although the high and low scenario projections do not precisely correspond to confidence intervals, they do provide an indication of the range of plausible outcomes. Consistent with this interpretation, the bands defined by the scenarios widen as the date being forecast moves further into the future. The range for 2020 averages 1.13 percent of GDP; that for 2045, 2.41 percent of GDP; and that for 2070, 3.66 percent of GDP. For 2020, in particular, one can also see the gap between the high and low scenarios narrowing over time, consistent with the fact that some uncertainty should have been resolved as this date moved from being 23 years in the future in 1997 to only six years in the future in 2014.

Forecasts for the other major U.S. old-age entitlement program, Medicare, are particularly important, given the share of the budget projected to be devoted to public health care spending in the future. For example, in its most recent long-term forecast, CBO (2014b) projects that public spending on the major health programs will exceed spending in all other categories combined, excluding social security and interest, by 2033, and that the same will be true for Medicare spending alone by 2060. This rapid projected growth in Medicare and other public health care spending also accounts for a major part of projected long-term imbalances, discussed below.

Long-term forecasts for Medicare are more complicated to analyze than those for Social Security for at least three reasons. First, Medicare involves several components, and only one of these (Part A, Health Insurance), which in 2013 accounted for less than half of

all Medicare spending, is financed through a dedicated-funding/trust-fund structure like the OASDI program of Social Security that permits a simple evaluation of annual balances. Parts B (Medical Insurance) and D (Prescription Drug Insurance) are heavily subsidized by general revenues.

Second, unlike for Social Security, there have been significant changes to the Medicare program over the period 1997-2014, including the introduction of Part D and the passage of the Affordable Care Act (ACA), so that changes in forecasts over time reflect the effects of these legislative changes as well as other factors. Third, other than changes in policy, the factors affecting future spending on Medicare include all of those that affect Social Security spending, plus many more that relate specifically to the provision of medical care.

Figure 4 presents the Trustees' forecasts for the HI program corresponding to those for OASDI given in Figure 3 and using the same display format.[11] As with OASDI, the forecasts generally are negative (indicating a deficit) and become progressively more negative as the forecast horizon lengthens. An exception to this worsening as the horizon lengthens appears in 2010, when the forecast imbalance for 2070 is smaller than that for 2045. This may reflect projected cost savings resulting from the provisions of the ACA that eventually bring health care spending under control, and are related to the progressively stronger improvements in forecasts that one sees between 2009 and 2010, with the passage of the ACA. Indeed, the intermediate scenario forecasts made in 2010 for all three forecast dates, 2020, 2045, and 2070, were all more favorable than the low-scenario

[11] Note that the vertical axis scale differs between the two figures, although it is the same for the different panels within each figure.

forecasts for the same dates made in the late 1990s. Even interpreting these low-scenario forecasts as upper confidence bounds, though, one must keep in mind that all three scenarios are based on the assumption that current policy is maintained, making realizations outside the bands due to legislation less of a surprise.

Concerning the effects of such policy changes, one further clarification may be helpful. As with the ten-year CBO forecasts, changes attributable to policy reflect estimates of the impact that a policy change has on revenues and spending. Just as forecasts made under the current-policy assumption, forecasts that reflect the impact of a policy change reflect the assumption that the new policy will remain in effect. Thus, a particular source of uncertainty, for example regarding whether the provisions of the ACA will remain in force and accomplish their cost-saving objectives, is ruled out. Given the improvements in the long-term forecasts for HI that appear to be attributable to the implementation of the ACA, this is an important issue to keep in mind when assessing the degree of uncertainty about future fiscal conditions.[12]

The remaining panels of Figure 4 illustrate the considerable uncertainty associated with forecasts for the HI program under current policy, which represents only a portion of overall Medicare spending and presumably of uncertainty about the overall program. As with the forecasts for OASDI, the gap between the low and high scenarios widens with the forecast horizon, but the gaps are generally larger for HI for all three years being forecast than for OASDI, averaging 1.14 percent of GDP for 2020, 4.41 percent for 2045 and 5.50 percent for 2070. For all three horizons, recent low-scenario forecasts show an annual

[12] This is not to say that enactment of the ACA increased uncertainty about future policy.

fiscal surplus, while high-scenario forecasts remain negative. Yet, forecasts made just a decade ago projected deficits for HI as high as 8 percent of GDP in 2070.

While Social Security and Medicare are the two most important U.S. entitlement programs, other components of the budget also contribute to long-run uncertainty. In addition, the figures provided so far do not offer a breakdown of uncertainty into its sources. However, the most recent long-term CBO forecast (CBO 2014b) provides not only projections for overall spending and revenues, but also estimates of how much uncertainty associated with different factors might affect these forecasts, based on historical variation in the factors. Expressing the effects of this uncertainty in terms of the impact on the 25-year "fiscal gap" – the required increase in taxes or non-interest spending required during each year of the period 2014-2039 to keep the debt-GDP ratio from increasing over its value at the beginning of the period[13] – results in the impacts of the different factors reported in Table 1.

To estimate the degree of uncertainty about various factors for the next 25 years, CBO calculated an historical range for each factor over recent 25-year periods. For example, over successive 25-year periods beginning as early as 1942 and ending as late as 2008, the average annual decline in the mortality rate varied by around 1 percentage point per year. Thus, CBO considered the plausible range for the annual decline in the mortality rate over the period 2014-2039 to be of the same magnitude, that is, as much as 0.5 percent per year higher or lower than the forecast annual value of 1.2 percent. CBO used the same

[13] Maintaining the debt-GDP ratio at its current level may be viewed as an optimistic measure of the needed fiscal adjustment, given that this level is already quite high by historical standards. Setting a more ambitious target for the terminal debt-GDP ratio would require a larger adjustment during the period, with the increase in the required annual adjustment larger the shorter the adjustment period. Thus, setting a lower target debt-GDP ratio would lessen the extent to which the fiscal gap grows with the forecasting horizon, a pattern discussed below. See Auerbach and Gale (2014) for further discussion.

method to estimate the range of 25-year averages of the productivity growth rate, the interest rate on federal debt (based on the spread between private and government borrowing), and the *excess growth rate* in government health care spending.[14] The forecast means and ranges for each factor are shown in the second and third columns of Table 1.[15]

The remaining three columns of Table 1 display estimates of the 25-year fiscal gap under CBO's *extended* baseline scenario under various assumptions about the values of these different factors. The extended baseline scenario is, itself, the more favorable of the two baseline scenarios CBO (2014b) reports, differing from the *alternative* baseline scenario in assumptions about whether existing policies will be maintained (extended baseline) or modified in a way that more closely resembles past practice (alternative baseline).[16] Choosing a scenario on which to base estimates of the role of uncertainty thus excludes uncertainty about policy choices themselves. As discussed earlier, policy choices can cause realized outcomes to deviate substantially from predictions, so this should be kept in mind as one considers just the effects of the factors that are considered here.

The first four rows of Table 1 show fiscal gap estimates under the extended baseline scenario, with one of the particular sources of uncertainty set at its most favorable,

[14] Excess health care spending growth measures the extent to which health care costs per beneficiary, adjusted for demographic changes, grow faster than potential GDP per capita. CBO adjusted the range for this factor, as well as the interest rate on the federal debt, upward by 50 percent based on an assessment that there are now additional elements of uncertainty not present during the historical base periods.

[15] While these four factors represent important sources of uncertainty in budget forecasts, they are by no means exhaustive. At present, for example, there is considerable uncertainty about what the future holds for the labor force participation rate, which has remained depressed during the recovery from the Great Recession.

[16] Under the alternative fiscal scenario, CBO assumes a continued adoption of the so-called "doc fix" that prevents a substantial cut in Medicare reimbursements to physicians; that federal nondefense discretionary spending would rise after 2024 to its average share of GDP during the past two decades; and that automatic *additional* spending reductions scheduled for 2015 under the Budget Control Act of 2013 will not occur.

projected, and least favorable values for the entire projection period.[17] The last row of the table shows the range of outcomes when all four factors are varied simultaneously in one direction or the other, with the range for each factor cut in half, to reflect the lower likelihood that such negative or positive experience could hit all factors at the same time. These ranges for individual and combined factors are similar in their construction to those provided by the low, high, and intermediate Trustees' forecasts for OASDI and HI, in that they express plausible ranges but do not correspond precisely to statistical confidence intervals. [18]

As Table 1 shows, the four factors differ in their contributions to fiscal uncertainty. While variations in productivity growth, interest rates, and excess health cost growth could lead to variations in the fiscal gap of 1 percent of GDP or more, variations in the rate at which the mortality rate declines have an insignificant impact on the fiscal gap. For all four factors combined, the range in the fiscal gap is 2.4 percent of GDP, with the most favorable outcome being essentially no fiscal gap and the largest being a fiscal gap of 2.5 percent of GDP, or roughly $450 billion per year currently, growing with GDP.

Figure 5 shows the impact of this combined range of factor uncertainty on the national debt held by the public, expressed relative to GDP, also taking into account the feedback effects that slower or more rapid debt accumulation is projected to have on economic activity. Starting from a baseline forecast debt-GDP ratio in 2039 of 111 percent

[17] Favorable outcomes in this context involve a slower decline in mortality, faster productivity growth, lower interest rates, and lower excess health cost growth.

[18] As with OASDI and HI, the translation from scenario ranges to confidence intervals is not obvious. When all four factors are considered simultaneously, one important issue is the extent to which the different sources of uncertainty reinforce each other. For example, if faster productivity growth, which would improve budget outcomes, is associated with faster excess health cost growth, which would worsen budget outcomes, then uncertainty about the budget associated with the two factors together would be overstated by simply adding together the possible ranges due to each.

– already higher than any in historical experience – the adverse combination of factors would raise the debt-GDP ratio by more than half, to 159 percent. On the other hand, favorable realizations in all four dimensions would result in a terminal debt-GDP ratio of 75 percent, nearly equal to the starting value, as one would expect given the trivial fiscal gap estimated for this scenario.

Although this range of outcomes may seem large, it understates the extent of uncertainty by stopping after 25 years. As discussed earlier, the effects of uncertainty on the deficit tend to compound over time, so that projecting beyond 2039 would widen the band of possible annual outcomes, and hence the range of fiscal gaps based on aggregating these annual outcomes. It should also be noted that starting from the extended baseline, and truncating the forecast period to 25 years both make the baseline scenario less troubling, given that plausible policy variations tend to increase the fiscal gap and that demographic and health care trends after 2039 are unfavorable. For example, CBO's extended baseline forecast for total spending on OASDI, Medicare and Medicaid in 2039 is 14.3 percent of GDP, up from 9.8 percent in 2013; but the share of GDP continues to rise at an accelerating rate thereafter, to 15.3 percent in 2049, 16.6 percent in 2059, 18.1 percent in 2069, and so on.

Indeed, other recent calculations show a fiscal gap that increases sharply as the calculation's horizon lengthens. Auerbach and Gale (2014) calculate a fiscal gap of 2.0 percent of GDP based on CBO's alternative fiscal scenario assumptions for entitlement spending, as expected larger than the gap of 1.2 percent reported in Table 1 through 2039 based on the more favorable extended baseline scenario. The gap rises to 5.3 percent when the period is extended through 2089, and to 9.9 percent of GDP when the period is

extended indefinitely, adding even more years of unfavorable projected outcomes to the calculation. While Auerbach and Gale do not estimate the effects of uncertainty on the fiscal gap, the range of estimates based on different contemporaneous forecasts does provide some indication. For example, using the more favorable Trustees' projections for Social Security and Medicare (corresponding to annual balances shown for the most recent forecasts in Figures 3 and 4) reduces the 2089 and indefinite fiscal gaps to 3.7 percent, and 5.5 percent of GDP, that is, by 30 percent and 44 percent, respectively.

One might view the possible range of outcomes as even larger, as 75-year fiscal gap calculations in OMB (2014) are negative, showing the national debt disappearing by the end of the period. However, a key difference between these estimates and those in Auerbach and Gale lies in assumptions about what constitutes current policy. The OMB estimates assume that discretionary spending continues to fall as a share of GDP throughout the period (from a 2014 value of 6.8 percent), reaching just 1.9 percent of GDP in 2085, rather than the 5.2 percent in Auerbach and Gale, and that revenues continue to grow as a share of GDP, from a 2014 value of 17.5 percent to 23.1 percent, rather than the 17.8 percent assumed by Auerbach and Gale. In a sense, the OMB projection lays out one possible scenario for changing current policy to eliminate the fiscal gap, a path not necessarily feasible or desirable.

### *C. Fiscal Uncertainty: Summary*

Uncertainty surrounding fiscal projections is large and increases with the horizon over which one is projecting, even if the additional uncertainty associated with policy choices is excluded. Several factors contribute to this uncertainty, although some (e.g.,

mortality) appear to be less important than others, at least over the next 25 years. The range of plausible outcomes over this period suggests that under the most favorable conditions no major fiscal policy changes will be needed, if stabilizing the national debt is our objective; baseline projections and even less favorable realizations of various sources of uncertainty suggest a need for very significant policy changes in order to stabilize the debt. Moreover, the picture worsens substantially as the forecast horizon is extended, simply because unfavorable trends continue. Even under favorable assumptions, the future path appears infeasible without major policy changes being undertaken – much bigger than we are accustomed to discussing in standard policy debates. Yet there is substantial uncertainty about the size of the fiscal gap we confront.

How should one think about projections that suggest a dire fiscal outcome? To this difficult question, some have found comfort in a simple answer, citing what has come to be known as "Stein's Law." Reflecting the views of Herbert Stein, a respected economist and Chair of the President's Council of Economic Advisers during the 1970s, Stein's Law states that that "If something cannot go on forever, it will stop." Subscribers to this view argue that forecasts of entitlement spending growing until it absorbs the entire federal budget should be ignored, since such an outcome is impossible.

There are three important problems with this sanguine perspective. First, projections that may seem implausible based on historical experience need not be infeasible or even unlikely. After all, who in the mid-1960s, when these expenditures accounted for around 2.5 percent of GDP, would have predicted based on past experience that net federal spending on Social Security, Medicaid and Medicare would account for 10 percent of GDP and over half of the federal budget excluding interest, as they did in fiscal-

year 2013?[19] It is true that these programs cannot absorb the entire federal budget if that budget remains constant as a share of GDP, given the irreducible amount required for other spending simply to keep the government running, but the overall budget can grow. Second, a logical certainty that a trend will not continue indefinitely has no bearing on the cost or difficulty of breaking with the trend. Finally, how and when the course of fiscal policy shifts can matter a lot for the level and distribution of economic well-being, and waiting for a crisis or a sudden incidence of responsibility to force action may result in substantial damage in the interim. Simply "letting things happen" is hardly a well-reasoned strategy for fiscal adjustment, particularly when major, complex entitlement programs are central to the adjustment process and when political realities may give policy makers an incentive to delay making tough choices. To paraphrase Dickens' Mr. Micawber, something *may* turn up. But it may not.[20]

## 3. Responding to Fiscal Uncertainty

Because one should evaluate government policy choices in terms of their ultimate effects on individual well-being, the lessons of economics about individual decision-making under uncertainty are relevant for public policy decisions. One must go further in the case of government, because of several issues that do not arise in the case of household

[19] This is not to suggest that all unlikely outcomes were in the direction of increasing expenditures. The collapse of the Soviet Union within a quarter century and the resulting "peace dividend" would also have been implausible in the mid-1960s, although the fall in the defense budget has been much smaller as a share of GDP than the total increase in the three entitlement programs, even to date.

[20] Evidence (e.g., Auerbach 2003) suggests that policy actions *do* respond to budget conditions in a manner that tends to stabilize the budget, with tax cuts and spending increases when deficits are small and the opposite when deficits are large. But this evidence relates only to short-run variations in budget conditions, and not to longer-run imbalances not reflected in current deficits. Moreover, it does not suggest that the policy responses are in any sense optimal in terms of timing or composition.

responses to uncertainty. Still, it is useful to start with the individual analogy before considering the more complicated choices that governments face. Some of the analysis that follows relies on points developed in more detail in Auerbach and Hassett (2007) and Auerbach (2009).

### *A. Decision-Making under Uncertainty: Some Basic Principles*

How should saving for the future be influenced by the existence of uncertainty? Standard economic analysis (e.g., Skinner 1988) of individual decision-making yields several suggestions. First, under reasonable assumptions about individual preferences, uncertain future earnings should induce more saving.[21] Put simply, even if one can't buy insurance to offset future income shocks, one can self-insure to some extent by putting aside more resources for an uncertain future. The logic is that such extra saving will be valuable enough when times are tough (and future resource needs high) that this offsets the relatively low value of such resources when future needs are lower as well as the cost of foregoing spending today.

Second, the greater the uncertainty, the stronger the incentive for precautionary saving and the more one should set aside for the future. In particular, the argument that one often hears in policy discussions, that projections for the future are so uncertain that we should largely ignore them,[22] appears to point in just the wrong direction.[23] If baseline

[21] Formally, greater uncertainty leads to an increase in precautionary saving if the third derivative of the individual's utility function is positive, as would be the case for preferences exhibiting constant relative risk aversion.

[22] For example, "Yes, current projections still show a rising ratio of debt to G.D.P. starting some years from now, and uncomfortable levels of debt a generation from now. But given all the clear and present dangers we face, it's hard to see why dealing with that distant and uncertain prospect should be any kind of policy priority." Paul Krugman, *New York Times*, October 9, 2014.

forecasts tell us that we need to save, then uncertainty about these forecasts tells us that we need to save more and greater uncertainty that we should save still more. Of course, we may end up regretting having saved for a rainy day that never came, just as we may regret having purchased fire insurance if our house does not burn down, but that regret can ultimately be traced to the uncertainty itself.

Even in a simple setting, there are complications to the analysis just described. For example, the incentive for precautionary saving is smaller if the returns to saving are themselves uncertain, since saving more in this case generates greater future uncertainty.[24] And, for the *individual* deciding how much to save, the existence of government social insurance programs that protect individuals who experience bad health or employment outcomes not only lessens the need for precautionary saving because of uncertainty is reduced, but may also discourage saving by effectively taxing returns to saving through the mechanism of future means-testing (Hubbard, Skinner and Zeldes, 1995).

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[23] Such comments may in some manner reflect the distinction introduced by Knight (1921) between the concepts of *risk* and *uncertainty*, where risk refers to an outcome with known mean and variance and uncertainty refers to a situation where the mean and variance themselves are unknown and can take on a range of possible values. The sense in which individuals may be more averse to outcomes in the presence of Knightian uncertainty, consistent with the evidence in Ellsberg (1961), has been referred to as *ambiguity* aversion. The limited published research to date on the relationship between ambiguity aversion and precautionary saving has either suggested that ambiguity aversion will provide an additional incentive for precautionary saving (Miao 2004) or derived conditions somewhat analogous to those related to risk aversion under which it will do so (Berger 2014) but does not provide a rationale for the position that predictions subject to considerable uncertainty, in the sense described by Knight, should be ignored.

[24] Numerical calibrations in Skinner (1988) and Viceira (2001) suggest that there will still be a clear incentive for precautionary saving in such cases, with the incentive increasing with future income uncertainty. Viceira also finds that greater future income uncertainty should cause a shift to safer assets on the part of the individual saver. As an increase in government saving takes the form of debt retirement, i.e., is an investment in nearly riskless assets, this complication does seem relevant for the analysis of government saving here. However, additional investment risk might still result for the economy as a whole to the extent that debt redemptions pushed private domestic investors into riskier alternative assets.

### *B. Influences on Government Policy Responses*

Since government decisions affect and should be guided by the well-being of individuals, much of the basic intuition regarding dealing with uncertainty and the determinants of precautionary saving carry over from the analysis of individual saving decisions. If government seeks to maintain future spending programs and is unsure whether the stream of revenue existing policy provides will be adequate to fund such programs, then uncertainty about the extent of this inadequacy should strengthen the motive to save and lead to even more resources being set aside for the future; in terms of the previous discussion about measuring the size of the current fiscal gap, uncertainty about the size of the fiscal gap should encourage even more saving than a baseline forecast of a gap of a particular magnitude.

Of course, there is much that is different when considering government rather than individuals, beginning with the obvious point is that there is no overlay of social insurance that must be taken into account. But there are a number of other important complications that arise. A discussion of many of these complications, along with their implications for decision-making, follows.

1. <u>What is government saving?</u>

While *national* saving – putting resources aside for the future – has a relatively clear definition in terms of economic fundamentals, *government* saving does not. Government saving is conventionally measured by the change over time in government financial assets net of liabilities – roughly, the government surplus (or, if negative, the government deficit); this measure depends very much on somewhat arbitrary classifications.

A familiar and important illustration is that if the Social Security system were converted to one in which the right to receive future benefits took the form of explicit government debt, nothing in the economy would change, but private assets and government liabilities would jump in equal and offsetting amounts,[25] and accruing rights to receive benefits would count as private saving and government dissaving (i.e., components of the government deficit). Converting implicit government liabilities to explicit ones has a massive impact on the division of national saving between government and private saving, as conventionally measured.

When referring to government saving here, what we mean is government action that directly reduces the fiscal gap, in terms of the extent of future tax increases or spending reductions needed to satisfy the government's long-term budget constraint. Such saving would happen directly if government reduced its current purchases of goods and services or transfer payments. It would also result if government raised current taxes, with no offsetting change in the planned future trajectory of government spending on goods and services or transfer payments.[26]

In both of these examples, the increase in saving would correspond to a reduction in the government budget deficit, i.e., to an increase in government saving as conventionally measured. However, as the above example involving pension system conversion shows,

[25] A partial conversion of this form would have taken place under the Bush administration's 2005 proposal to redirect a portion of payroll taxes to personal retirement accounts and reduce future benefits from the existing system by an amount roughly equal in present value. The increase in government debt would have occurred to cover the payments to current beneficiaries no longer financed by the redirected payroll taxes.

[26] Government saving as defined here would also increase if the government shifted from current spending to investment in productive, income-producing assets, which again would amount to a reduction both in the government's net borrowing and also in the fiscal gap. The situation is more complicated if the government investment were in assets not yielding any direct return to the government, such as national parks or infrastructure. A switch from current spending to such projects might well have substantial benefits in terms of individual welfare, and in the case of infrastructure indirect feedback effects on the government's fiscal position, but it would have no direct impact on the fiscal gap.

the two concepts – reductions in the budget deficit and government saving as defined here in terms of the fiscal gap – are distinct, because not all effects on the fiscal gap result from current changes in borrowing. In that example, an increase in current borrowing would be offset by a reduction in future pension payments, with no direct impact on the fiscal gap. This distinction is not limited to entitlement programs; there are also many examples relating to the way tax systems are structured.[27] An implication of this approach is that government saving need not include any changes in current taxes or spending. Future changes adopted or otherwise made credible today could have a similar effect, not only the government's long-run fiscal situation, but also on individual behavior as well.

For example, a policy of raising payroll taxes on current workers should have an impact very similar to a policy of reducing future benefits for the same individuals, to the extent that the future benefit reduction is seen as likely to occur and individuals can alter their own saving to offset the difference in timing of the two policies. A key issue here is how to make policy changes adopted for the future credible. One may be skeptical about the possibility, but at least one clear example is the adoption in 1983 of a policy change still underway – a delayed and gradual increase in the retirement age from 65 to 67, over a 22-year period beginning in 2000. On the other hand, many policies adopted for the future have never taken effect, such as the Medicare Catastrophic Coverage Act, passed in 1988 and repealed scarcely more than one year later.

[27] An example from tax policy is the comparison of traditional IRAs/401(k)s and Roth IRAs/401(k)s. The programs are roughly equivalent in their effects on the government's long-run budget and the fiscal gap, if tax rates are constant over time, but their effects on deficits differ. While in this example the timing difference is very much part of the motivation for the Roth vehicles – to make the fiscal cost appear lower within a short-term budget window – there are other, more important cases, for example in comparing income and consumption taxes, where timing differences are fundamental but have typically not been central to policy discussions. See Auerbach and Kotlikoff (1987) for a more general presentation of this issue.

2. Aggregation over individuals

Government policy affects the well-being of individuals within and across generations. How the well-being of different individuals should be weighed is of course a central question of government policy not specific to the issues being discussed here. But as one considers how much government should put aside for the future, the question involves the relative weight given to the young and the old today, and to current versus future generations.[28]

A common argument against deferring spending today, either by reducing government spending or increasing current tax revenues, is that future generations will be better off than current generations and therefore should bear a higher fiscal burden relative to their income than do current generations, as progressive policy would dictate. Whatever the strength of this argument, though, it does not relate to how government should respond to *uncertainty*. One would have to claim further that the more affluent future generations will also be less sensitive to uncertainty in order to argue that their affluence alone reduces the need for precautionary saving. Perhaps this argument has some merit, but it has received little attention or evaluation.

Even the basic argument in favor of transferring resources from the more affluent individuals or generations to the less affluent must be made with some care. This argument rests on the assumption that providing additional resources to the affluent increases their well-being by less than providing these resources to the less affluent. Particularly when making comparisons across generations, though, it is important to

[28] Whether one should think of different generations as fully distinct depends on the strength and prevalence of operative bequest motives. In the quite extreme case in which current generations view their descendants as extensions of themselves, as in Barro (1974), the distinction weakens considerably.

distinguish between overall well-being and the increase in well-being resulting from additional resources. For example, although we would associate an increase in life expectancy with an increase in well-being, the life extension could also raise the cost of providing a reasonable living standard to the longer-lived, particularly if greater longevity stretched the resources already available to those living longer. Of course, we would expect the longer-lived to extend their working lives to earn more and save more for retirement, but even so the value of additional resources might be heightened by greater life expectancy. Note that in this setting an "adverse" shock (from a budget perspective) that would prompt us to value a generation's resources more highly would be associated with a positive outcome, an increase in life expectancy.

One important distinction among existing generations in their ability to bear risk is their planning horizons; the longer the planning horizon, the more flexibility one has to deal with an economic shock of a given magnitude. For example a 40-year old presented with the prospect of uncertain retirement income has options, such as to retain the possibility of remaining in the labor force longer or to engage in greater precautionary saving, that a 65-year old may not have. Allocating uncertainty among existing generations should take account of this. Indeed, it is common for proposals to reform entitlement spending to exempt older generations.

3. Distortionary taxation

Even if government determines that future generations' affluence reduces the need to put resources aside for the future, and even if this also suggests a weaker need for precautionary saving, the manner in which government raises revenue provides a counterweight to this prescription. This is because raising revenue as a share of income

means raising marginal tax rates, assuming that distributional objectives maintain their importance in determining the general tax rate structure.[29]

A central lesson of the economics of public finance is that the social cost of economic distortions, including those arising from marginal tax rates that influence economic decisions and reduce well-being, rises roughly with the square of the distortion; for example, doubling a marginal tax rate causes a four-fold increase in the associated economic loss to society as a whole. This means that there will be an incentive for government to keep marginal tax rates from fluctuating from year to year (Barro 1979), instead using government saving and borrowing to smooth out fluctuations in revenues.

Another implication of this analysis is that the motivation for government to save less because of expected future affluence is tempered by the distortions that will ensue from higher marginal tax rates. For example, we might feel that future generations will be so well off that they can afford a tax burden that claims 50 percent of their income, much higher than the federal tax burden today, but the marginal tax rates needed to deliver this income could be so high that we might find the resulting distortions too large to be acceptable.[30] Again, this is a conclusion about the optimal government response to future revenue needs, not to uncertainty about these needs. But for the same reason that fluctuations in marginal tax rates over time impose additional costs on the economy,

[29] It is certainly true that one can avoid or lessen marginal tax rate increases while increasing revenue and maintaining the existing degree of progressivity by broadening the tax base, for example by reducing tax deductions and credits for higher income individuals. However, such base-broadening measures, whatever their other potential attractions, act like marginal rate increases by reducing the purchasing power of after-tax income. See the discussion on this point in Auerbach and Slemrod (1997), relating to the Tax Reform Act of 1986 and its objective of maintaining the existing distribution of the tax burden through a combination of marginal tax rate reductions and base broadening measures, and explaining why the combination of policies would have been expected to yield minor changes in labor supply and employment.

[30] Indeed, revenue requirements might rise to a point where they could not be satisfied, given the implied marginal tax rates and economic distortions, which would then require a reduction in marginal tax rates and a less progressive tax system to raise sufficient revenue, a policy shift that itself would also presumably be undesirable.

uncertainty also magnifies the costs of marginal tax rate distortions. For example, if we expect that a top marginal tax rate of 60 percent will be needed to cover future expenditures, but also recognize that revenue needs may be 20 percent higher or lower, the increased distortions when the marginal tax rate must be higher will be substantially greater than the reduced distortions when the tax rate can be lower. This strengthens the incentive for the government to save.[31]

Note also that, to the extent that we expect the recent trend toward greater inequality to continue, this will strengthen the argument just made, for one plausible response to greater inequality in the future will be higher marginal tax rates.

4. Avoiding crises and disruptions

As recent experience reminds us, the resolution of uncertainty is not always an orderly process. As in the Great Recession, a drop in asset prices can cause disruptions in the financial system that magnify economic losses, indeed that threaten the functioning of the economy and may have long-lasting effects, as the downward adjustments in estimates of potential GDP in the recession's wake suggest. Similar concerns relate to the activities of government. We cannot predict when a fiscal trajectory like the one the United States is currently on would lead to a credit-market disruption like those experienced during recent years by Greece and Argentina, and it may seem foolish to suggest that the situations are even comparable. But, to the extent that a crisis brings with it significant additional economic costs (beyond those associated with slower economic growth) due to disruptions in the economy, it is an event that we should strongly seek to avoid.

[31] With distortionary costs of taxation reducing income by a greater fraction in bad states of nature than in good ones, the effect of uncertainty is to reduce the mean and increase the variance of income, both of which contribute to an increased incentive to save.

Even with a clear understanding (which we lack) of the conditions under which a crisis might occur, uncertainty about our fiscal trajectory magnifies the relevance of a potential crisis to the decisions we make today. We should wish not only to avoid a crisis along the path we expect the economy to follow, but also even if a series of negative shocks hits the economy. The outcome may be unlikely,[32] but it can still loom large if it brings with it costly economic disruptions.[33]

5. Dealing with political constraints

In household surveys, individuals commonly express regret that they are not saving more for retirement and other future needs. This well-known self-control problem carries over to government decisions, insofar as government is making decisions on behalf of and in response to the same impatient and short-sighted individuals who have trouble saving on their own. But there are additional factors that may exacerbate the problem at the government level.

First, governments are impermanent; even a rational, forward-looking government might choose to spend more than would otherwise be prudent as a way of committing resources to areas of interest. For example, a government whose constituents would like to devote a larger share of the budget to national defense might embark on major defense spending programs that are difficult to reverse after a change in government.[34]

[32] ...or perhaps not so unlikely, at least during periods of extreme economic turbulence. At the height of the Great Recession, in March 2009, the default rate implied by five-year credit default swaps for senior U.S. Treasury securities reached nearly 8 percent (Auerbach and Gale 2009, Figure 13).

[33] The argument is much the same as in the case of distortionary taxation. If the likelihood of a costly disruption increases when there are unfavorable income shocks, this will reduce the mean and increase the variance of expected income, net of the costs of disruption.

[34] See the discussion in Auerbach (2006), for example. Of course, if the group in power favored a very low rate of spending to begin with, it might still end up spending less than would be preferred by others, as well as concentrating spending in its own preferred areas.

Second, access to information about the government's fiscal position is limited. There has been an improvement over time in this regard, with long-run CBO analyses becoming ever more detailed and sophisticated and a range of long-range projections now available for government entitlement programs, but there is still considerable confusion among the general citizenry, and indeed among economists, particularly about the relationship between short-run budget developments and longer-run fiscal challenges. In such a setting, those in government need not face the right incentives to clarify information for public; perhaps obfuscation may give them more latitude to pursue personal objectives, or to gain popularity by making promises that cannot be kept. An interesting question here is the extent to which the manner in which information is conveyed influences policy outcomes. For example, would changes in the official accounting for old-age entitlement programs, listing accrued benefits as government liabilities, influence government policy? Would they do so even if those in government already understand the underlying situation regardless of the accounting method, simply by increasing the salience of these commitments to voters?[35]

The political process may also make it difficult to enact changes in policy, even changes that represent a significant improvement. Such difficulty not only can worsen outcomes generally, but it also can influence the types of policies that should be adopted. For example, if government recognizes that frequent changes in policy are unlikely, it may choose to defer attempting policy changes until they are really needed, and then to make large changes; in particular, there may be an even stronger incentive for precautionary

[35] Of course, not all ignorance or lack of salience need bias outcomes toward larger long-run commitments. For example, individuals not yet retired may not realize how much they stand to benefit from existing programs under current law.

saving if reacting to bad news in the future will be difficult. Also, as Kamin (2014) suggests, automatic adjustment mechanisms may be more appealing, even if such mechanisms are too simple to accommodate the full range of possible circumstances. An example of such a mechanism, now part of the formula used in Germany's old-age public pension system, reduces the growth rate of pension benefits as the old-age dependency ratio rises.[36] The logic of such a provision is that the old-age dependency ratio affects the fiscal balance of a pay-as-you-go pension system. One might wish to condition benefit changes on other factors as well, but this adjustment is likely to increase the pension system's fiscal stability and lessen the negative consequences of an extended period of inaction.

6. <u>The productivity of government spending</u>

In addition to uncertainty about future earnings or life expectancy, another important source of uncertainty, particularly in relation to government spending on health care, is the productivity of spending, that is, how much benefit an additional dollar of government spending provides. There is a close analogy here to the issue of life expectancy discussed earlier. Just as the positive development of increased life expectancy makes additional resources more valuable, medical advances may improve individual well-being while at the same time increasing the social value of additional spending on medical care. It may seem unfair to spend more on generations who have access to productive medical care than on those who don't, but doing so can be consistent with putting resources to their most effective uses, even taking distributional objectives into account. Greater uncertainty about the progress of medical advances could, therefore, justify additional saving for the future.

[36] This formula is discussed in Börsch-Supan et al. (2003).

However, we are uncertain not only about the rate of progress, but also about the nature of future evolution of medical technology. It is also possible that medical advances will coincide with little change or even a decline in the value of additional spending. For example, discovery of an expensive new technique for extending life would increase the value of additional resources, both directly (on medical spending) and indirectly (on consumption during the longer lifespan). On the other hand, discovery of a cure for a chronic disease that improves the quality of life rather than its length could reduce the value of additional future medical spending. To the extent that medical advances lessen the value of resources, the possibility of more rapid progress would lessen, rather than strengthen, the value of government saving for the future.

To some extent, forecasts of future excess cost growth in government medical spending may implicitly embody predictions of what it will cost to provide a certain standard of care based on the technology that will exist at the time, but these forecasts, and estimates of the uncertainty surrounding them, largely reflect past trends along with relatively arbitrary assumptions about how long government medical spending can continue to grow faster than the economy.

7. Private-public interactions

In thinking about the need for government saving, we should keep in mind the individual choices that are occurring simultaneously. As an illustration, consider the following simple, extreme example. Suppose that we are uncertain not only about the future value of additional medical spending, which the government provides, but also about the future value of spending on other items that individuals provide for themselves (e.g., food, clothing, etc.), and that our uncertainty is primarily about the relative values of the

two types of spending, rather than about the overall value of additional spending. Then, in the aggregate, there is little uncertainty about how much to save for the future, but considerable uncertainty about how much future spending we will wish to be undertaken by the government. However, the uncertainty regarding composition of spending still provides a reason for precautionary government saving, given that the government must raise funds through distortionary taxation, and that we wish to avoid the possibility of high marginal tax rates in the future when it turns out that we wish to devote a large share of our overall resources to the public sector.

In the previous example, values of private and public spending are negatively correlated, so that overall uncertainty about the value of saving for the future is lower than uncertainty about the value of private or public spending. More generally, uncertainty about the values of public and private spending may be largely unrelated, or even complementary, as in the case where costly medical advances extend life and increase the value of additional spending on private consumption. Such complementarity would increase the value of government saving today, to help avoid raising taxes in the future in circumstances where these resources are also particularly valuable for other uses.

8. Irreversibility and the resolution of uncertainty

As discussed earlier, substantial uncertainty about the need for future resources provides little justification for failing to take action today. However, if we expect a resolution of uncertainty at some future date, this provides an argument for deferring action, scaling back its current magnitude, or changing the form of the current response. The argument is particularly strong where there is some irreversibility in our policy choices.

For example, we are unsure today about the most efficient way to organize the delivery of health care, in particular what measures might reduce excess health cost growth in a manner that minimizes damage to the quality of health care. Will any of the payment reforms in the Affordable Care Act be effective? Is any of the recent slowdown in the growth of health care costs of a permanent nature, related to structural changes? Suppose that we expect to learn more about this over time, and that setting up our national health care system involves substantial fixed costs that make frequent large changes in the organization of health care delivery undesirable. We may then wish to defer making major cost-reducing changes in our health care system until we know more. But it might still be desirable to engage in precautionary saving, to put resources aside in response to the uncertain future needs for spending on medical care; and, to the extent that structural changes are costly to undertake, even more precautionary saving may be needed.

### *C. Summary: Government Policy Responses to Fiscal Uncertainty*

Uncertainty about the need for future resources should spur government saving, over and above what current projections suggest is needed; and current projections, as in the estimates in Auerbach and Gale (2014), suggest that a substantial amount is needed, on the order of one quarter of the current federal government budget even under favorable assumptions about the future growth in health care costs. The possibility of even worse outcomes generally should weigh more heavily as we plan for the future than the offsetting possibility that outcomes might be better, and the costs to economic performance of substantial future tax rate increases or fiscal crises provide further arguments for setting resources aside now, even if future generations can bear increased fiscal burdens.

But government saving should be viewed as encompassing more actions than simply cutting current deficits. Undertaking credible measures to reduce the size of implicit government liabilities also represents government saving in the sense discussed here, and may be an appropriate element of policy reforms. Also, saving is only one dimension of possible policy responses, which also include the allocation of risks among different generations through the design and reform of tax structure and spending programs. There are many ways of making entitlement programs sustainable through additional government saving, for example, and choosing among them has important consequences.

## 4. Some Thoughts on the Reform of Government Policy

The preceding analysis leads to conclusions regarding the policy process as well as about policy itself. Regarding process, key issues are how information about uncertainty is conveyed and how this information is incorporated into the policy process. As discussed above and often lamented, the uncertainty associated with baseline projections and estimated effects of revenue and spending provisions tends to be suppressed not only in the presentation of projections but also in the legislative process itself. There may be some logic in excluding the uncertainty associated with legislative decisions themselves, but not for that arising from other factors. Constructing confidence intervals is not a simple task, particularly when one takes into account that sampling error is just one source of uncertainty (Manski 2014), but the recent CBO efforts presented above suggest that some quantitative assessments are possible and useful.

Making the provision of such information a more regular occurrence, perhaps by requiring that baseline forecasts be accompanied by quantitative expressions of the degree of uncertainty associated with them, would be a first step. Incorporating uncertainty ranges into estimates of the budgetary effects of potential legislation would be more of a challenge, not only because of the additional work involved for so many individual estimates, but also because of the unresolved issue of whether macroeconomic feedback effects are to be incorporated in the estimates themselves, that is, whether "dynamic scoring" will be used. One can, in principle, exclude such dynamic feedback effects in the same manner that the effects of legislative changes are excluded, but the logic of doing so is less obvious than the logic of holding policy constant. One of the common arguments against dynamic scoring is the added uncertainty associated with incorporating the effects of macroeconomic feedback in estimates. While perhaps reasonable in the current environment, this argument seems to weaken if the magnitude of uncertainty is conveyed along with the estimates. Here, though, a point that is particularly relevant is that the range of uncertainty with respect to possible outcomes would need to include uncertainty about the right forecasting model.

Even if ranges of possible outcomes are reported more regularly and prominently, this leaves the question of how to incorporate uncertainty into budget rules and procedures. While it might make sense in theory to have rules based on meeting a desired budget target with some probability, it is hard to imagine implementation of such rules. On the other hand, just as it has become common practice since the onset of the recent global financial crisis to subject large banks to "stress tests" to determine whether they would be solvent in adverse circumstances, one could test whether the government budget would

meet some target in the event of an unfavorable but plausible combination of economic factors.

As to changes in policy itself, there are two types of responses to consider. One, along the lines of the automatic adjustments to the Social Security benefit formula discussed above, would recognize the difficulty of mustering frequent active responses to changes in budget circumstances by building in provisions that adapt to major sources of uncertainty, for example by adjusting the normal retirement age or the level of benefits. One would structure automatic adjustments not just to provide budget stability but also to ensure appropriate risk-sharing among cohorts via the mix of adjustments, for example in the portion coming through increased payroll taxes versus benefit cuts, or the allocation of benefit cuts among different age cohorts. Automatic adjustments for health-care programs could be more complex to design, although there are simple measures in that area as well, such as allowing the rate of premium growth to vary with budget outcomes.

The bigger and more politically difficult type of policy response would be an increase in government saving. There seems little doubt that we need to save more to deal with the expected fiscal gap, and the analysis in this paper provides a number of other arguments why the increase in saving should be even higher given our uncertainty about projections. But governments at all levels do poorly in putting resources aside for the future, as we are reminded by the inability of state governments to fund and maintain large rainy-day fund balances, which would have helped avoid the sharp reductions in state spending during the Great Recession.[37]

[37] For a general discussion of the mechanics of rainy day funds, see Rueben and Rosenberg (2009).

If saving for future needs is hard, then saving for possible future needs is surely harder. The challenge may be further exacerbated by government accounting rules that characterize programs with large and growing unfunded commitments as being currently in budget surplus, as is the case at present for the Social Security system. Would changes in accounting rules work, to make existing commitments for the future count as current liabilities? Could the establishment of some mechanism for alienating accumulations from the overall budget process through the creation of separate, independently controlled funds have real effects? The answers are not clear, but the questions may be worth considering. What is clear is that hoping for a better future does not constitute an appropriate policy response to uncertainty, and waiting until the size of the problem is known is waiting too long.

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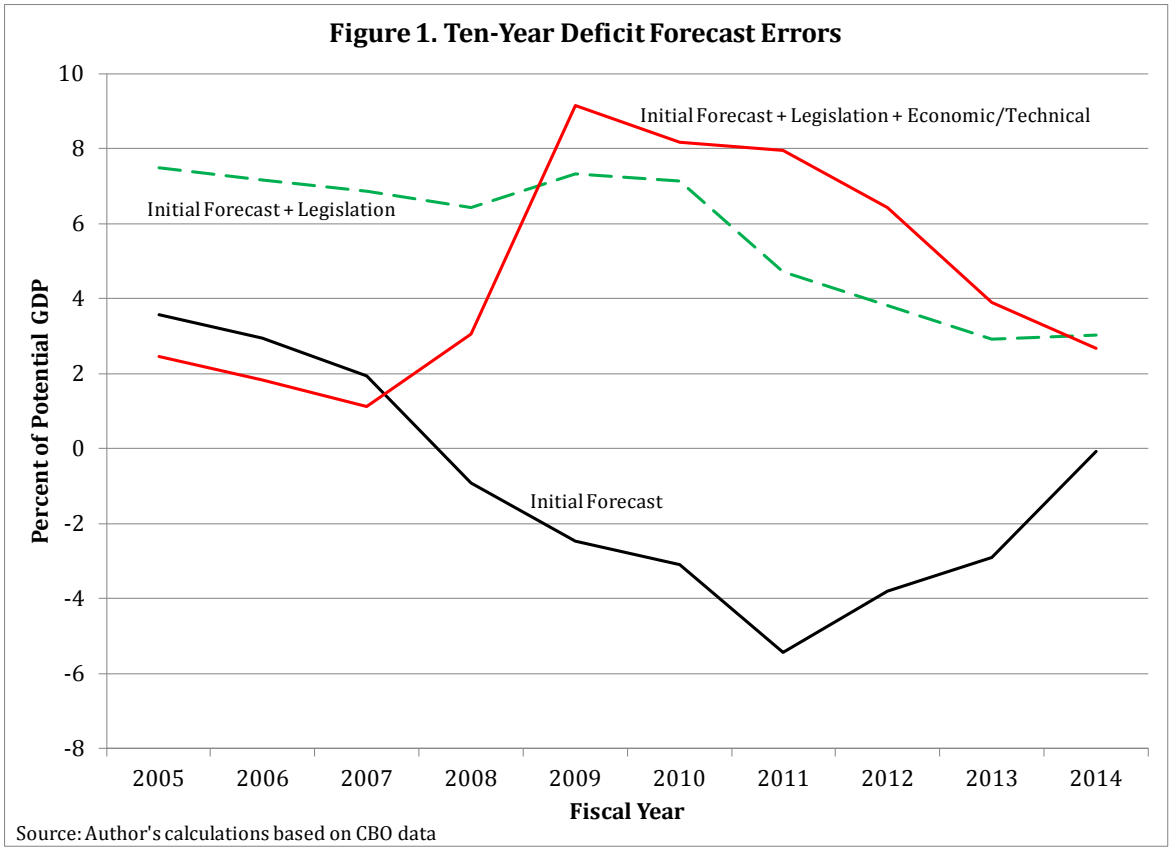
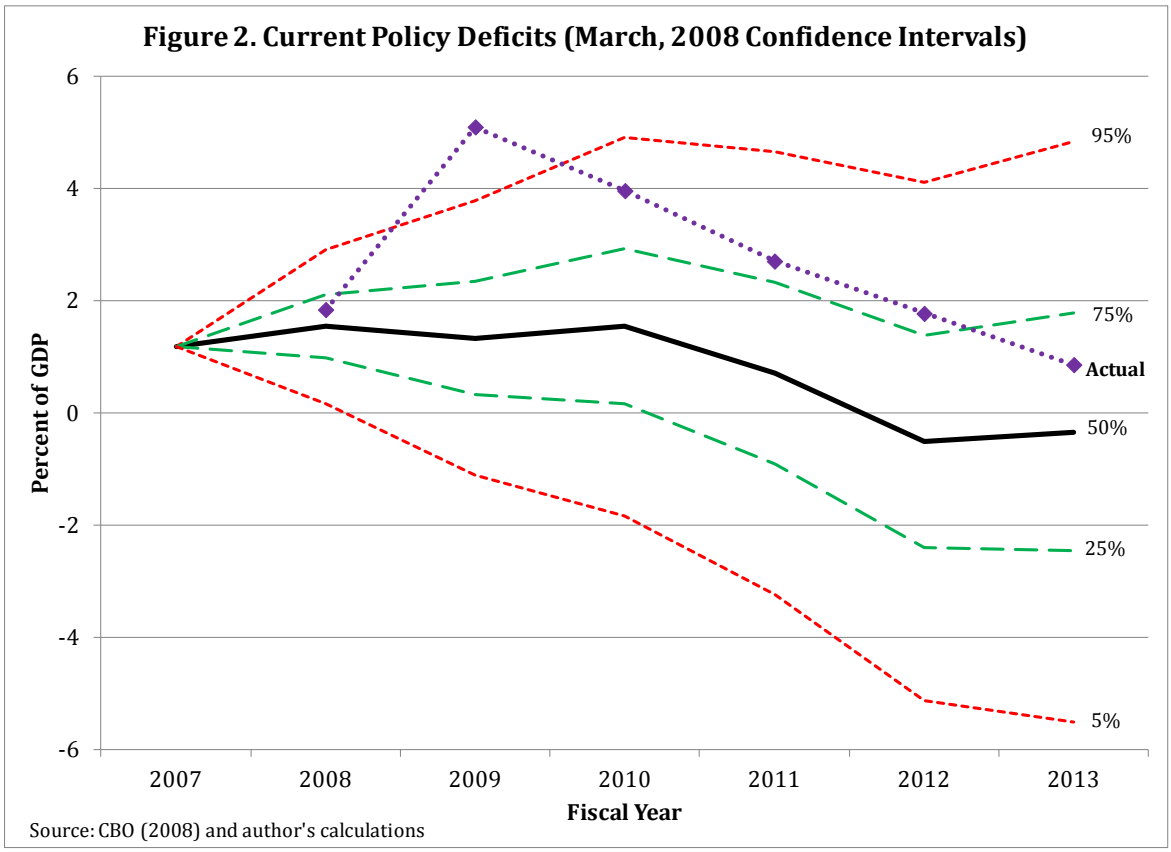


Source: Author's calculations based on CBO data



Source: CBO (2008) and author's calculations

**Figure 3a. Intermediate Forecast OASDI Balance, by Year of Forecast**

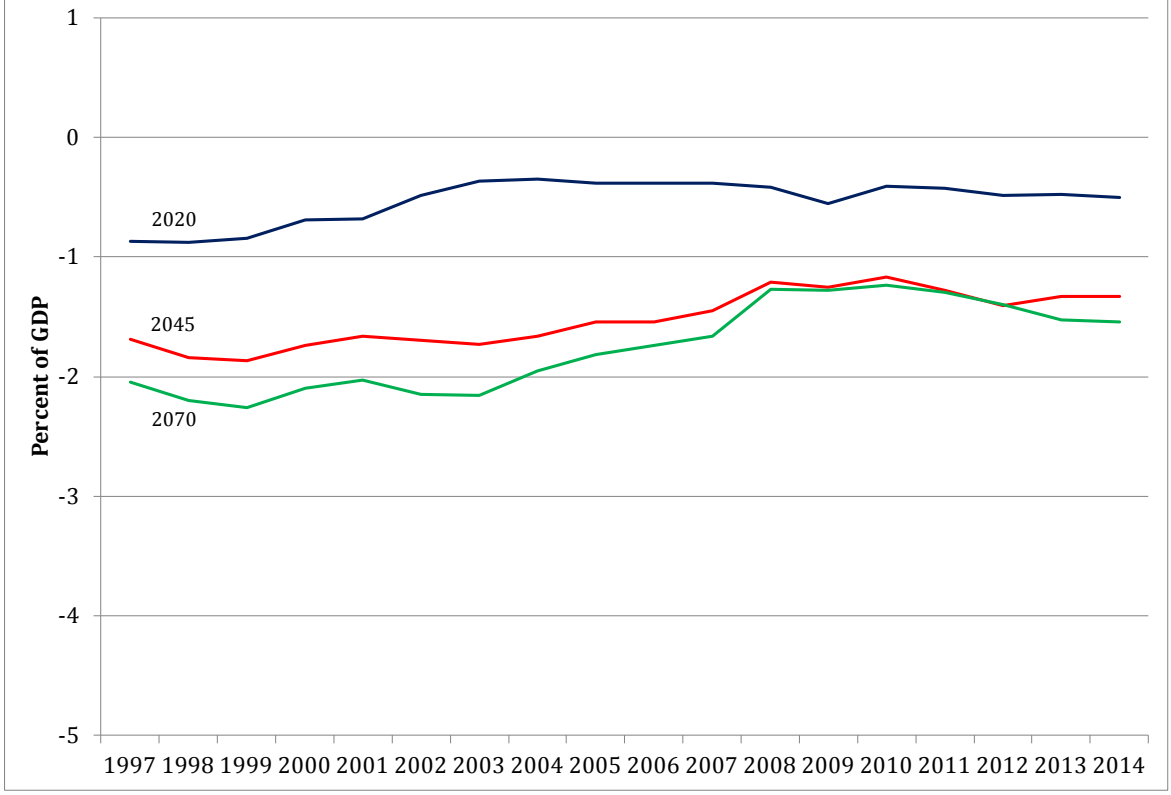
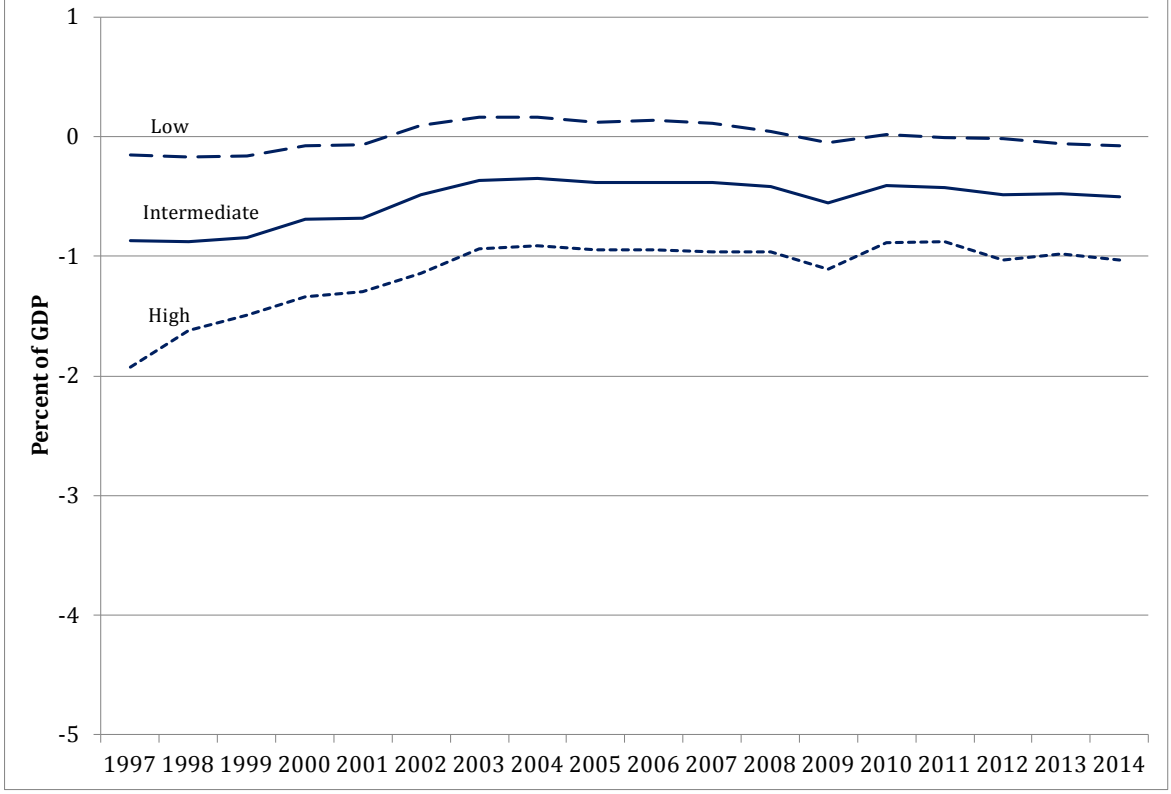



**Figure 3b. Forecast OASDI Balance, 2020, by Scenario**



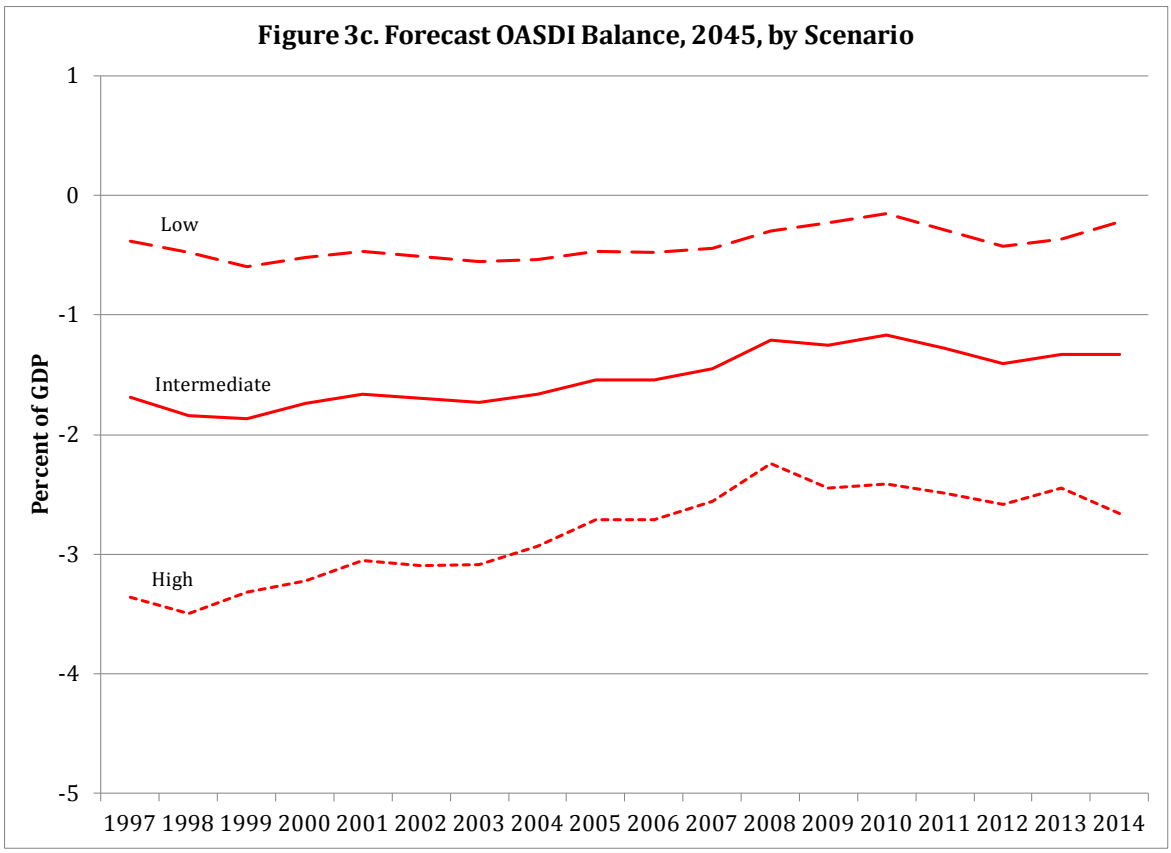


Figure 3c. Forecast OASDI Balance, 2045, by Scenario
Percent of GDP
1
0
-1
-2
-3
-4
-5
Low
Intermediate
High
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

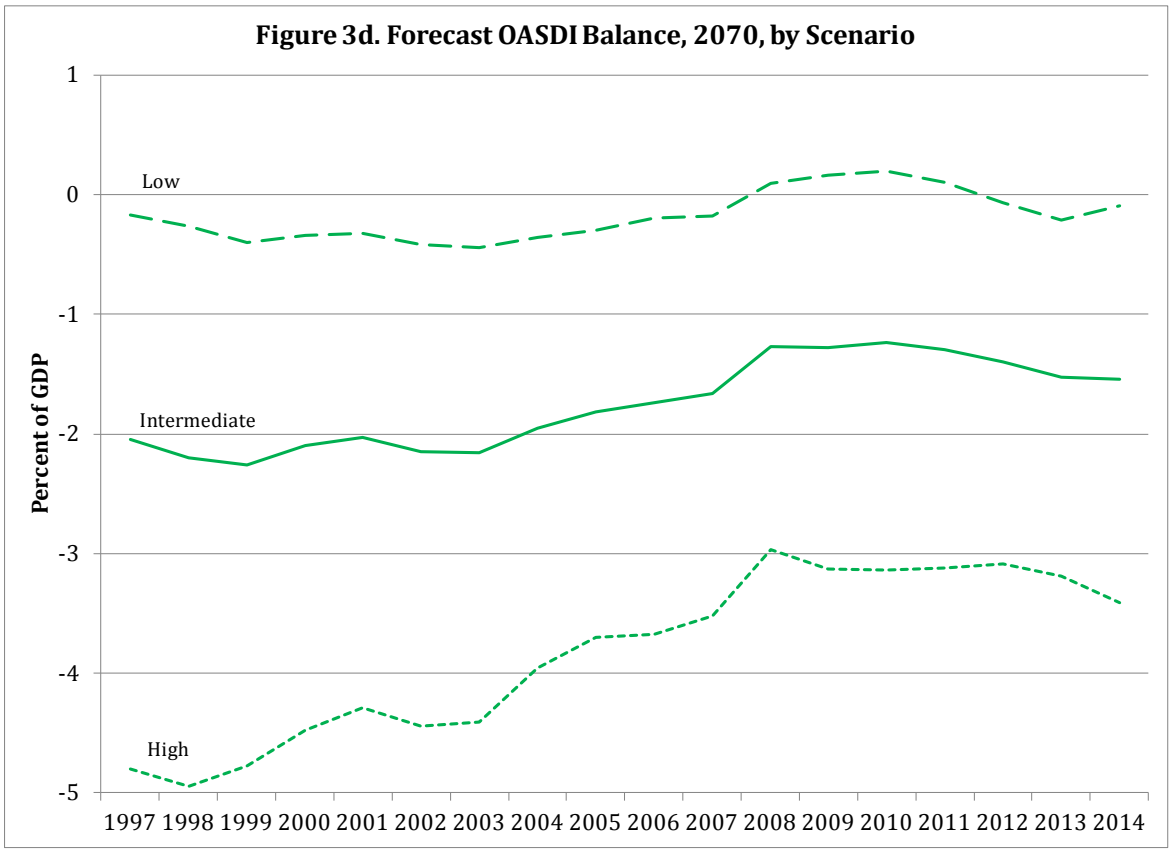


Figure 3d. Forecast OASDI Balance, 2070, by Scenario
Percent of GDP
1
0
-1
-2
-3
-4
-5
Low
Intermediate
High
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

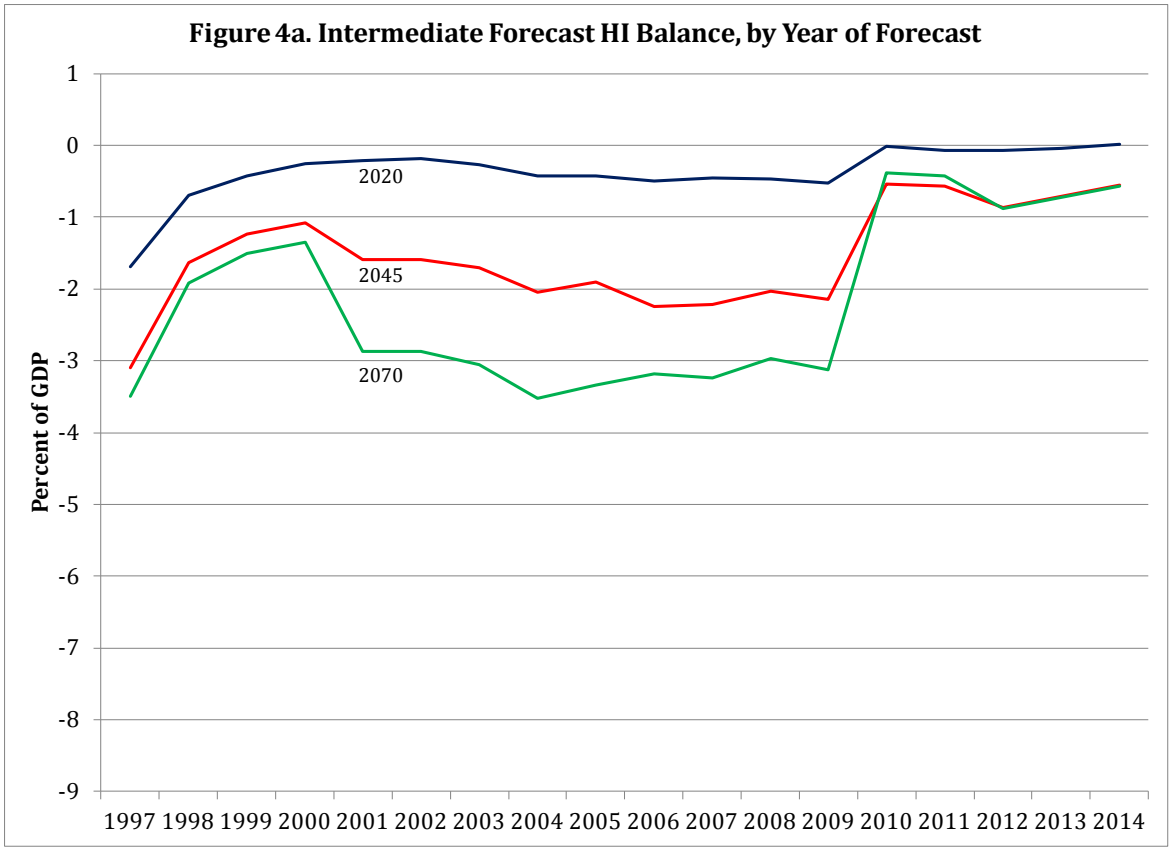


Figure 4a. Intermediate Forecast HI Balance, by Year of Forecast
Percent of GDP
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
2020
2045
2070
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

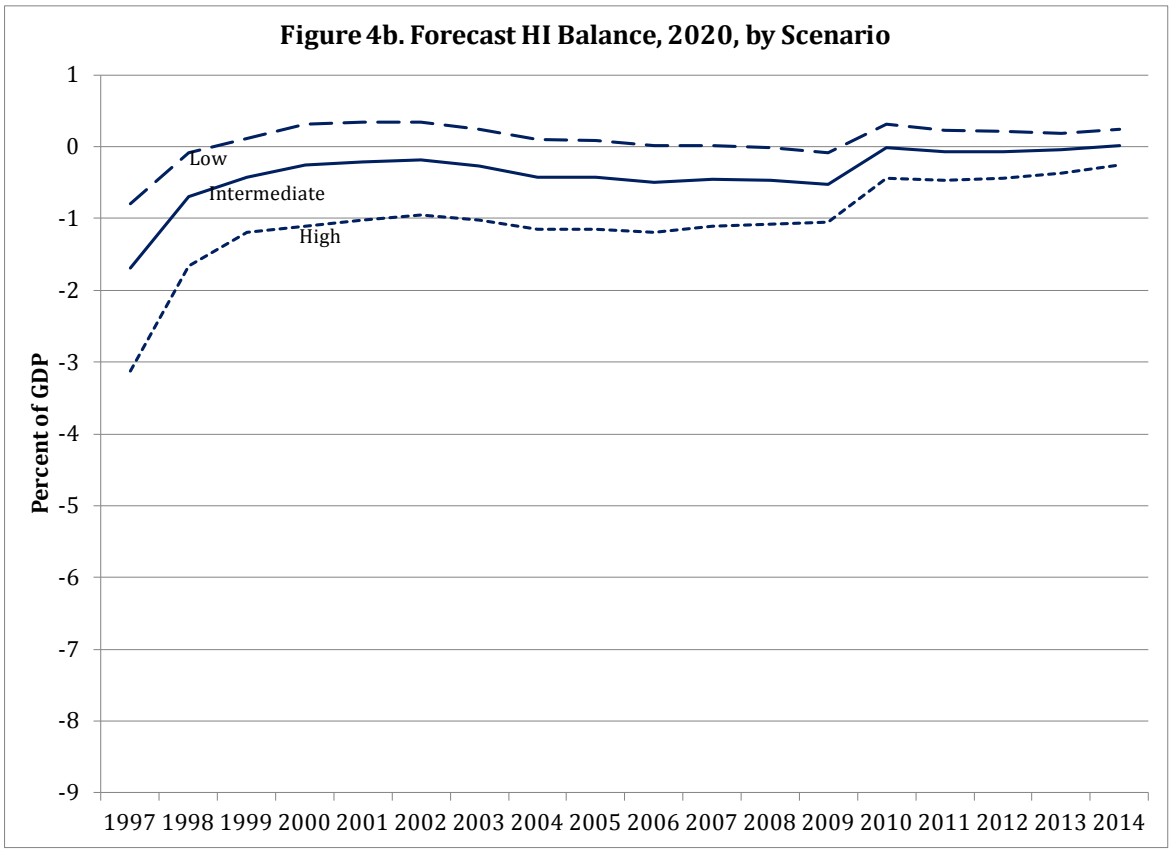


Figure 4b. Forecast HI Balance, 2020, by Scenario
Percent of GDP
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
Low
Intermediate
High
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

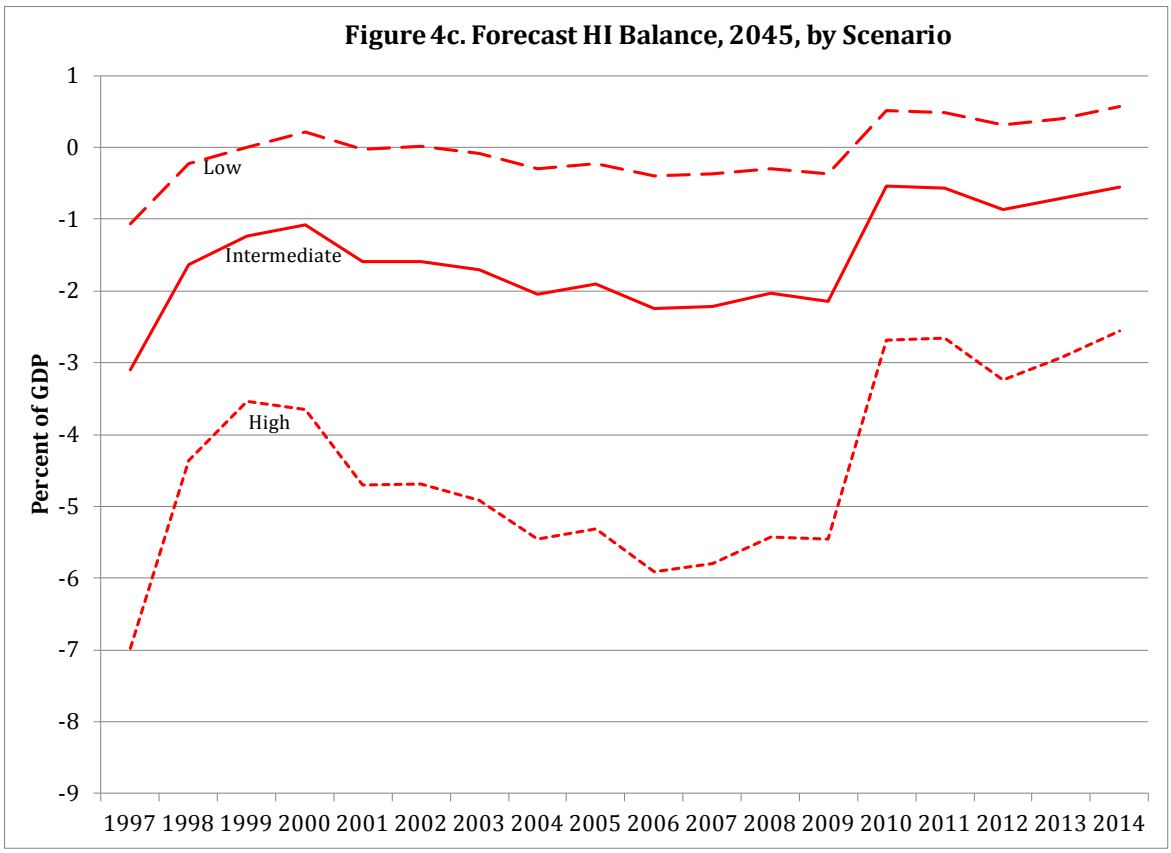


Figure 4c. Forecast HI Balance, 2045, by Scenario
Percent of GDP
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
Low
Intermediate
High
1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014

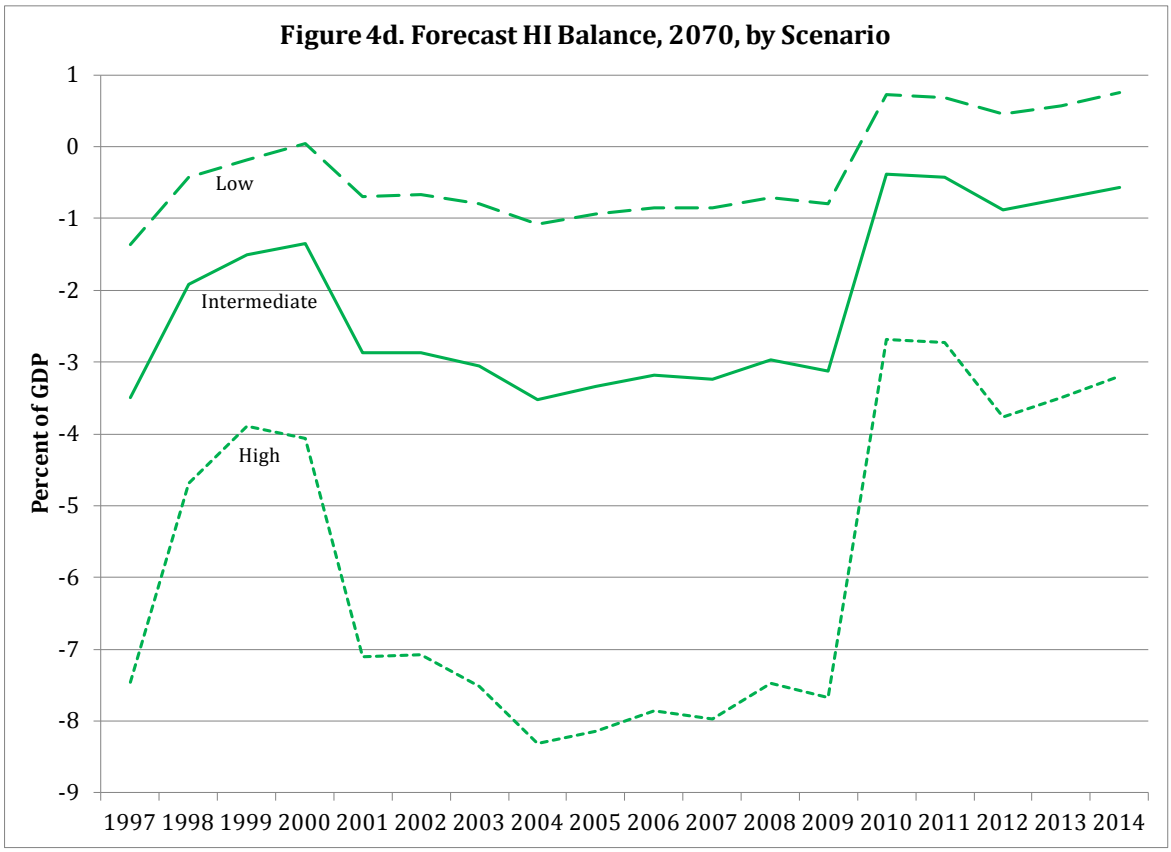


Figure 4d. Forecast HI Balance, 2070, by Scenario
Percent of GDP
1
0
-1
-2
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Low
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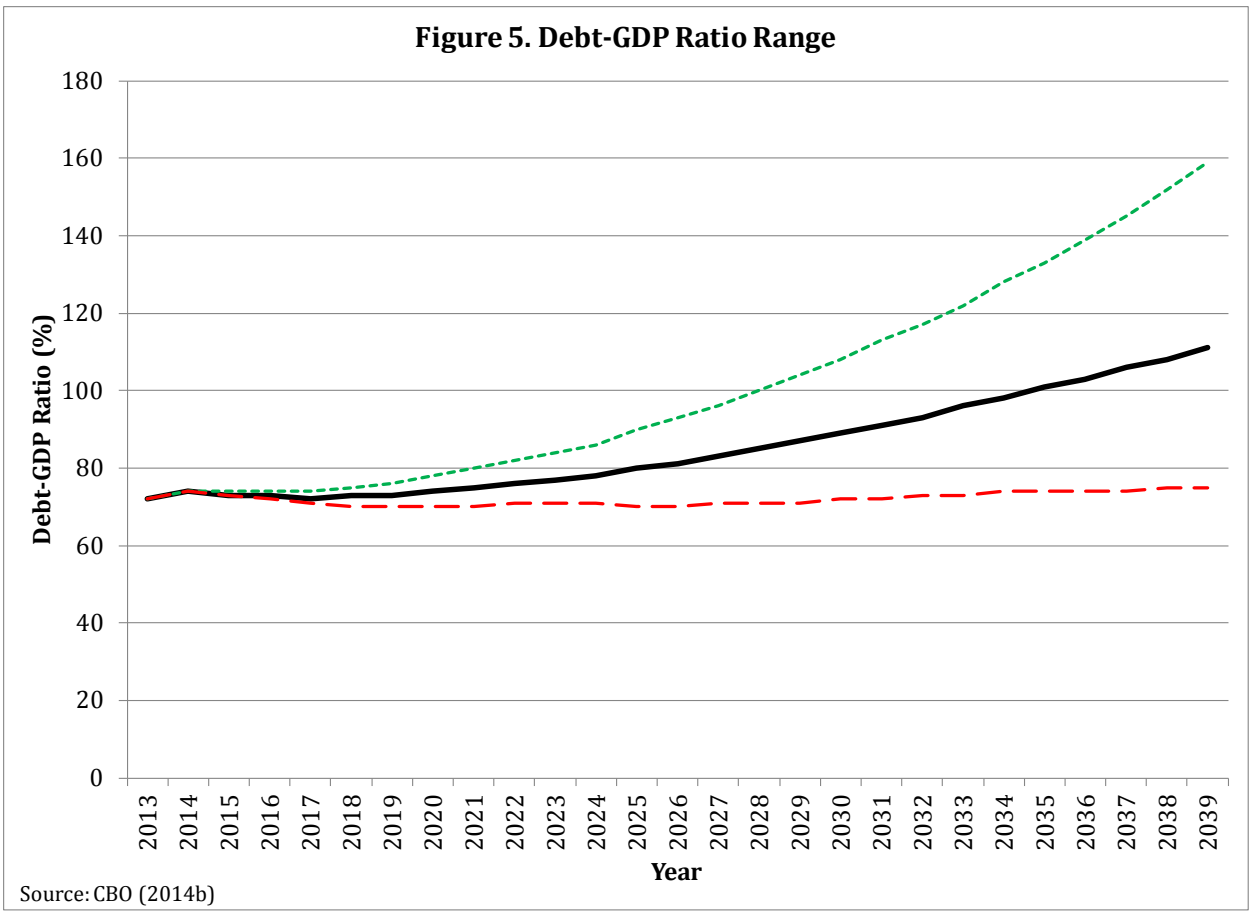

Source: CBO (2014b)

# Table 1. Effects of Uncertainty on the 25-Year Fiscal Gap

**Under CBO's (2014b) Extended Baseline Scenario**

| Factor | Baseline Value (%) | Range (%) | Fiscal Gap (%) | | |
|---|---|---|---|---|---|
| | | | Low | Baseline | High |
| **Mortality Rate** (Annual Rate of Decline) | 1.2 | ± 0.5 | 1.2 | 1.2 | 1.3 |
| **Productivity Growth Rate** | 1.3 | ± 0.5 | 0.6 | 1.2 | 1.9 |
| **Interest Rate on Federal Debt** (Average over Period) | 4.1 | ± 0.75 | 0.7 | 1.2 | 1.7 |
| **Excess Health Cost Growth Rate** | * | ± 0.75 | 0.7 | 1.2 | 1.9 |
| **Combination of All Factors** | | ** | 0.1 | 1.2 | 2.5 |

Notes:

* Medicare range for the period is 1.26-1.39; Medicaid range is 0.90-1.38

** Range is half the magnitude of those used for factors individually