

# IMF Working Paper

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"An Analysis of U.S. Fiscal and Generational  
Imbalances: Who Will Pay and How?"

*Nicoletta Batini, Giovanni Callegari, and Julia Guerreiro*

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**IMF Working Paper**

Western Hemisphere Department

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**Abstract**

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This paper updates existing measures of the U.S. fiscal gap to include federal laws up to and including the mid-December 2010 federal fiscal stimulus. It then applies the methodology of generational accounting to establish how the burden of adjustment required to attain fiscal sustainability is shared across generations. We find that the U.S. fiscal and generational imbalances are large under plausible parametric assumptions, and, while not much affected by the financial crisis, they have not improved much by the passing of the Final Healthcare Legislation. We find that, under our baseline scenario, a full elimination of the fiscal and generational imbalances would require *all* taxes to go up and *all* transfers to be cut immediately and permanently by 35 percent. A delay in the adjustment makes it more costly.

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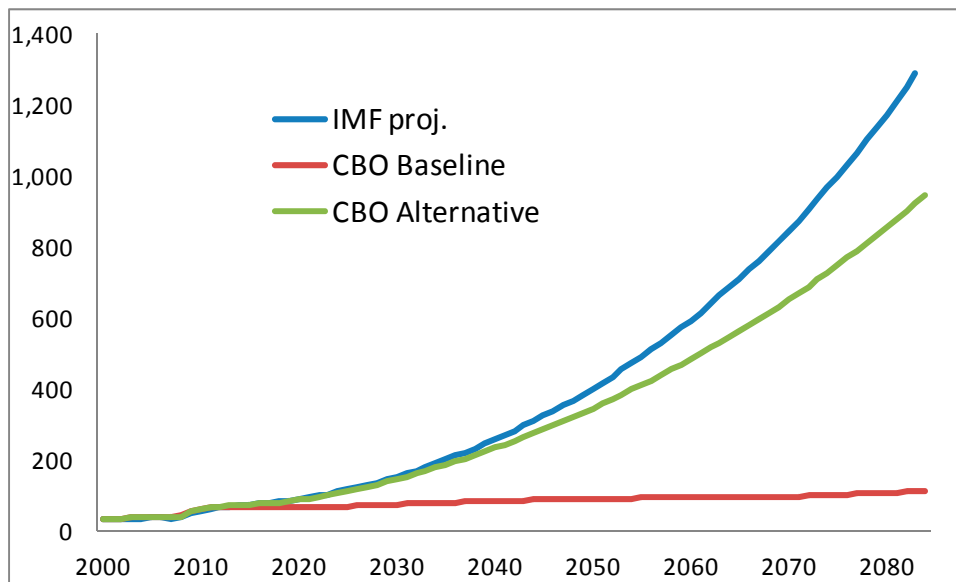
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## I. INTRODUCTION

The United States is facing an untenable fiscal situation due to the combination of high fiscal deficits, an aging population and rapid growth in government-provided healthcare benefits. IMF and Congressional Budget Office forecasts imply that U.S. debt will rise rapidly relative to GDP in the medium to long term (Figure 1).

Since a large part of the U.S. fiscal liabilities relate to commitments to future transfers (under federal entitlement programs) that will generate outlays in coming years, traditional fiscal indicators like the current fiscal imbalance or the stock of federal debt cannot capture well issues of fiscal sustainability nor give indications of the fiscal adjustment necessary to stabilize the debt permanently relative to GDP. Equally, they cannot measure whether, in the light of that adjustment, future generations will face an equal fiscal burden to current or past generations. With this in mind, this paper measures the U.S. fiscal imbalance and assesses the long-run sustainability of the U.S. fiscal structure. It then applies the methodology of generational accounting to establish how the burden of adjustment required to attain fiscal sustainability is shared across generations.

Figure 1. Evolution of U.S. Federal Public Debt Held by the Public  
(in percent of GDP)



Source: CBO (2010) and IMF 2010 Art. IV Staff Report, SM/10/189

To measure the U.S. fiscal imbalance we compute the “fiscal gap.” Over a finite horizon, it measures the reduction in the deficit required so that the debt-to-GDP ratio in a particular year is the same as today. Over an infinite horizon, it measures the adjustment needed for the government to meet its intertemporal budget constraint, so that the present value of the excess of future expenditure and current liabilities over future receipts is zero. It has been

argued that when fiscal pressures are concentrated in the long run, as in the United States, using the infinite horizon definition is preferable because finite horizon measures of the gap can underestimate the necessary adjustment (see Gokhale and Smetters, 2006).<sup>2</sup>

Alongside the fiscal imbalance we calculate also the “generational imbalance,” which illustrates how the burden to close the fiscal gap is shared across generations. To derive the U.S. generational imbalance we compute a set of generational accounts for all current and future U.S. generations. Generational accounts indicate the net present value amount that current and future generations are projected to pay to the government now and in the future. The accounts can be used to assess the fiscal burden that current generations place on future generations, and thus offer a measure of the fiscal adjustments needed to make the fiscal structure generationally equitable (the Appendix details the methodology used to compute the generational accounts).

Our findings show that the U.S. fiscal gap associated with today’s federal fiscal policy is huge for plausible discount rates. Using the same discount rate (3 percent) used by the Trustees of the Social Security Administration (2009) in their own Social Security-specific fiscal gap analysis and by CBO (2010e), and the infinite horizon definition, the U.S. fiscal gap is over 15 percent of the present discounted value of U.S. GDP under our baseline scenario. This implies that closing the fiscal gap requires a permanent annual fiscal adjustment equal to over 15 percent of U.S. GDP. In other words, fiscal revenues and spending would need to change so that the primary balance predicted under that scenario improves by over 15 percentage points of U.S. GDP every year into the indefinite future starting next year.<sup>3</sup> The main drivers of the fiscal gap are low revenues from revenue-constraining laws (like the once enacting tax cuts and AMT indexation); and rising healthcare costs that under current law will boost mandatory spending to above 18 percent of GDP by 2050. The gap remains large even excluding the adverse fiscal effects from the crisis. Using a more optimistic scenario where all tax cuts under current law are repealed, the Alternative Minimum Tax (AMT) is delinked from inflation, and all future governments succeed at permanently capping healthcare spending growth in the vicinity of nominal income growth, the fiscal gap drops to 4 percent of the present discounted value of GDP—per se stressing the importance of rapid fiscal action on these measures. The fiscal gap under a finite horizon definition, or a larger discount factor, is smaller under both the baseline and optimistic scenarios but remains sizeable.

The U.S. generational imbalance is also large. Applying “generational accounting” to U.S. data indicates that—under the baseline scenario—unless currently living Americans pay

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<sup>2</sup> For these reasons the SSA Trustee Report has recently begun to derive and publish an infinite horizon measure of the SSA Trust Fund adequacy.

<sup>3</sup> Technically, the ratio of the fiscal gap to the present discounted value of GDP shows how much of the gap adjustment can be apportioned to each year from now to infinity to ensure intertemporal solvency.

more in net taxes or unless government spending on current generations is curtailed, future Americans will face net tax rates that are about 21½ percentage points of the present discounted value of labor income higher than those facing current newborn Americans under our scenarios.

As part of the medium term adjustment, the authorities would need to raise taxes and/or cut transfers substantially to avoid an undesirable escalation of the debt-to-GDP ratio. The longer the wait, the larger the necessary adjustment will be and the greater the burden on future generations.

The paper is organized as follows. Section 2 goes through the methodology used to derive the fiscal gap and generational accounts, and gives details about the scenarios that we use. Section 3 presents results. Section 4 discusses the sensitivity of the results to various key assumptions. Section 5 suggests policy reforms to eliminate the gap over different horizons in ways that are generationally equitable. Section 6 concludes.

## II. METHODOLOGY

### A. What is the Fiscal Gap?

The fiscal gap measures, as a present value, a country's excess of total expenditures (including those arising from its commitments to spend in the future) over available current and future resources. It is commonly defined as the current federal debt held by the public plus the present value in today's dollars of all projected federal non-interest spending, minus all projected federal receipts. In symbols:

$$FG_t = PVE_t - PVR_t - A_t \tag{1}$$

Where  $FG_t$  is the fiscal gap at time  $t$ ,  $PVE_t$  is the present value of projected expenditures under current policies at the end of period  $t$ .  $PVR_t$  stands for the present value of projected receipts under current policies, and  $A_t$  are assets in hand at the end of period  $t$ .

A non-zero fiscal gap implies that the federal government is violating its inter-temporal budget constraint, meaning that it will not be able to finance its expenditures at some point in the future.

## B. What Are Generational Accounts?

Generational accounting—a concept originally developed by Laurence J. Kotlikoff, Alan J. Auerbach, and Jagadeesh Gokhale—answers the hypothetical question: if policy remained as it is for current generations for the rest of their lives, how much would they pay in net taxes and how much would future generations pay? A basic assumption is that there is no default and no free lunch: all net liabilities transferred forward must be paid for eventually. In this sense, generational accounts differ from the fiscal gap, which is computed assuming no changes in current policies even if this implies a violation of the intertemporal budget constraint of the government.

Generational accounts indicate the net present value amount that current and future generations are projected to pay to the government throughout their lives. The accounts can be used to assess the fiscal burden current generations are placing on future generations, and thus represent an alternative to using the federal budget deficit to gauge intergenerational policy.<sup>4</sup> Generational accounts can also be used to calculate the policy changes required for achieving a generationally balanced and therefore sustainable fiscal policy—one that implies equal lifetime net tax rates on today’s newborns and future generations. For further discussion, the reader is referred to Auerbach, Gokhale and Kotlikoff (1991) or Auerbach and Kotlikoff (1999).

The calculation of generational accounts starts from the government’s intertemporal budget constraint, which implies that the sum of future government consumption spending has to be equal to the sum of all future net taxes (taxes minus transfers, all in present value terms) plus current government net wealth. This can be expanded to detail the amount of government consumption and revenues apportioned to current and future generations, where the apportioning is done by summing each generational account across all current generations on one side, and on all future generations, on the other side. Specifically, a generational account is the present value of the remaining lifetime net payments (taxes minus transfers) of the average individual of each generation. In our analysis we distinguish between males and females, and we assume that each individual lives for 100 years. So we have 100 generations (0 to 100) per each gender. Omitting for simplicity gender notation, and following the notation used by Auerbach and Oreopoulos (1999), the government intertemporal budget constraint expressed using generational accounts then becomes:

$$\sum_{s=0}^D N_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t-s}(1+r)^{-(s-t)} = \sum_{s=t}^{\infty} G_s(1+r)^{-(s-t)} - W_t^g \quad (2)$$

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<sup>4</sup> However, from a theoretical perspective, the measured deficit need bear no relationship to the underlying intergenerational stance of fiscal policy.



Where  $N_{t,t-s}$  is the account of the generation born in year  $t-s$ , and the index  $s$  runs from age 0 to the maximum length of life (year  $D$ );  $G_s$  is government consumption in year  $s$ ,  $W_t^g$  denotes the government net wealth in year  $t$ —its assets minus its explicit debt;  $r$  is the pre-tax real interest rate or the discount rate. The first term on the left hand side of equation (2) sums together the generational accounts (i.e., the present value of the remaining lifetime net payments) of existing generations. The second term does the same for future generations, with  $s$  representing the number of years after year  $t$ , i.e., the year in which the generation is born.

Like more standard versions of the intertemporal budget constraint of the government, equation (2) suggests that intergenerational fiscal policy is a zero sum game: for a given present value of government consumption, lower taxes in present value terms on current generations imply a higher tax burden on future generations, in present value terms.

To compute the first and second term of equation (2) it is necessary to derive individual generational accounts, i.e. present values of lifetime net tax payments per each current and future generation. To do so, in turn, it is necessary to build a set of relative-age profiles for each sex (this is important because the average amount of any tax and transfer can vary greatly by sex as well as by age). Relative-age profiles by sex are derived using micro data from official surveys. Figure 2 summarizes in a flow diagram the methodology that is used to construct generational accounts. Table A.1 in the Data Appendix lists the data that we have used to build the profiles employed in this analysis.

The profiles are essentially distributions of the cumulative incidence of taxes and transfers on all individuals belonging to a particular age cohort. The profiles are “relative” because they are generally expressed (like here) relative to the incidence of taxes and transfers of a 40-year-old male, which acts as a numeraire to ensure profile comparability across age cohorts. The profiles are then transformed into per capita terms using demographic projections and used in conjunction with CBO’s long-term taxes and transfer projections to generate per capita lifetime net tax burdens by age and sex.

Figure 2. How Are Generational Accounts Built

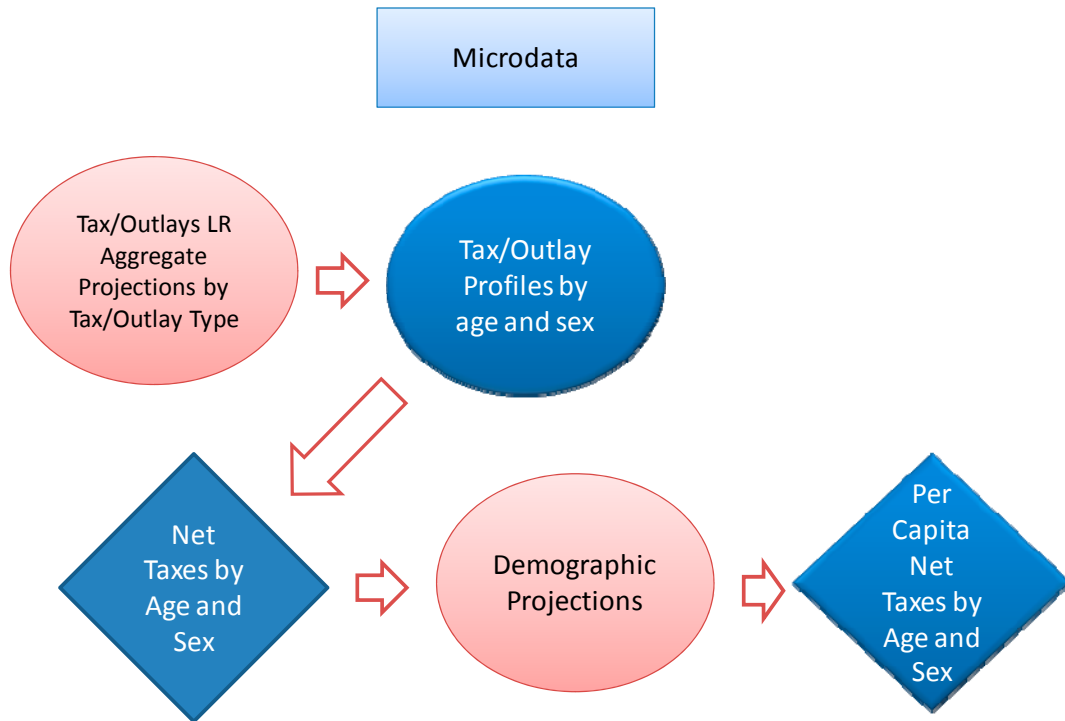
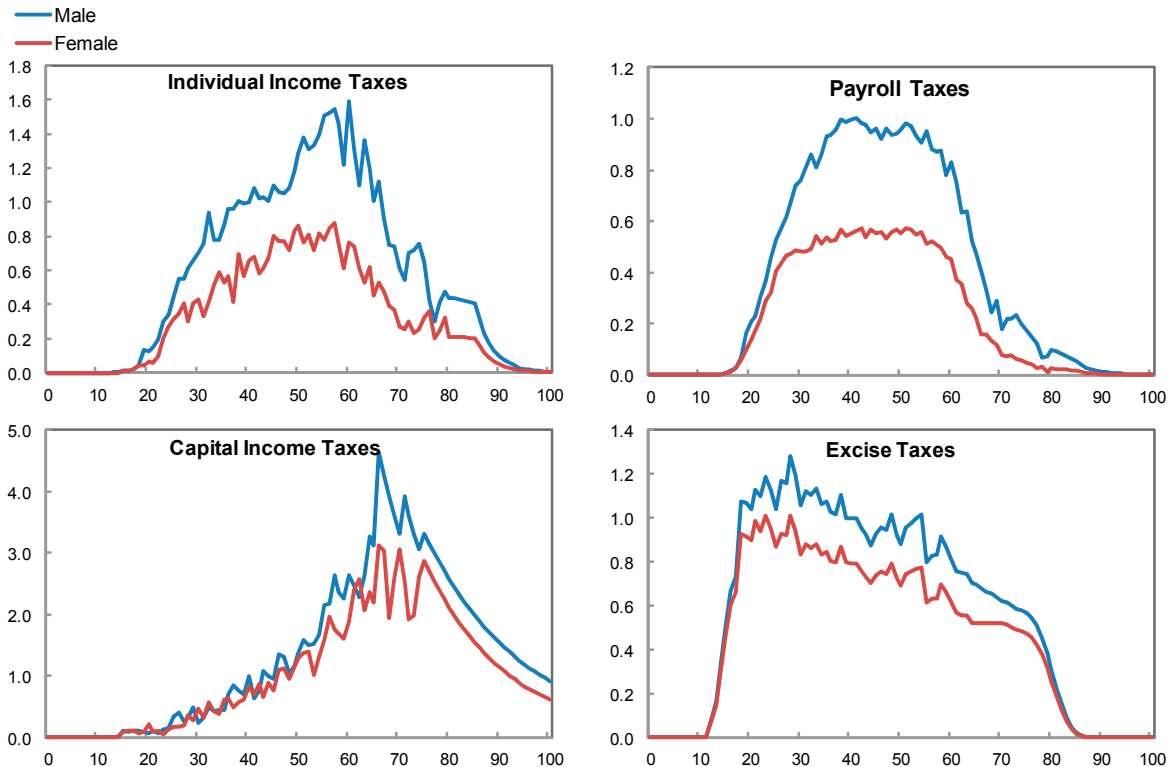


Figure 3 and 4 plot profiles of taxes and transfers that we use in the calculations, respectively. Male and female profiles tend to have similar shapes but can differ significantly in level terms. For example, transfers on food stamps and child support are generally higher for females since they are the main beneficiaries of such transfers themselves and on behalf of children. On the other hand, males receive more Medicare and Medicaid transfers than females as they get older, since the degree of morbidity of males tends to be higher than that of females. On labor income taxes, males tend to face a heavier burden of taxation across the entire life span, due to the fact that they tend to earn proportionally more than females across lifetime. The shape of profiles is also interesting. Taxes profiles are hump-shaped, in line with the life-cycle hypothesis, while transfers associated with the provision of healthcare increase exponentially with age, particularly after 65 years of age, while unemployment and general welfare transfers profiles are similar to tax profiles. Likewise child-bearing-related transfers tend to match fertility profiles for women.

**Figure 3. Tax Profiles by Age and Sex**



Since generational accounts reflect only taxes paid less transfers received, the accounts typically do not impute to particular generations the value of the government's purchases of goods and services. Therefore, the accounts do not show the full net benefit or burden that any generation receives from government policy *as a whole*, although they can show a generation's net benefit or burden from a particular policy change that affects only taxes and transfers. Thus generational accounting tells us which generations will pay for government spending, rather than telling us which generations will benefit from that spending. Another characteristic of generational accounting is that, as its name suggests, it is an accounting exercise that does not incorporate induced behavioral effects or macroeconomics responses to policy changes.

The generational gap is calculated by assuming that future generations (those born after the base year) pay in the form of net taxes all government's bills left unpaid by current generations. This assumption ensures that the difference between generational accounts of the newborn generation and generational accounts of future generations reflects the policy adjustment required to satisfy the government's intertemporal budget constraint.

Figure 4. Transfer Profiles by Age and Sex

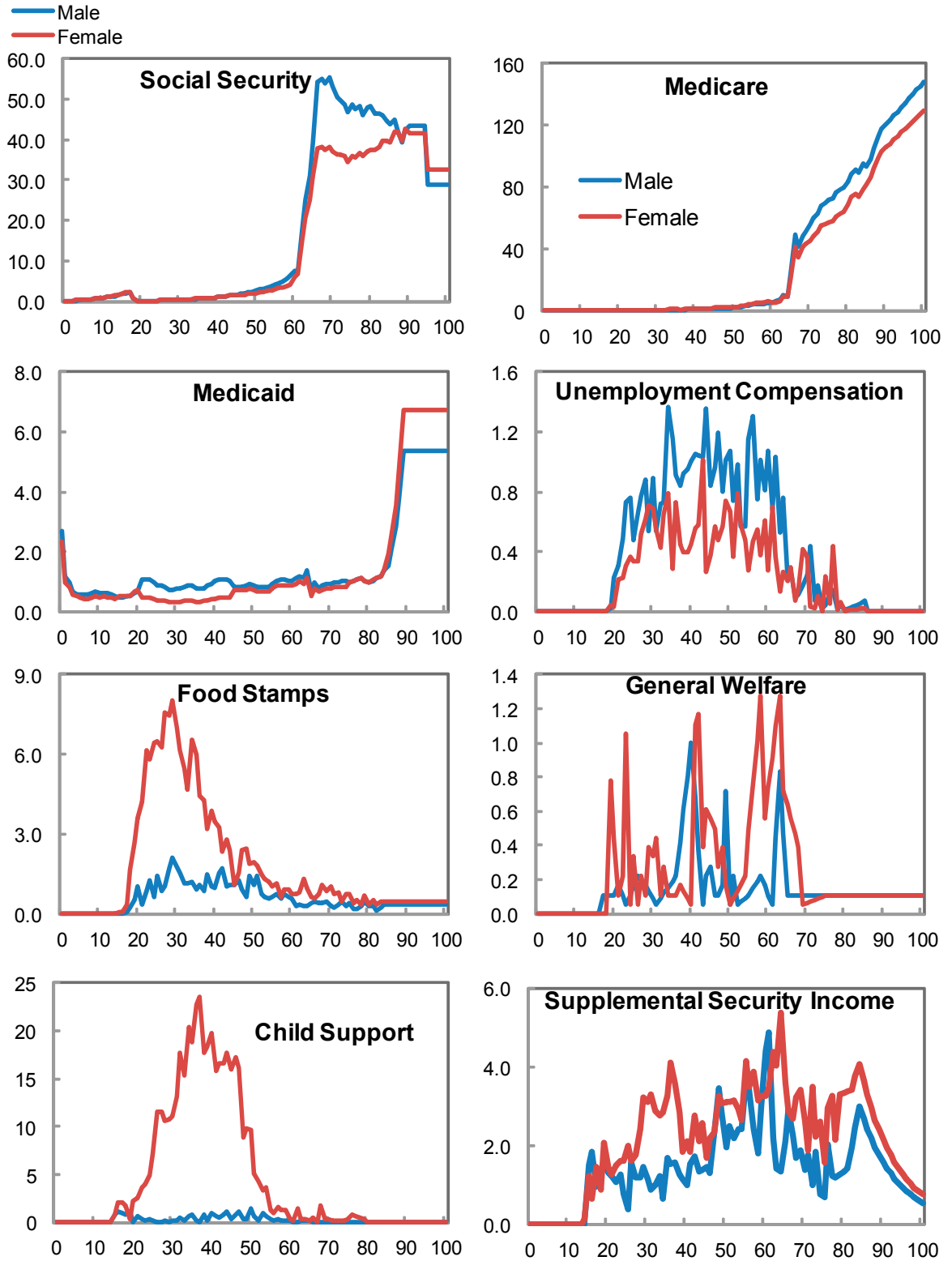
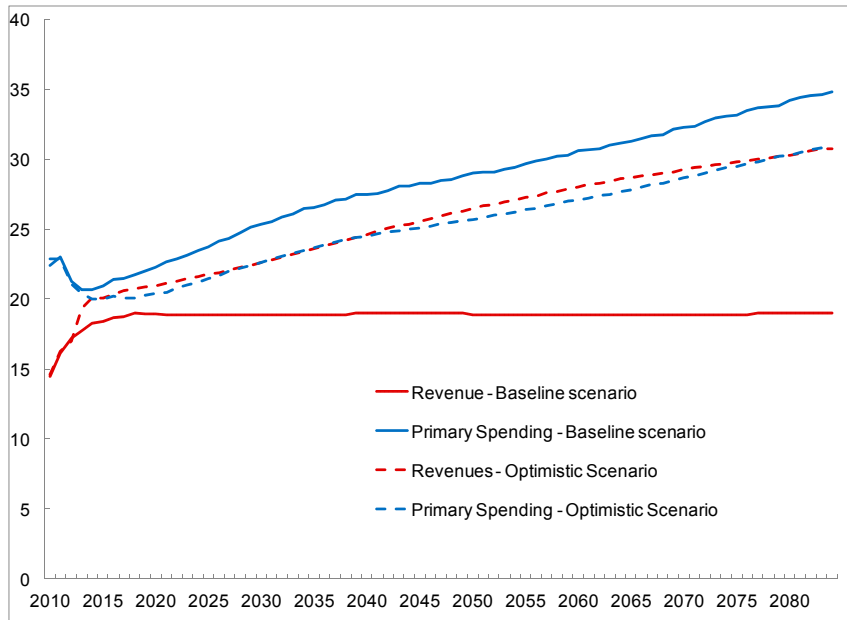


Figure 5. Baseline and Optimistic Scenarios  
(percent of GDP)



Source: CBO, OMB and Fund staff calculations; all the ratios refer to fiscal year.

### C. Scenarios

Two main fiscal scenarios are used. The data underlying both scenarios are derived primarily from the Congressional Budget Office’s Long-Term Budget Outlook (CBO) 2010 revised in line with the August 2010 Budget and Economic Outlook for the 2010-2020 period and, accordingly, account for the passage of the new healthcare legislation.<sup>5</sup> The projections of real GDP between 2010 and 2085 is also from CBO (2010). The baseline scenario, however, also incorporates fiscal “news” relative to CBO (2010) in the form of the extension of tax cuts and indexation of the AMT as part of a novel, stimulative USD 858 billion tax bill approved by the U.S. Congress in December 2010. More specifically, the following scenarios are used (Table 1 provides details on each scenario; Figure 5 plots the revenue and primary spending GDP ratios for the projection period in the two scenarios):

- A “baseline” scenario based on the CBO’s (2010) Alternative Scenario (AS), and extended to include the revision of the August 2010 Budget and Economic Outlook for the

<sup>5</sup> Thus both scenarios account for all the CBO’s March 20, 2010 estimates of the budgetary impact of the H.R. 4872, Reconciliation Act of 2010 (Final Health Care Legislation) combined with H.R. 3590, as passed by the U.S. Senate (CBO, 2010d), as revised in CBO (2010a).

period until 2020.<sup>6</sup> Like the AS, this scenario assumes the permanent extension of the tax cuts enacted in the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA), and in the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA). But, in contrast to the AS, our baseline scenario incorporates the tax measures included in the mid-December 2010 fiscal stimulus package, namely a tax cut to the wealthiest top 2 percent, and a cut in the real estate tax rate to 35 percent with a \$5 million individual exemption.<sup>7</sup> In the same way as the AS, after 2020, the baseline scenario incorporates possible changes to several provisions of current law that are unlikely to be sustained for a long period, namely: (i) certain restraints on the growth of spending for Medicare and indexing provisions that will slow the growth of subsidies for health insurance coverage; and (ii) other provisions of current law, if continued, would cause tax revenues as a percentage of GDP to ultimately rise well above the levels that U.S. taxpayers have seen in the past. Thus, like the AS, our baseline scenario envisages unspecified changes in tax law that would keep revenues constant as a share of GDP after 2020. Taken together, the baseline scenario portrays the likely path of the fiscal outlook were today's underlying fiscal policy to continue.

- An “*optimistic*” scenario that is built on the Extended Baseline Scenario of CBO (2010) (EBS), also adjusted to incorporate the revisions provided by the August 2010 Budget Economic Outlook, as detailed in CBO (2010d). Like the EBS, the optimistic scenario envisages a considerably better fiscal outlook than that implied by the baseline in that it assumes that all tax cuts will be repealed in 2012, and that the AMT will cease to be indexed to inflation from 2011. The optimistic scenario also assumes that annual appropriations, apart from mandated programs, will rise only in line with inflation.

Finally, as in CBO (2010), in both scenario, excess growth of Medicare spending is projected to remain constant between 2010 and 2020 on 1.7 percent and follow a declining path ever since; the path is set such that at the end of the projection period the excess growth is 1 percent per year for Medicare spending and no excess growth for all other healthcare spending other than Medicare.<sup>8</sup>

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<sup>6</sup> See the appendix for further details on how the projections of the 2010 August Budget and Economic Outlook are included in our scenarios.

<sup>7</sup> The assumptions of the budgetary impact of the full extension of the 2001 and 2003 tax cuts are borrowed from CBO (2010e). We do not include in the baseline scenario the budgetary impact of the 2 percentage points cut in the employee payroll tax, since there are no official estimates of it. However, because of its temporary nature (one year from implementation), this measure has only a very marginal impact on our results.

<sup>8</sup> Excess growth is defined as the difference between the growth rate of healthcare spending per beneficiary and the per capita growth rate of output.

To understand how fiscal policy choices impact the fiscal gap, we show how the gap changes when some of the key policy choices (e.g., the extension of the tax cuts, the extension of AMT indexation, etc.) are reverted in the baseline scenario one by one (Table 2). Finally, to better assess the relative importance of recent events on the fiscal gap, we also derive the gap under three main “baseline variations” that include the following counterfactuals (Table 2): (1) no healthcare reform;<sup>9</sup> (2) no financial crisis during 2007–2009;<sup>10</sup> (3) no excess growth in healthcare spending.

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<sup>9</sup> In order to account for the healthcare reform, we use the CBO’s (2010d) assessment for the period from 2010 to 2019; from 2020 on, the impact is assumed to remain constant at 2019 levels in percent of GDP terms. The subsidies for health insurance exchange are allocated using the same profiles of Medicare (described in the section below). Premium credits are treated as a reduction in individual income taxes. Small employer tax credit and penalty payments by employers and uninsured individuals are applied to corporate income taxes.

<sup>10</sup> To assess the impact of the crisis, individual and capital income taxes are set at the pre-crisis GDP ratio level for 2009–11. Unemployment compensation and food stamps are set at the pre-crisis GDP ratio for 2009–14. Discretionary spending is reduced in order to exclude fiscal stimulus and above-the line financial sector support above the line. Relatedly, IMF Staff Position Note SPN 2009/13 calculates that the PV of the impact of the financial crisis is only 7½ percent of the PV of age-related fiscal costs. Finally, real GDP is assumed to continue growing at its pre-crisis trend of approximately 3 percent per year in the 2010–2015 period to then gradually converge to a long term growth as projected in CBO (2010).

Table 1. Assumptions About Spending and Revenues Underlying Budget Scenarios		
	Baseline Scenario	Optimistic Scenario
<b>Assumptions About Spending</b>		
Medicare	As scheduled under current law, except that payment rates for physicians grow with the Medicare economic index (rather than at the lower rates of the sustainable growth rate mechanism) and that after 2020, several policies that would restrain spending growth are assumed not to be in effect	As scheduled under current law
Medicaid and Exchange Subsidies	As scheduled under current law, except that after 2020, a policy that would slow the growth of subsidies for health insurance coverage is assumed not to be in effect	As scheduled under current law
CHIP	As projected in CBO's baseline through 2020; adjusted for growth in per capita GDP and the size of under-18 population thereafter	As projected in CBO's baseline through 2020; adjusted for growth in per capita GDP and the size of under-18 population thereafter
Social Security	As scheduled under current law	As scheduled under current law
Other Non-Interest Spending	As projected in CBO's baseline through 2013; remaining at the 2010 level as a share of GDP (minus stimulus and related spending) thereafter, except that some refundable tax credits, and certain Medicare premiums and certain payments by states to Medicare are as scheduled under current law	As projected in CBO's baseline through 2020; remaining at the 2020 level as a share of GDP thereafter, except that some refundable tax credits, and certain Medicare premiums and certain payments by states to Medicare are as scheduled under current law
<b>Assumptions About Revenues</b>		
Individual Income Taxes	Through 2020, tax cuts from EGTRRA and JGTRRA are extended and AMT relief is extended; thereafter, individual income taxes are adjusted to keep total revenues constant as a share of GDP	As scheduled under current law
Payroll Taxes	As scheduled under current law	As scheduled under current law
Excise Taxes	As scheduled under current law through 2020; remaining constant as a share of GDP thereafter	As scheduled under current law
Other Sources of Revenue	As scheduled under current law through 2020; remaining constant as a share of GDP thereafter	As scheduled under current law through 2020; remaining constant as a share of GDP thereafter



### III. RESULTS

#### A. Fiscal Gap

Table 2 shows estimates of the U.S. fiscal gap under an infinite horizon for both the baseline and the optimistic scenarios using a discount rate based on an annual real rate of 3 percent. The table shows fiscal gaps as a fraction of the present discounted value (PDV) of GDP because this ratio shows how much of the gap adjustment can be apportioned to each year from now to infinity to ensure intertemporal solvency. Main points that emerge from the table are:

The U.S. fiscal gap associated with today's federal fiscal policy is very large. Using the same discount rate (3 percent) used by the Trustees of the Social Security Administration (2010) in their own Social Security-specific fiscal gap analysis and by CBO (2010e), and the infinite horizon definition, the U.S. fiscal gap is more than 15 percent of the PDV of U.S. GDP under the baseline scenario. This implies that closing the fiscal gap requires a permanent annual fiscal adjustment equal to about 15 percent of U.S. GDP. In other words, fiscal revenues and spending would need to change so that the primary balance predicted under that scenario improves by 15 percent of GDP every year into the indefinite future starting next year. Under the optimistic scenario, the fiscal gap is much smaller and equal to about 4 percent of the PDV of GDP, mostly due to the higher revenue generated by the removal of the 2001 and 2003 tax cuts, the lack of AMT indexation to inflation, the containment of excess growth in healthcare spending (which delivers less fiscal saving but still important saving than the complete elimination of excess growth) and a stabilization of the revenue-to-GDP ratio post-2020.

- The main drivers of the fiscal gap is the low level of revenues and the rapid increase in healthcare costs that under current policy will boost mandatory spending to above 18 percent of GDP by 2050.<sup>11</sup> Compared to the impact of the increase in healthcare costs, the extension of the tax cuts contemplated in the December 2010 tax bill has a minor effect, (only about 2 percent of the PDV of GDP). Since the federal government has historically collected about 18.4 percent of GDP in tax revenues, mandatory programs may hence absorb all federal revenues sometime around 2050, or as early as 2026 when the cost of servicing the debt is included in the calculation. As a result, bold entitlement reforms and measures to increase tax collection in the long-run will be necessary well before those dates to restore fiscal sustainability.

Table 2 also calculates the impact of some main fiscal policies onto the baseline scenario. For example, it shows how smaller would the fiscal gap be under the baseline scenario were the

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<sup>11</sup> Population aging is also an important driver but far less than the increase in healthcare costs; the increase in healthcare costs is in turn due to various factors, the more important of which is technological change. This factor is summarized in CBO's "excess growth component" of health-care costs growth (see CBO, 2010).

federal government to repeal all tax cuts by 2012. Main messages from these additional experiments are:

- Eliminating the tax cuts included in the baseline scenario—as contemplated under the optimistic scenario—would reduce the gap by about 1½ percent of GDP. The overall impact of the tax cuts, however, is about 2 percentage points of GDP in PDV terms.
- The indexation (or lack thereof) of the AMT is also an important factor driving the size of the fiscal gap. If the AMT ceased to be indexed, the gap could increase by about 4 percentage points of GDP in PDV terms.
- Success by the Independent Payment Advisory Board (IPAB) to control excess growth in healthcare beyond 2020 goes some way towards reducing the gap (-2 percentage points of GDP in PDV terms or about one seventh of the fiscal gap), but is not sufficient to close it.<sup>12</sup>

Focusing on the “baseline variations” or “baseline counterfactuals,” we find that:

- Once we separate potential saving from the introduction of the IPAB from the rest of the health care reform, the rest of the health care reform has a small (equal to 0.3 percent of the PDV of GDP) restraining impact on the fiscal gap. This is logical in that the health care reform main objective was that of extending universal coverage in the near term and the future, rather than generating large fiscal saving.
- The financial crisis has had minimal repercussions on the magnitude of the U.S. fiscal gap. This is because the financial crisis is a relative short-term phenomenon and impact only marginally the fiscal and generational imbalances, that are essentially driven by future, growing imbalances. The fiscal gap for the no crisis scenario in Table 2 is calculated assuming that excess growth is constant, so that healthcare costs essentially increase with GDP. The gap is only slightly reduced to 14.6 percent of the PV of GDP if we drop this hypothesis and we assume that in the no-crisis scenario the costs (and thus the relative provisions) of healthcare services in real terms is as in the baseline.<sup>13</sup>

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<sup>12</sup> In the recently enacted healthcare reform, IPAB has a mandate to recommend proposals to limit Medicare spending by a specified amount if the projected five-year average growth rate in Medicare per beneficiary spending is projected to exceed a target according to the targets set by CMS Office of the Actuary. The commission is planned to start working in 2014; the targets are set such as they make the growth of the per-beneficiary Medicare spending to converge to the growth of per capita GDP plus one. As the long-term targets are higher than per-capita GDP growth, the impact of IPAB-driven limit of spending is much smaller than the full removal of excess growth.

<sup>13</sup> Real GDP projections included in CBO (2010) includes a partial catch-up of real GDP to levels in line to the pre-crisis trend. Compared to a path GDP projected in the no-crisis scenario (see footnote 10 for details), the

(continued...)

- Were healthcare spending not to grow in excess of nominal income beyond 2020, the U.S. fiscal gap would be almost a third in size of what it would be otherwise.

Table 2. Fiscal Gap  
In percent of the PV of GDP

	Real Interest Rate (in fraction terms)
	0.03
<b>Baseline Scenario</b>	<b>15.4</b>
<b>Optimistic Scenario</b>	<b>4.0</b>
<b>Memo:</b>	
<b>Baseline: Counterfactual Scenarios</b>	
Excluding impact of healthcare reform	15.7
Excluding impact of financial crisis	15.3
No excess growth in healthcare spending	5.7
<b>Baseline: Impact of Key Fiscal Measures</b>	
No AMT indexation to inflation	-4
No extension of tax cuts (2001, 2003 and estate tax)	-2
Long-term IPAB adjustment to Medicare growth	-2
No post-2020 adjustments to maintain the revenue/GDP ratio constant	-3

Source: CBO and IMF staff calculations; a constant real interest rate of 3 percent is assumed throughout the analysis

## B. Generational Accounts

Table 3 shows results from the generational account analysis. The table lists per each consolidated age cohort of current U.S. generations the net tax burden in billions of 2010 dollars vis-à-vis the net tax burden expecting tomorrow's newborns (i.e., 'future generations') under our baseline scenario. The table indicates that the U.S. generational imbalance is also large: current generations are net receivers of public resources, while future generations of Americans are expected to foot the bill.

Table 4 shows results in a slightly different way reporting the implicit net tax rate (in percent of the net present value of labor income of current generations) vis-à-vis that of future generations. The table also distinguishes between alternative scenarios, showing how the net tax rate of current and future generations is affected by potential future fiscal actions by the

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GDP projections reach a peak negative difference of 9.4 percent in 2011 to then gradually converge to a long run gap of 4.1 percent. As a consequence, the difference between the PDV of GDP in the baseline and in the no-crisis scenario is only 4.2 percent.

U.S. federal government. (The third column (“Diff.”) expresses the generational imbalance; these data aggregate both male and female cohorts). Main messages from Table 3 are:

- The burden of the U.S. fiscal adjustment falls squarely and fully on future generations, with current generations expected to receive a net flow of resources from the federal government.
- The impact of the healthcare reform on the generational accounts is zero in terms of net tax rate difference; however, it is not zero in terms of net tax rates of current and future generations. Excluding the impact of the reform reduces net taxes (or increases net transfers) of both current and future generations by 0.2 percentage points of the NPV of labor income.
- All the fiscal policy measures envisaged in the second section of Table 2 (excluding the full extension of tax cuts) reduce the generational imbalance, with the impact being bigger for AMT indexation and smaller for the full removal of the tax cuts.
- In particular, the indexation of the AMT to inflation would aggravate considerably the fiscal burden faced by current generations (+4.3 percent of the NPV of labor income); in turn relieving the burden on future ones (by around -6 percent of the NPV of labor income).

Results in Table 4 differ substantially from earlier results in the literature, notably the most recent previous analysis on U.S. generational accounts by Gokhale, Page and Sturrock (1999, henceforth GPS). In particular, our net tax rates for current generations are much smaller than in GPS. For current generations, for instance, we show a negative rate of -4.3 percent while GSP had +28.6 percent. The large difference is due to a number of factors, notably:

- GPS use a discount factor of 6 percent, which tends to reduce the overall fiscal imbalance (more on this in sub-section V.A).
- Our generational accounts are not directly comparable with the ones in GPS, because they are limited to the federal government, while GPS included also state governments and municipalities. This difference substantially reduces the net tax rate because many of the mandatory spending is at the federal level. (Thus, by including states and municipalities one adds tax payments but does not add similar amounts of transfers).
- The outlook of revenues in 1995 (i.e., the last year of fiscal data used in GPS to compute fiscal imbalances) was much more benign than the current one, thanks to the Clinton-era adjustments and the absence of the 2001 and 2003 tax cuts.
- The outlook on healthcare costs was also much better than the current one; Medicare spending, for instance, was expected to reach around 8 percent of GDP 75 years after the

base year (1995 for GPS), while now it is expected to reach around 13 percent of GDP. Medicaid was expected to reach slightly less than 4 percent of GDP, while now it is expected to reach 6⅓ percent of GDP.

- To compare the two projections, Figure 2 shows the dynamic of social security and healthcare costs in terms of individual income taxes. The figure compares the proportion of individual income taxes (the biggest contributor to overall revenues) that go into these two categories of spending in GPS and our analysis.

Table 3. Generational Accounts  
In billions of 2010 dollars

Age in 2010	Baseline
0	-111.0
5	-92.3
10	-75.0
15	-52.6
20	-30.4
25	-19.6
30	-31.4
35	-56.7
40	-89.5
45	-124.3
50	-169.6
55	-229.7
60	-291.8
65	-332.7
70	-305.0
75	-268.6
80	-236.1
85	-203.2
90	-164.7
<b>Future generations</b>	387.9
<b>Difference</b>	498.8

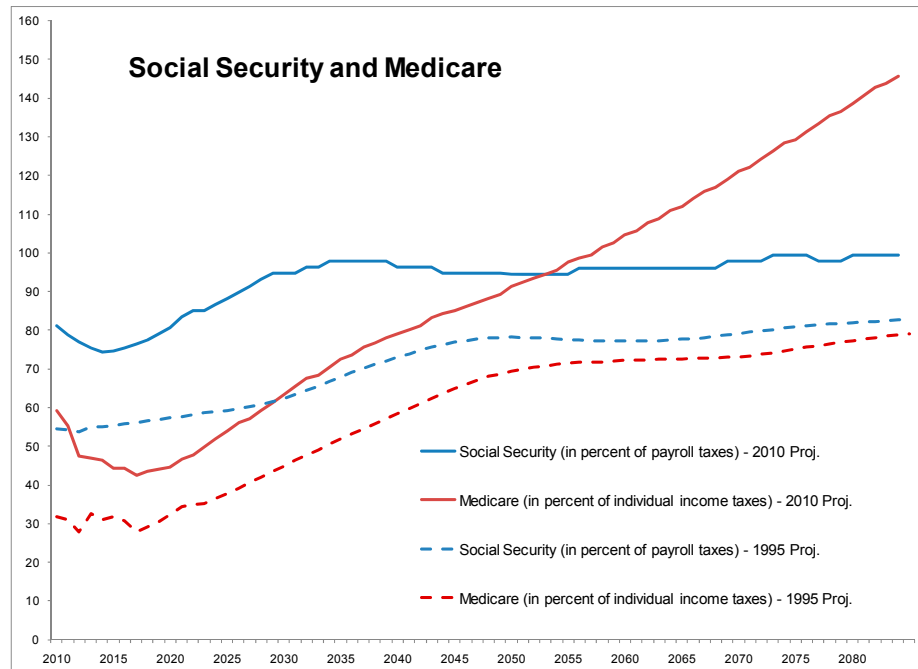
*Source:* CBO and IMF staff calculations; the analysis reproduced on table 2 is based on a constant real interest rate between 2010 and 2084 of 3 percent

Table 4. Generational Accounts Net Tax Rate  
(in percent of NPV of labor income)

	Zero year old	Future new born	Diff.
<b>Baseline Scenario</b>	-4.8	16.7	21.5
<b>Optimistic Scenario</b>	6.3	9.9	3.6
<b>Memo:</b>			
<b>Baseline Counterfactuals</b>			
Excluding impact of healthcare reform	-5.0	16.6	21.5
Excluding impact of financial crisis	-4.8	16.6	21.4
No excess growth in healthcare spending	4.4	12.1	7.8
<b>Baseline: Impact of Key Fiscal Policies</b>			
No AMT indexation to inflation	-0.4	15.2	15.6
No extension of tax cuts (2001, 2003 and estate tax)	-2.7	15.4	18.0
Long-term IPAB adjustment to Medicare growth	-2.6	15.6	18.3
No post-2020 adjustments to maintain the revenue/GDP ratio constant	4.8	12.1	7.3

Source: CBO and IMF staff calculations; a constant real interest rate of 3 percent is assumed throughout the analysis

Figure 6. Comparison of Medicare and Social Security Projection, 1995–2010  
In percent of Individual Income Taxes



Source: CBO (2010), CBO (2010e), Gokhale *et al.* (1999) and IMF staff calculations.

### C. Generational Impact of Key Recent Reforms of Entitlements

In this section we look at the impact on generational accounts of recent measures taken to reform the provision of healthcare system. In particular we focus on the impact on the accounts of: (1) the passing of the Final Healthcare Legislation in 2010; and (2) the establishment of the IPAB.<sup>14</sup> We also look at (3) what would be the implication for the generational accounts of maintaining age-related spending constant after 2020.

Table 5 lists per each consolidated age cohort of current (living) U.S. generations the net tax burden in billions of 2010 dollars vis-à-vis the net tax burden expecting tomorrow's newborns (i.e., 'future generations') under the baseline scenario in the absence of the introduction of the Final Healthcare Legislation, assuming that the IPAB recommendations are implemented post-2020, and, finally, keeping health expenses constant after 2020. The main results from the table can be summarized as follows:

- Compared with a scenario that excludes the impact of the healthcare reform, the baseline shows an increase in net taxes for young and old cohorts of living generations and for future (unborn) generations. At the same time, the reform substantially reduces net taxes for current working generations. As the overall impact on net taxes on a lifetime basis is positive (as can be seen by higher net taxes for current newborns in the baseline), the impact on working or older generations depends on the relative timing of spending reduction, tax increases and tax credits. More specifically:
  - *Current young generations*: these generations “lose out” from the reform in that the reform raises their net taxes by 4.3 billion of 2010 dollars (in NPV terms). The reduction in Medicare spending and the increase in capital and excise taxes are expected to be higher than the increase in Medicaid spending and the premium credits and insurance subsidies.
  - *Current working generations*: these generations “gain” from the reform because current working generations will benefit *now* from the tax credits and the health insurance subsidies, while the reduction in Medicare transfers are expected to occur in the future, and are thus weighted by a higher discount factor.
  - *Current older generations*: current retirees are “losers” in the reform: like young living generations: given provisions under the reform, current retirees will face lower

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<sup>14</sup> We treat the introduction of the IPAB and its potential budgetary impact as separate from provisions under the Final Healthcare Legislation. This approach follows CBO (2010) by interpreting that the introduction of the IPAB with the mandate provided under current law (involving the control of the growth of spending for Medicare) might be difficult to remain law for a long period, and thus should be treated as an “optimistic” assumption.

Medicare transfers in the next 10–20 years, and are expected to pay higher taxes associated with Medicare coverage (like hospital and manufacturers’ taxes).

- *Future (unborn) generations:* the unborn also “lose out” from the reform: the increase in Medicaid transfers for current generations and the relative postponement of many of the reductions and increase in taxes generates an increase in net taxes by about 4 billion of 2010 dollars (in NPV terms).

Table 5. Generational Impact of 2010 Healthcare Reform Provisions  
In billions of 2010 dollars

Age in 2010	Baseline Bln of 2010 dollars	No Healthcare reform		Impact of IPAB		Post-2020 constant health spending	
		Bln of 2010 dollars	Diff. with baseline	Bln of 2010 dollars	Diff. with baseline	Bln of 2010 dollars	Diff. with baseline
0	-111.0	-115.3	-4.3	-60.6	50.3	110.3	221.3
5	-92.3	-94.8	-2.5	-41.9	50.5	126.0	218.3
10	-75.0	-76.0	-1.0	-25.1	49.9	137.8	212.8
15	-52.6	-52.4	0.3	-4.3	48.3	151.2	203.8
20	-30.4	-28.5	1.9	15.0	45.4	159.1	189.5
25	-19.6	-16.5	3.2	22.1	41.7	152.8	172.5
30	-31.4	-26.9	4.5	6.9	38.3	125.2	156.6
35	-56.7	-50.6	6.1	-21.4	35.3	87.0	143.6
40	-89.5	-81.5	8.0	-57.9	31.6	39.6	129.1
45	-124.3	-114.5	9.8	-97.2	27.1	-10.4	113.8
50	-169.6	-158.1	11.5	-148.0	21.6	-72.3	97.4
55	-229.7	-216.5	13.2	-214.0	15.7	-151.2	78.5
60	-291.8	-278.9	12.9	-281.5	10.3	-233.5	58.3
65	-332.7	-323.3	9.3	-326.9	5.8	-293.1	39.6
70	-305.0	-299.9	5.0	-302.4	2.6	-281.1	23.9
75	-268.6	-268.0	0.6	-267.8	0.8	-256.6	11.9
80	-236.1	-239.4	-3.3	-236.0	0.2	-231.9	4.2
85	-203.2	-207.0	-3.8	-203.2	0.0	-202.2	1.0
90	-164.7	-166.4	-1.7	-164.7	0.0	-164.7	0.0
Future generations	387.9	383.9	-3.9	362.9	-25.0	331.5	-56.4

Source: CBO and IMF staff calculations; a constant real interest rate of 3 percent is assumed throughout the analysis

- The analysis of the impact of potential fiscal saving from healthcare cost constraint under the IPAB is simpler: since it is expected to start only from 2025 on, it will increase net taxes of current generations up to the 70-year old cohorts, which are not expected to be affected by the reductions in Medicare spending.

- For illustrative purposes, we include a scenario in which healthcare spending (Medicare + Medicaid) is assumed to remain constant (in percentage of GDP terms) from 2020 on. The impact on generational accounts is so large that it actually turns net taxes of future generations negative.



#### **IV. HOW TO CLOSE THE GAPS: “MENU OF PAIN” UNDER DIFFERENT SCENARIOS**

The results presented in the previous sections suggest that the U.S. fiscal gap is large under the baseline (most likely) fiscal scenario, and that presently, the U.S. fiscal structure is not equitable across generations: future generations are expected to subsidize the entirety of current generations’ huge fiscal shortfall. The recently introduced Final Healthcare Legislation promises some important public savings, reducing in part of the shortfall, but it is insufficient in closing the U.S. fiscal gap.

This section offers a quantification of the fiscal adjustment that would be necessary to eliminate the fiscal gap, making the U.S. fiscal structure tenable. If implemented, these measures would also eliminate the imbalance in fiscal burden that presently exists between living and future generations, leading to an equitable fiscal system.

Results from this analysis are reported in Table 6. The key messages that emerge are as follows:

- Under most scenarios, the fiscal adjustment needed to eliminate the fiscal and generational gaps would entail significant adjustments in taxes and/or transfers. Under the baseline scenario, for example, the federal government can restore fiscal balance by raising all taxes and cutting all transfer payments immediately and for the indefinite future by 35 percent.
- Were the U.S. government to finally repeal the tax cuts enacted in the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA), the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA), and were the IPAB to succeed in curbing healthcare spending growth as provided in the IPAB mandate, reining in the fiscal gap would still require an immediate and permanent increase in all taxes and cut in all transfers of 26 percent.

Another important message from the analysis is that postponing fiscal consolidation is costly. Table 7 shows that a 10 or 20-year delay in the implementation of the fiscal adjustment would imply the need of ever larger additional increases in taxes/cut in transfers, equal to 1 and 4 percent, respectively.

Table 6. Menu of Possible Corrective Measures to Close the Fiscal Gap  
In percent of baseline PV of taxes or transfers

	Baseline scenario	No extension of tax cuts	IPAB reductions	IPAB reductions and no extension of tax cuts
Individual income taxes	175%	126%	147%	103%
Payroll taxes	266%	233%	222%	189%
Individual + payroll taxes	106%	82%	88%	67%
<b>All taxes</b>	<b>88%</b>	<b>69%</b>	<b>73%</b>	<b>57%</b>
Individual + payroll taxes and				
Social security	74%	60%	62%	49%
Medicare	58%	47%	53%	42%
Medicaid	76%	61%	64%	50%
Medicare and Medicaid	47%	39%	43%	35%
All transfers	38%	32%	34%	28%
All taxes and				
Social security	65%	53%	55%	43%
Medicare	52%	43%	47%	38%
Medicaid	66%	54%	56%	44%
Medicare and Medicaid	44%	36%	39%	32%
<b>All taxes and transfers</b>	<b>35%</b>	<b>30%</b>	<b>32%</b>	<b>26%</b>

<sup>1</sup> Applied to both current and future generations

Source: CBO and IMF staff calculations; the measures proposed apply to both current and future generations.

Table 7. Menu of Possible Corrective Measures—Impact of Delaying the Implementations  
In percent of baseline PV of taxes and/or transfers

	Adjustment			
	Immediate	Starting in 2015	Starting in 2020	Starting in 2030
All taxes	83%	87%	91%	100%
Individual + payroll taxes and				
Social security	71%	73%	77%	85%
Medicare and Medicaid	45%	47%	48%	51%
All transfers	36%	38%	39%	42%
All taxes and				
Social security	62%	64%	68%	74%
Medicare and Medicaid	42%	43%	44%	47%
<b>All taxes and transfers</b>	<b>34%</b>	<b>35%</b>	<b>36%</b>	<b>39%</b>

<sup>1</sup> Applied to both current and future generations

Source: CBO and IMF staff calculations; the measures proposed apply to both current and future generations.

## V. SENSITIVITY ANALYSIS

In this section, we check the sensitivity of our fiscal gap's results to changes in two parameters: (i) the real interest rate used to calculate the time discount factor; (ii) the profiles of individual income taxes.

### A. Sensitivity of Results vis-à-vis the Choice of a Time Discount Factor

Checking how the fiscal gap changes with different assumptions on the real interest rate ( $r$ ) is important because  $r$ , although not directly linked to any policy decision (excluding risk premia considerations), can alter the substantially the size of the gap. We need to understand then how changes in  $r$  affect the gap and how appropriate is our choice of a constant 3 percent real interest rate assumption.

Table 8. Impact on Fiscal Gap of Different Real Interest Rate Assumptions  
In percent of the PV of GDP

	Real Interest Rate (in fraction terms)					
	0.03	0.06	Base	Optimal	1954-2010 average	Simulated
<b>Baseline Scenario</b>	<b>15.4</b>	<b>9.3</b>	<b>18.4</b>	<b>17.5</b>	<b>16.2</b>	<b>17.0</b>
<b>Optimistic Scenario</b>	<b>4.0</b>	<b>2.7</b>	<b>5.7</b>	<b>5.1</b>	<b>4.6</b>	<b>5.4</b>
<b>Memo:</b>						
<b>Baseline Counterfactual Scenarios</b>						
Excluding impact of healthcare reform	15.7	9.6	18.7	17.8	16.5	17.2
Excluding impact of financial crisis	15.3	9.0	18.4	17.4	16.2	16.9
No excess growth in healthcare spending	5.7	5.6	6.7	6.3	5.9	6.2
<b>Baseline Scenario: Impact of Key Fiscal Measures</b>						
No AMT indexation to inflation	-4	-2	-5	-5	-5	-5
No extension of tax cuts (2001, 2003 and estate tax)	-2	-2	-2	-2	-2	-2
Long-term IPAB adjustment to Medicare growth	-2	-1	-3	-3	-2	-2
No post-2020 adjustments to maintain the revenue/GDP ratio constant	-3	-2	-4	-4	-3	-3

Source: CBO and IMF staff calculations.

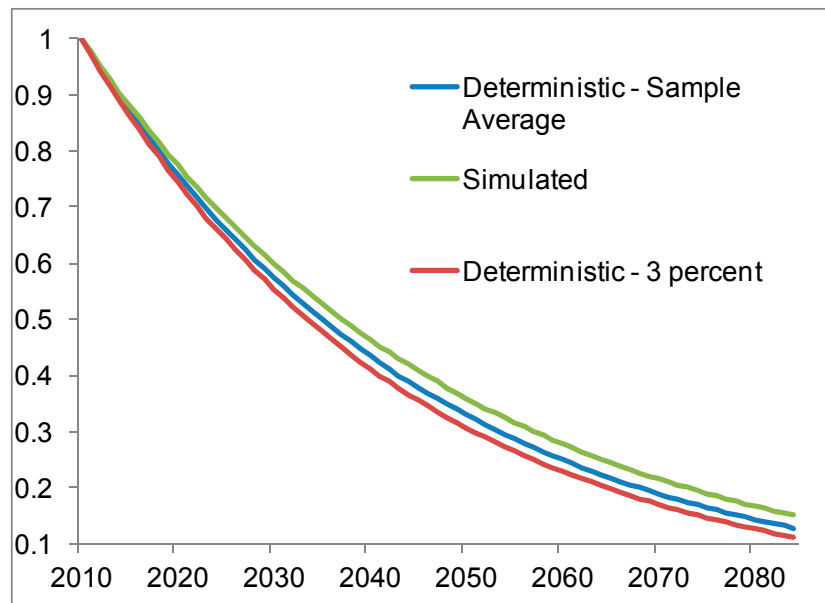
Table 8 summarizes sensitivity analysis of the results on the fiscal gap to a change in the real interest rate used to derive the time discount factor employed in the calculations. (Note that all previous reported results are based on the assumption of a 3 percent real interest rate). Previous works on fiscal and generational imbalances use a constant 6 percent real interest rate to take into account the risk implied by uncertain revenues vis-à-vis policy defined expenditures. We do not use this assumption as a baseline because in order to introduce risk considerations, one has to use a fully-fledged model that includes the determinants of risk. We do not take that approach here: our analysis remains in the realm of certainty equivalence. Moreover, the choice of the real interest rate includes an assessment of the time horizon used by the fiscal authorities for fiscal planning (and of households in general).

Throughout our analysis we assume that both households and the government care about future outcomes and give relatively higher weights to future outcomes compared to what assumed in previous studies.

Main points to note from the table are:

- Using the time-varying interest rate used in the CBO alternative scenario (our baseline) increases the fiscal gap, because it assumes that the real interest rate converges to a long-run average of 2.7 percent, against our baseline assumption of 3 percent. Using the real interest rate series implied by the optimistic scenario slightly reduces the fiscal gap, because this scenario converges to a long-run interest rate marginally below that of our baseline scenario (2.6 vs. 2.7 percent).
- More generally, assuming a higher real interest rate (and thus a lower discount rate) produces larger fiscal imbalances over the infinite horizon. The rationale behind this finding is that the U.S. fiscal imbalance is projected to grow over time, thus milder discounting gives larger weight to shortfalls that will get generated in the distant future, in turn producing a larger fiscal gap.

Figure 7. Path of the Discount Rate Under Different Assumptions on  $r$



Source: CBO and IMF staff calculation; the discount rate is defined as  $1/(1+r)$ , where  $r$  is the real interest rate

- Experimenting with different real interest rates suggest that even small differences in the real interest can have a large impact on the fiscal gap. The fifth column of table 7, for

example, shows what it would be the fiscal gap with an interest rate equal to the 1954–2010 average. We choose this period because this is the period where there are available data on 10-year bond yields. The average is 2.8 percent—a mere twenty basis points away from the real rate assumption in the core set of results. However, because of the increasing path of the fiscal imbalances, it shows a higher fiscal gap.

- Moving away from the assumption of certainty equivalence commonly used in the derivation of the discount rate also has implications. In the sixth column of Table 7, the path of the discount rate is simulated following the method of Newell and Pizer (2004). In all previous scenarios, the discount rate between  $t$  and  $t_0$  was calculated as follows:

$$d_{t,t_0} = \left( \frac{1}{1 + E(r_t)} \right)^{t-t_0}$$

where  $r$  is the real interest rate and  $E$  is the expectations operator. This definition then implies that to calculate the discount rate we use assume *certainty equivalence* making thus coincide the real interest rate with its expected value. Following Newell and Pizer (2004) we simulate the path of the real interest rate assuming that it follows a normal distribution with average and variance equal to the ones of the 1954–2010 period. Using a Monte-Carlo simulation we then calculate the discount factor using this slightly different formula:

$$d_{t,t_0} = E \left( \frac{1}{1 + r_t} \right)^{t-t_0}$$

Now the expectation operator is applied to a convex transformation of  $r$  and, as Newell and Pizer (2004) show, this leads to higher discount factor than using the corresponding certainty- equivalent rate based on the same average of the 1954–2010 period. This can be seen in table 8 by comparing the fifth and sixth column.

All in all, the sensitivity analysis reaffirms that our choice of a constant 3 percent real interest rate in computing the fiscal and generational imbalances can be considered relatively conservative, but fundamentally a prudent choice. The fiscal gap falls only if we use a 6 percent real interest rate, which we think it is not appropriate for several reasons, as explained above. In all the other scenarios, the fiscal gap is always higher than in our baseline calculation. Finally, the comparison between the sixth and fifth column shows that taking fully into account uncertainty tends to rise, rather than reduce the fiscal gap.

## **B. Sensitivity to Different Profiles on Individual Income Taxes:**

What happens to fiscal and generational gaps if we use a different set of profiles on individual income taxes, for example using Survey of Consumer Finance (SCF)-based profiles instead of CPS-based profiles? The main differences in the CPS based profiles payments of individual income taxes are more equally spread than in the SCF-based ones; with a maximum of 1.8 (1.8 times the taxes paid by the average 40-year man); their tails are also thicker. Cohorts between 50 and 65 years old are the one contributing the most. In addition, SCF-based profiles are more variable and more concentrated on the 50–65 year old males, with a maximum of around 3.5 times the amount paid by the average 40-year old man. Finally, the level difference between male and female profile per each generational cohort is bigger in the SCF-based profiles than in the CPS-based profiles.

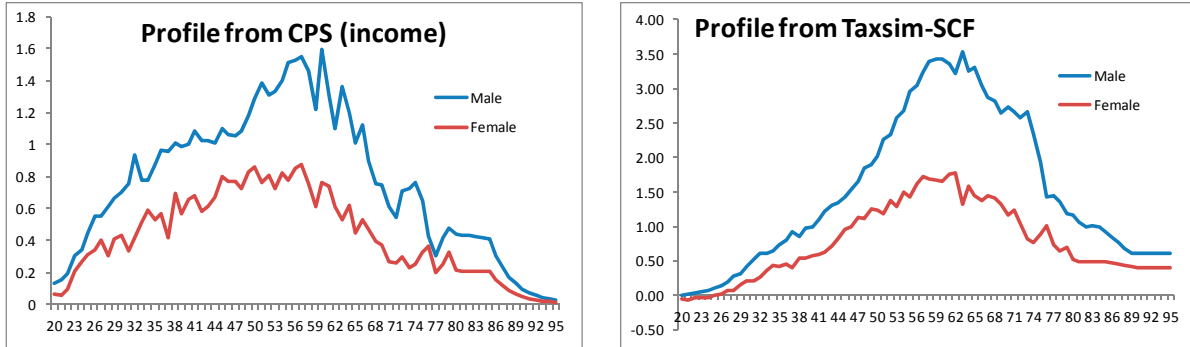
In our baseline calculations of the generational accounts, we use income profiles based on CPS data; these data usually tend to underestimate the impact of taxpayers with higher income, since they are under-represented in the surveys. We then check how the generational accounts change when using the SCF data that usually tends to better represent high income earners.

We combine SCF income data with the TAXSIM model developed by Dan Feenberg at the NBER to properly take into account all income classes and progressivity.<sup>15</sup> The SCF-based profiles are not included in our baseline analysis because only a fraction of the SCF observations contain enough data to allow the TAXSIM model to run. As a consequence, some cohorts contain a limited amount of observations, thus making these profiles not statistically representative. However, they are useful for this sensitivity analysis because, by showing more variability in tax payments and more concentration in the 50–65 year old cohorts, they replicate quite well the expected difference between the CPS and SCF-based profiles.

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<sup>15</sup> See [www.nber.org/~taxsim](http://www.nber.org/~taxsim). The main reference on TAXSIM is Feenberg, D. and E. Coutts, 1993 “An Introduction to the TAXSIM model,” *Journal of Policy Analysis and Management* Vol. 12 no. 1 (Winter, 1993).

Figure 8. Comparison of CPS- and SCF-based Profiles of Individual Income Taxes  
Amount of individual income taxes paid relative to 40-year men by age



Source: CPS, March 2009 Supplement, SCF (2007), and IMF staff calculation. SCF-based profiles are generated using the TAXSIM model developed by Feenberg and Coutts (1993).

In analyzing the impact of using SCF-based profiles, two additional elements should be borne in mind:

- Aggregate projections are not affected by the use of different profiles.
- However, because of time discounting, the increase in tax payments of identical cohorts in different periods of time can affect the generational accounts. For instance, an increase in tax payments for a the 50-year old male cohort in 2010 have a bigger impact in present value terms than an equal increase for the same cohort in 2030.

As a consequence, the redistribution of tax payments across age cohorts affects the generational accounts because they affect current and future generations in different moments in time. For current working generations, tax payments are higher with the SCF-based profiles now and in the next years, while for newborn and future generations this relative increase occurs farther in the future, when flows are more heavily discounted. For this reason, net taxes of newborns and future generations both fall. The marginal change in the generational imbalance for our baseline (0.2 percent of the PV of labor income) then masks a redistribution of the fiscal burden on current working generations.

Key results from shifting to SCF-based profiles are presented in Table 9 and 10 and can be summarized as follows:

- Using SCF-based profiles reduces the generational imbalance in all those scenarios apart from the scenario in which we assume that the AMT is not indexed to inflation. In contrast with other scenarios, not indexing the AMT shifts the fiscal burden from the present to the future, as its impact increases with time. Because of this, current newborns and younger generations end up paying more in present value terms, as they reach working age

before future generations (whose increase is then discounted more). This change tends to reduce the generational imbalance.

- Although it changes the distribution of net taxes across living generations, the use of SCF-based profiles does not affect the calculation of the generational imbalance. The only scenario where the impact is more visible is the scenario excluding the indexation of AMT to inflation.

Table 9. Generational Accounts with CPS- and SCF-Based Profiles  
In billions of 2010 dollars

Age in 2010	Baseline scenario		Diff.
	CPS-based profiles	SCF-based profiles	
<b>0</b>	-111.0	-126.3	-15.3
<b>5</b>	-92.3	-108.2	-15.9
<b>10</b>	-75.0	-91.4	-16.4
<b>15</b>	-52.6	-69.4	-16.8
<b>20</b>	-30.4	-44.5	-14.1
<b>25</b>	-19.6	-23.4	-3.7
<b>30</b>	-31.4	-18.3	13.1
<b>35</b>	-56.7	-25.9	30.8
<b>40</b>	-89.5	-41.1	48.4
<b>45</b>	-124.3	-60.9	63.3
<b>50</b>	-169.6	-96.7	73.0
<b>55</b>	-229.7	-153.0	76.6
<b>60</b>	-291.8	-223.0	68.8
<b>65</b>	-332.7	-278.9	53.8
<b>70</b>	-305.0	-270.6	34.4
<b>75</b>	-268.6	-251.3	17.2
<b>80</b>	-236.1	-226.0	10.1
<b>85</b>	-203.2	-194.7	8.5
<b>90</b>	-164.7	-157.5	7.2
<b>Future generations</b>	387.9	368.1	-19.8
<b>Difference</b>	498.8	494.4	-4.4

*Source:* CPS, March 2009 Supplement, SCF (2007), and IMF staff calculation. SCF-based profiles are generated using the TAXSIM model developed by Feenberg and Coutts (1993).

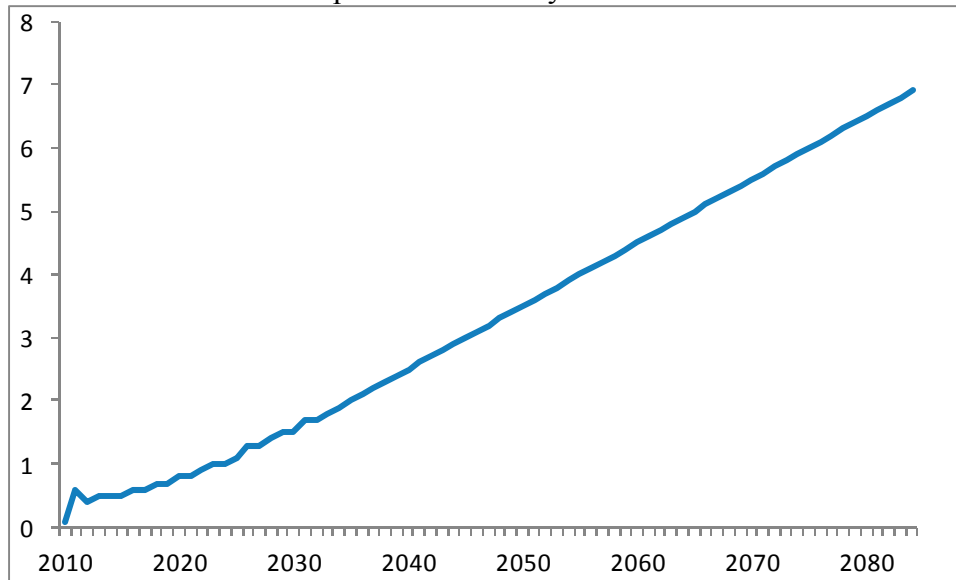


Table 10. Comparison of Generational Imbalances  
In percent of the PV of labor income

	CPS-based profiles			SCF-based profiles		
	Zero year old	Future new born	Diff.	Zero year old	Future new born	Diff.
<b>Baseline Scenario</b>	-4.8	16.7	21.5	-5.4	15.9	21.3
<b>Optimistic Scenario</b>	6.3	9.9	3.6	5.9	8.5	2.6
<b>Memo:</b>						
<b>Baseline: Counterfactual Scenarios</b>						
Excluding impact of healthcare reform	-5.0	16.6	21.5	-5.6	15.7	21.3
Excluding impact of financial crisis	-4.8	16.6	21.4	-5.5	15.7	21.2
No excess growth in healthcare spending	4.4	12.1	7.8	3.7	11.3	7.6
<b>Baseline: Impact of Key Fiscal Measures</b>						
No AMT indexation to inflation	-0.4	15.2	15.6	-0.6	14.0	14.6
No extension of tax cuts (2001, 2003 and estate tax)	-2.7	15.4	18.0	-3.5	14.3	17.8
Long-term IPAB adjustment to Medicare growth	-2.6	15.6	18.3	-3.3	14.8	18.1
No post-2020 adjustments to maintain the revenue/GDP ratio constant	4.8	12.1	7.3	4.1	11.2	7.1

Source: CPS, March 2009 Supplement, SCF (2007), and IMF staff calculation. SCF-based profiles are generated using the TAXSIM model developed by Feenberg and Coumts (1993).

Figure 9. Impact of no AMT Indexation to Inflation  
In percent of fiscal year GDP



Source: CBO and IMF staff calculations.

## VI. CONCLUSIONS

After a consolidation process that took up most of the 1990s, the United States went through a substantial fiscal deterioration since 2001 as a result of the 2001 and 2003 tax cuts, the expansion of Medicare and the rapid increase of per-capital healthcare costs. The stimulus measures recently implemented, although helpful for the economic recovery, have further expanded the fiscal deficit, accelerating the accumulation of public debt.

Since the bulk of U.S. fiscal liabilities are yet to be generated under current policies, fiscal deficit and debt are not good measures of overall US net liabilities. In this analysis we thus resort to fiscal gap and generational accounts calculations to measure the extent of the unsustainability of the US fiscal structure as well as the degree of inequality in the fiscal burden weighing on different generations.

Under plausible assumptions we find that the U.S. fiscal gap is large. The size of the gap is 50 percent larger than what Gokhale, Page and Sturrock found in 1999, reaffirming the massive deterioration of U.S. fiscal finances over the past decade—the 2001 and 2003 tax cuts are responsible for half the fiscal gap alone. Contrary to common belief, we find that the financial crisis has had negligible implications for the fiscal gap. Finally, the effects on the fiscal gap of the Final Healthcare Legislation depend on the IPAB's success at controlling excess growth in healthcare spending going forward. If the IPAB is successful, the fiscal gap could be about 2 percent smaller in percent of the present discounted value of this year U.S. GDP—an estimate in the ballpark of the OMB's—but still large at around 13½ percent of the PV of today's U.S. GDP. However, if the IPAB fails to contain excess growth, the recent health reform will on net worsen slightly the fiscal gap, according to our estimates.

We also show that the U.S. fiscal structure is severely inequitable across generations. Some recent fiscal measures, like provisions under the 2010 Final Healthcare Legislation have exacerbated this inequality, not just between current and future generations but also favoring working-age living generations compared to young and old living generations. The current generational gap is mainly the result of the rapid growth in healthcare spending which, in turn, is driven mostly by the impact of technological growth.

Our results are somewhat sensitive to the choice of the discount rate, although most parametrizations tend to push up—rather than down—the estimates of the fiscal gap. Choosing an alternative set of micro data to build relative age/sex profiles produces very similar generational accounts, suggesting that the U.S. generational imbalance calculation is quite robust to the data used.

The findings in this paper indicate that reversing fiscally-deficitarian measures taken in the 2000s (i.e., the tax cuts, the indexation of the AMT) and successfully containing excess growth in healthcare spending would go a long way in returning the United States to a fiscally-sustainable path. A complete eradication of all imbalances would however require, *on top of this*, bold immediate and permanent increases in all taxes and cuts in all transfers as well.

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## APPENDIX

**A. Detail on the Projection Methodology:**

- *Inclusion of the August 2010 CBO's Budget and Economic Outlook (CBO, 2010a).* The projections in CBO (2010a) are relative to a scenario “under current law.” As a consequence, for the period between 2010 and 2020, the projections in the optimistic scenario are the same as in CBO (2010a). We then calculate *revision factors* for every year and every series; a revision factor is the percentage change in the real series between the projections in CBO (2010a) and the projections in the extended baseline scenario of the CBO's long-term outlook, CBO (2010). For the period 2010–2020, our baseline scenario is derived by applying the revision factors to the alternative scenario of CBO's long-term outlook. For the post-2020 period, the real series are projected to grow at the same rates used in the alternative scenario (for our baseline scenario) or the extended baseline scenario (for our optimistic scenario).
- *2001 and 2003 tax cuts:* the yearly impact of the tax reductions approved in 2001 and 2003 are taken from CBO (2010e) and applied accordingly to each scenario's assumptions.
- *Individual Income Taxes and Payroll Taxes* series are taken from CBO 2010 for the years 2009 to 2020, corrected for the impact of the 2001 and 2003 individual tax cuts extension for all classes of income; the extension is assumed to be until 2012 in the Optimistic scenario and permanent in the Baseline scenario.
- *Excise Taxes* for the period 2010–2015 is taken from OMB (2010); from 2016 on it is assumed to remain constant as a share of other revenues, that is all revenue excluding individual income taxes and payroll taxes, according to CBO (2010), updated in line with CBO (2010a).
- *Capital Income Taxes* series is calculated as a residual to match total revenues as in CBO (2010), updated in line with CBO (2010a).
- *Social Security (OASDI), Medicare, and Medicaid-CHIP* series are from CBO 2010, updated in line with CBO (2010a) with the same methodology used for individual and payroll taxes.
- *Unemployment Compensation, Food Stamps, Child Support, and Other Welfare* series are from CBO (2010) updated in line with CBO (2010a) for the years 2010 to 2020 (see above). After 2020, the growth rate of “other primary spending” is taken from CBO 2010 alternative scenario and applied to these series and years until 2084. Food Stamps includes Supplemental Nutrition Assistance and Child Nutrition programs, Child Support is considered Family Support, and Other Welfare includes Foster Care, Making Work Pay, TRICARE, Higher Education Transfers, Universal Service Fund, COBRA, and veterans' compensation, pensions, and life insurance programs.

- *Discretionary Spending* is from CBO from CBO (2010) updated in line with CBO (2010a) for the years 2010 to 2020 (see above). It is the residual of total primary spending to OASDI, Medicare, Medicaid and other transfer programs listed above. After 2020, the growth rate of the “residual” calculated based on CBO 2010 alternative scenario (“other primary spending” minus transfer programs) is applied.
- *IPAB* impact is already included in the baseline projections until 2020. In the scenario “long-term IPAB adjustment” we assume that the IPAB impact continues also after 2020. The extended impact is calculated as to gradually converge to the growth of the 5-year moving average of the per-beneficiary Medicare expenditure to a value equal to the 5-year moving average of the per-capita nominal GDP by 2040.
- *The excess growth* impact and the *AMT indexation* impact are taken from CBO (2010).

The optimistic scenario includes the projections as in CBO (2010a) until 2020. From 2021 on, every series is projected to grow at the same rate projected in the extended baseline scenario of CBO (2010).

## **B. Sources and Methodologies used to Build the Relative Age/Sex Profiles of Taxes and Transfers**

### *1. Individual Income Taxes, FICA Taxes, Capital Income Taxes, Unemployment Compensation, Child Support, and Supplemental Security Income, 2007*

Source: Current Population Survey, March 2008 Supplement. Data was extracted using Data Ferrett, the “Federal Electronic Research and Review Extraction Tool” ([dataferrett.census.gov](http://dataferrett.census.gov)). Average values by age and sex are provided by Data Ferrett.

### *2. Food Stamps and General Welfare, 2007*

Source: Survey of Income and Program Participation, 2008. Data was extracted using Data Ferrett and average values by age and sex are the final output.

### *3. Excise Taxes, 2007*

Sources: Alcohol and tobacco products use in 2007 by age category are from the U.S. Department of Health and Human Services, Office of Applied Studies, 2007 National Survey on Drug Use & Health: Detailed Tables. Population data comes from the Census Bureau, National Population Projections 1999–2100, middle series data.

Methodology: Department of Health and Human Services tables giving alcohol and tobacco products use per age groups are allocated by age according to the age group average. Consumption per thousand of male and female population at each age is calculated using total population from the Census Bureau to get per capita consumption profile for total population by sex. For age cohort “65 and over,” it was assumed that the consumption

happens between 65 and 75 years of age (2/3 from age 65–69 and 1/3 from age 70–74), so that persons 75 and older do not smoke nor consume alcohol.

4. *Social Security (OASDI), 2007*

Sources: Average benefits and number of beneficiaries data comes from the U.S. Social Security Administration, Office of Retirement and Disability Policy, Annual Statistical Supplement, 2008 (2008 report reflects data for year ending December 2007). Population data comes from U.S. Census Bureau intercensal estimates for July 1, 2007. Census Bureau 5-year age group population counts estimated as 1-year age groups using Beers' Interpolation.

Methodology: OASDI tables giving average benefits and number of different types of beneficiaries by age-sex groups are made into single year series for each sex. All beneficiaries receiving OASDI benefits are added up and multiplied by average annual benefit to get aggregate benefits at each age and sex. Aggregate benefits at each age are divided by total population at each age to get per capita benefit profile for total population by sex.

5. *Medicare and Medicaid, 2003*

Sources: Medical Expenditure Panel Survey (MEPS), National Nursing Home Survey (NNHS), National Income and Product Accounts (NIPA), and National Health Expenditure (NHE).

Methodology: Age shapes are estimated using survey or administrative data (MEPS and HHHS - single age shape used for Medicare and Medicaid. Sex profiles are generated applying to the age-profiles the same male/female per capita ratio of the profiles used in Gokhale, Page and Sturrock (1999).