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## Societal Aging: Implications for Fiscal Policy

Alan J. Auerbach\*

### Abstract

This paper considers implications of population aging for the conduct of fiscal policy, grouping the issues into four areas, focusing on the impact of aging on:

- (1) the size of government budget imbalances;
- (2) the composition of government spending and government budget flexibility;
- (3) the composition of tax collections and the desirability of alternative tax systems; and
- (4) the effectiveness of fiscal policy as a tool for stabilization.

Societal aging puts considerable stress put on public sector finances because of large, unfunded and age-based entitlement programs. Even if existing programs can be modified, a growing share of government budgets will be devoted to old-age entitlement programs, and both economics and politics suggest that this will reduce the flexibility of budget determinations. An aging population makes certain tax bases – in particular, consumption taxes, and wealth transfer taxes as well – more productive and efficient. The consequences of aging are less clear as to stabilization policy, both with respect to the effectiveness of automatic stabilizers and the ability of government to take effective discretionary actions.

**Keywords:** deficits; fiscal imbalances; tax reform; political economy; stabilization policy

**JEL classification:** E62, H21, H62

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## **I. Introduction**

Japan, the United States, and most leading economies are experiencing significant population aging, as the result of reduced birth rates and increased longevity. In this paper, I consider several implications that this aging has for the conduct of fiscal policy, grouping the issues into four areas.

First, and perhaps most important, because the public sector finances a large share of the consumption of the elderly through unfunded or partially funded transfer programs, population aging puts significant pressure on government budgets. Increases in life expectancy increase the number of beneficiaries of government programs, given that such programs typically provide benefits for those above a given age, while past reductions in fertility lower the relative number of taxpayers in the working population upon which these programs largely depend for financial support.

Second, and related to the first point, changes in the elderly share of the population will affect the composition of government budgets, with a shift toward programs that benefit the elderly and away from others targeted to younger groups in the population. This shift may influence the government's ability to make short-run budget adjustments. Given the long-range nature of many old-age transfer programs and the potential disruptions that significant immediate changes to them might induce for those nearing retirement age, changes in old-age entitlement programs may need to be phased in over time and with advance announcement. Also, these programs are structured in a way that creates natural coalitions in favor of maintaining them, and this popular support may reduce the government's ability to make changes in the programs even over the longer term.

Third, an aging population has implications for the design of tax policy. An increase in the average age and elderly share of the population will affect capital-labor and consumption-income ratios, and hence the relative size of different tax bases (e.g., labor income, capital income, and consumption) as well as the relative economic efficiency of different tax systems. Thus, structural tax changes might be in order, even if the initial tax system were the most desirable for a different population age structure.

Finally, there may be some adjustments needed in the conduct of stabilization policy to take account of the changes in population age structure and the associated changes in the composition of the government budget and the sources of tax revenues. These changes will be associated with the extent to which the fiscal system provides automatic stabilizers, the options available for discretionary fiscal policy, and the effects on the economy of different discretionary fiscal actions.

Throughout the discussion that follows, I will focus on the effects of societal aging without typically distinguishing the cause, i.e., increased longevity versus reduced fertility. In some cases, as for example when the relevant consideration is the share of the population that is very old, the causes of societal aging matter, but few such issues arise in the analysis presented below.

## **II. Societal Aging and Budget Stress**

There is nothing inherent in the nature of government budgeting requiring that population aging must increase budget stress. Just as with the private life-cycle planning of households, governments can, at least in principle, make arrangements for the rather predictable process of societal aging by saving for future expenditures. This is most apparent in the case of old-age entitlement programs, where governments could fund future benefits of current workers using

these workers' current tax contributions, but the same logic applies to other spending that tends to rise with the elderly share of the population. On the other hand, the reverse argument would apply to spending on the young; to the extent that the young receive benefits from the government prior to entering the labor force and becoming taxpayers, logic suggests that a "funding" model of having each cohort finance its own benefits would call for borrowing, rather than saving for items such as education funding.

Unfortunately, governments generally do not operate in this manner, but rather mostly on a cash-flow basis, balancing (or attempting to balance) revenues and spending in annual terms and taking inadequate account of the large implicit liabilities associated with future entitlement commitments. With old-age transfer programs largely financed by current taxes, increases in the old-age dependency ratio lead to an increase in benefits relative to taxes and hence an increased budget deficit.

### *A. Assessing the Problem*

Figure 1, adapted from Auerbach (2011), helps illustrate the importance of this phenomenon. For several developed countries, the figure shows the fiscal gap over the 50-year period 2011-2060, estimated using a variety of data sources. The fiscal gap is defined here as the permanent annual increase in the primary surplus as a share of GDP, say  $\Delta$ , that would be needed to keep a country's publicly held debt-GDP ratio at the end of the period equal to its initial debt-GDP ratio; that is,

$$(1) \quad \Delta = \frac{B_{t-1} - (1+r)^{-(T-t)} B_{t-1} \frac{Y_{T+1}}{Y_t} + \sum_{s=t}^T (1+r)^{-(s-t+1)} D_s}{\sum_{s=t}^T (1+r)^{-(s-t+1)} Y_s}$$

where  $B_{t-1}$  is the outstanding debt at the end of year  $t-1$  (the beginning of year  $t$ , in this case 2011),  $D_t$  is the primary deficit in year  $t$ ,  $Y_t$  is GDP in year  $t$ ,  $T$  is the terminal year (in this case 2060), and  $r$  is the relevant interest rate, assumed for simplicity in the formula to be constant over time.<sup>1</sup>

Note that these fiscal gaps are only imperfectly associated with current fiscal deficits. While it is no surprise that countries like Greece (EL) are among the “leaders,” other countries that have faced recent budget problems, such as Ireland (IE) and Spain (ES) are not. The intuition for this lack of a close connection comes from expression (1). If one assumes that achievement of a sustainable path means that a country must maintain a constant debt-GDP ratio, then a portion of debt service is provided by debt growth, since debt is allowed to grow at the same rate as GDP. Thus, the added fiscal burden of debt service is determined by the difference between the interest rate and the growth rate, and will not be especially high unless one assumes a large gap between the two rates.

Another way of demonstrating this point is by considering how much of the fiscal gap is due to debt service, and how much is due to future primary surpluses. The second bar for each country in the figure displays fiscal gaps under the assumption of no initial debt, showing that projected future primary deficits based on current policy trajectories, rather than initial debt, are typically much more important as a determinant of the fiscal gaps. That is, eliminating the

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<sup>1</sup> These estimates are for general government at all levels. To form them, we start with actual 2010 levels of net publicly held debt and GDP, and then add projections for primary surpluses as a share of GDP through 2016 from IMF (2011). For years after 2016, it is necessary to make some assumptions as to the further evolution of primary surpluses. We do this by separating “normal” components from those related to aging and health.

For shares of GDP accounted for by revenues and non-interest spending in areas excluding health care and public pensions, we set values equal to the average of these shares over the period 2002-2007, an assumption intended to provide over the longer run a stable estimate of recent, pre-crisis revenue and spending fundamentals. For the remaining components, we incorporate recent projections from the IMF (2010a, b). We assume a real discount rate of 3 percent and a real GDP growth rate of 2 percent.

See Auerbach (2011) for further discussion and alternative calculations.

current stock of national debt would, for most countries in the figure, have relatively little impact on the magnitude on necessary fiscal adjustments; it is changes in future policy that will be crucial to adjustment.

The last set of calculations in Figure 1 illustrates how important the implicit liabilities are that are associated with health care spending and pension growth. The third bar for each country shows what the fiscal gap would be if there were no increase relative to GDP in spending on health care or pensions after 2016. For all countries, this assumption reduces the estimated fiscal gaps, and for many (Australia, Belgium, Canada, Denmark, Finland, and New Zealand) it eliminates the gap entirely. That is, for these countries, more than 100 percent of the estimated fiscal gap can be attributed to growth in these expenditures. For most other countries, this adjustment eliminates more than half of the initially estimated fiscal gap, meaning that these factors account for a larger share of the fiscal gap than the need to service initial liabilities, the importance of which we have already considered, or other sources of ongoing primary imbalances.

Not all of this growth in pensions and health care spending is attributable to population aging. Particularly for health care spending, other factors may also be playing a role, in this case the projected growth in health care spending as a share of GDP, even adjusted for changes in population composition. For example, Figure 2 shows different trajectories for U.S. public health care spending through 2035, as estimated by the Congressional Budget Office (2011). The highest curve corresponds to “excess cost growth” of health care spending at 2.0 percent faster than GDP (after adjustment for changes demography) – a growth rate consistent with that of the past several decades, while the lowest corresponds to no excess cost growth at all, presumably all due to population aging (since older individuals not only require more health care



per capita, but, at least in the United States, are more likely to be provided health care by the public sector). Even this lower, and quite unrealistic projection shows rapid growth in public health care spending – 1.2 percent of GDP over the 13-year period 2021-2034. Combined with the growth in spending on old-age pensions, for which factors unrelated to aging are not important, it is clear that population aging is an important factor contributing to increased government spending.<sup>2</sup>

Another way to express the size of age-based unfunded liabilities is by capitalizing them and comparing them to outstanding explicit liabilities and trust funds. For the United States, for example, by one measure the unfunded liability of the Social Security system was \$21.6 trillion at the beginning of 2012 (Social Security Trustees, 2012, Table IV.B7), which was more than twice the publicly held stock of national debt at that time (\$10.4 trillion). This net implicit liability for the Social Security system is the so-called “closed group” liability measure. It is calculated as the present value cost of paying benefits to those already retired or in the work force in excess of the present value of taxes that this same group of individuals will pay into the system, and also net of the system’s trust fund balance. An alternative measure of the unfunded Social Security liability, its “open group” liability to all cohorts over the infinite horizon, is slightly smaller (\$20.5 trillion).<sup>3</sup>

As large as these measures of the Social Security implicit liability are, they pale in comparison to what one would calculate using a similar methodology for the major U.S. public health care spending programs, Medicare and Medicaid. Even under the most favorable

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<sup>2</sup> CBO (2011, p.10) estimates that 64 percent of entitlement spending growth through 2035 and 44 percent through 2085 is attributable to aging, rather than excess cost growth, under its “extended baseline scenario,” which is somewhat more optimistic than the cost growth shown by the intermediate curve in Figure 2.

<sup>3</sup> This difference reflects the fact that future generations are projected to make net contributions to the system under current rules.

estimates, for example, Medicare's infinite horizon unfunded liability at the beginning of 2012 was nearly \$43 trillion.<sup>4</sup>

### *B. Addressing the Problem*

How should governments deal with the large looming unfunded liabilities associated with population aging? In some respects, the answers are the same as those that apply to the standard question of how governments should deal with previous debt accumulation. The distribution of the burden of servicing the debt must be allocated across members of current and future generations according to some pattern, and the instruments for achieving this allocation of the burden, through reductions in spending and increases in taxes, must be determined. In the process of determining this optimal policy, distributional fairness and economic efficiency will both tend to push in the direction of smoothing adjustments over time, even though these are distinct objectives. Sharply higher tax rates over any short period of time will tend to concentrate the burden on a small number of generations, and also lead to greater economic inefficiency than a smoother increase in tax rates.<sup>5</sup> Hence, even in cases where intergenerational distributional considerations are not given as much weight (as, for example, if Ricardian equivalence is viewed as a credible characterization of the behavior of private agents), spreading of adjustments over time will appear optimal.

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<sup>4</sup> According to the 2012 Medicare Trustees Report, over the infinite horizon general revenue contributions – funding from sources over and above the programs' dedicated revenues – of \$23.7 trillion will be needed to cover expenses for Medicare Part B (supplementary medical insurance; see Table III.C11) and another \$14.3 trillion will be needed to cover Medicare Part D (prescription drug insurance; see Table III.D8). According to these same projections, the remaining component of Medicare, Part A (hospital insurance; see Table III.B11) has an infinite-horizon unfunded liability of \$4.8 trillion. Moreover, these large numbers assume the successful enforcement of the reductions in reimbursement rates as called for by the 2010 Affordable Care Act. Alternative projections put the costs of Medicare higher.

<sup>5</sup> For further discussion, see Auerbach (2009).

When the liabilities being dealt with are those associated with population aging and unfunded old-age entitlement programs, however, some additional considerations are relevant. First, to the extent that population aging or other demographic changes are stochastic in nature, issues arise concerning the use of fiscal policy to spread demographic risks among generations. For example, to offset stochastic increases in the old-age dependency ratio, increasing taxes on working generations and reducing benefits for retirees represent two distinct approaches that will maintain a feasible path for an unfunded old-age pension system, and these two approaches will spread demographic shocks differently across generations. It appears that some combination of the two policies may be preferred to either in isolation from the perspective of risk-spreading (Auerbach and Lee, 2011).

Looking forward, this is a potentially important issue in the design of unfunded old-age pension systems, for building in carefully specified automatic responses to demographic shocks can make such systems fiscally sustainable while at the same time ensuring that risks are spread broadly and in a desirable manner. However, while there undoubtedly is uncertainty about the magnitude of the forthcoming increase in the old-age dependency ratio, the very large unfunded liabilities that countries face are already a feature of expected outcomes. That is, even if unfunded pension systems are reformed on a going-forward basis, such reform does nothing to address the unfunded liabilities that already have been accumulated and hence represent current government liabilities.

Even for dealing with liabilities that already exist, of course, the demographic transition is relevant for determining how the burden should be distributed. For example, if population aging is due to increased longevity, it may be optimal to allocate more resources to generations that live longer, because they may have higher consumption needs than other generations as a

consequence of having to spread resources over more years. This will be less of an issue the more that demographic changes are permanent, since there will be little heterogeneity to take advantage of in shifting the burden across generations.<sup>6</sup>

Finally, the unfunded liabilities of age-based entitlement programs differ from official national debt in two important respects. First, they do not have the same legal status as official government liabilities; governments can adjust them through changes in law without having to undergo the process of default. This makes benefit cuts or tax increases on those holding the implicit liabilities easier to undertake than adjustments in national debt, although national debt can be eroded through inflation without explicit default, and in cases (like Japan) where most of the national debt is domestically held the distinction lessens further, since debt holders are subject to domestic taxation anyway.

Perhaps a more important difference between explicit and implicit liabilities, given the politics of debt and fiscal adjustment, is that implicit liabilities are just that – they are not listed as liabilities in official government accounts, even where, as in the United States, they are at least partially acknowledged and computed and reported annually in official government documents. As a consequence, policies to deal with implicit liabilities may be difficult to enforce.

For example, if one made the type of fiscal adjustment called for by the calculations based on expression (1) and Figure 1 to achieve a sustainable path, this permanent increase in the primary surplus would generate large official primary surpluses in the short run, as a consequence of the need to set aside resources to fund implicit liabilities that are projected to grow faster than GDP. Indeed, calculations in Auerbach (2009) suggested that to make U.S.

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<sup>6</sup> See Auerbach and Hassett (2001) for further discussion of optimal fiscal responses to demographic changes.

policy permanently sustainable (that is, over the infinite horizon, not simply through some fixed terminal year) at that time, using such a permanent adjustment in primary surpluses, it would have been necessary for the government initially to run large primary surpluses, so that in the medium run the government would eliminate all explicit national debt and actually begin the accumulation of net financial assets.

Although such a policy response is based on apparently reasonable assumptions and projections, it calls for a path for explicit debt and deficits that ranges far from historical values, and one must ask how sustainable, politically, a policy of debt retirement followed by asset accumulation would be?<sup>7</sup> The presumption here is that the underlying fiscal policy path is optimal, in which case the path of deficits and spending would be, as well. But with policy traditionally using the annual deficit and debt-GDP ratio as a signal of performance, substantial learning on the part of political actors and voters might be required to accept large tax increases to pay for future benefits.

Indeed, past U.S. policies aimed at dealing with unfunded liabilities have not proved viable. In 2001, as a decline in explicit (but not implicit) liabilities loomed in official forecasts, the United States adopted a large tax cut shortly after the election of George W. Bush. One of the stated objectives of proponents of the tax cut was to reduce the budget surplus. The logic was that the government would be returning money to taxpayers that it did not need, as evidenced in their view by the existence of the budget surplus.

More generally, some evidence empirical suggests that accumulations of the Social Security trust fund (around \$2.7 trillion at the beginning of 2012 and still small in relation to the

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<sup>7</sup> This leaves aside the interesting question, contemplated briefly in the United States in 2001, of what assets the federal government and the Federal Reserve would have held if the explicit stock of national debt were retired and the government continued to run budget surpluses. Fortunately or not, this question no longer appears to be of imminent policy relevance.

unfunded Social Security liabilities discussed above) are at least fully offset elsewhere in the budget; that is, the annual surpluses that arise in the trust fund simply lead to larger deficits of at least equal magnitude elsewhere in the government's budget (Smetters, 2004). It is possible that changes in government accounting practices might alter this bleak situation, for example, if certain government programs were accounted for on an accrual basis, thereby converting implicit liabilities to explicit ones. Such changes have evolved over time in accounting for the long-term commitments made by private companies, as for unfunded retirement benefits and executive stock options. But governments have generally resisted such accounting provisions and they are not a common feature of government accounts.<sup>8</sup>

In summary, dealing with implicit liabilities that arise from the combination of societal aging and unfunded old-age entitlement programs is in some respects similar to dealing with any past accumulation of national debt, since both represent obligations that already have been incurred. But both real and perceived differences in circumstances make dealing with implicit liabilities more challenging. Perhaps the biggest challenge is that they are not included among explicit liabilities, and so are treated by the political process as “future” problems that governments will confront. With political horizons in democracies already made short by the nature of the electoral process, an opportunity to put off dealing with significant fiscal problems is likely to be readily accepted.

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<sup>8</sup> An important real effect of the lack of explicit accounting for long-term government liabilities comes from the U.S. state and local government sector. Although such governments typically can accumulate debt only for capital projects, they currently have enormous unfunded liabilities for the pension and health benefits of current and retired government workers (Novy-Marx and Rauh, 2011).

### III. Changing Budget Composition

Spending on old-age entitlement programs will pose a serious challenge to national budgets as societal ageing occurs, as just discussed. But the changing composition of government budgets is likely to have additional short-run and long-run effects on the conduct of fiscal policy.

To help motivate the discussion of these issues, Figure 3 shows the historical and projected shares of federal spending (excluding debt service) for the U.S. federal government, comparing spending on the three large age-based entitlement programs – Social Security, Medicare, and Medicaid – and all (defense and non-defense) discretionary spending. Together, these two categories of spending account for around 86 percent of federal spending,<sup>9</sup> a total share that is relatively constant over the period. However, the breakdown into these two categories changes over the period, starting with discretionary spending at 60 percent and old-age entitlements at 24 percent, and ending with the values roughly switched, at 28 percent and 61 percent.

Assuming that this shift in spending can be accommodated along a feasible fiscal trajectory, it still has other implications for the conduct of fiscal policy. First, there is likely to be less flexibility with respect to high-frequency (i.e., annual) budget adjustments, because for old-age entitlement programs long-range planning is involved on the part of beneficiaries, and this translates into the need for long-range planning for changes on the part of government. As an illustration of this point, Auerbach (2006, Table 3) estimated simple linear decision rules for annual changes in U.S. federal spending relative to full-employment GDP, with two explanatory variables, the lagged values of the budget surplus and the GDP gap, meant to represent budget

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<sup>9</sup> The remaining categories of spending are primarily other entitlement programs, such as unemployment compensation, plus retirement programs for government workers.

and macroeconomic policy determinants. In looking separately at discretionary spending and spending on Social Security, Medicare, and Medicaid, the results were that while discretionary spending responded to both determinants with the expected sign (and with the level of significance depending on sample period), spending on the three major entitlement programs bore essentially no relationship to these same determinants.

Thus, as the composition of government spending changes over time, the ability of governments to make high-frequency policy adjustments is likely to be diminished. From a welfare perspective, this inflexibility is probably a good thing, as it may be substantially more costly to affected individuals for the government to make sudden changes in old-age entitlement benefits than, say, for the government to accelerate or slow down spending on public infrastructure programs or military hardware development. But from the perspective of a government that may need to make overall budget adjustments or may wish to use spending adjustments for purposes of macroeconomic stabilization, this reduction in flexibility will present a challenge. There may be a very small component of the government budget that is relatively easy to adjust.

A second potential impact on budget policy of the growth in old-age entitlement spending is more of a long-term, lower frequency concern. This concern relates to the “natural constituency” that such programs have, as a consequence of their universality. As has been explored in the literature (see, e.g., Tabellini, 2000), universal unfunded systems can create a natural constituency of support among the elderly and those nearing retirement. Even those who over an entire lifetime may have contributed far more to a public pension system or old-age health care system than they receive as retirees will benefit when old from the system’s continuation. These individuals, along with those who are younger but for other reasons may



still benefit from the system's continuation (perhaps because they have low incomes and so will be net beneficiaries of the system's redistributive provisions), can form a coalition against reducing benefits, even if such a coalition would not exist if everyone were voting at the beginning of their respective lives.

In the context of societal aging, the presence of a large cohort of beneficiaries simply strengthens the coalition in favor of maintaining the current system. This impact may be somewhat mitigated to the extent that maintaining an increasingly expensive transfer program might have very negative effects on the economy, for example through the need for much higher marginal tax rates and hence a reduction in the level of economic activity. In such a case, even self-interested voters might favor some modifications in entitlement programs, but presumably they would still prefer alternative budget cuts to reductions in their own benefits. While the large postwar baby-boom cohort might, when young, have weakened the coalition in favor of old-age entitlement programs (see, e.g. Cooley and Soares, 1996), the aging of this cohort has likely reversed the effect.

How resistant the voting population will be to reform depends critically on the proposed alternatives, for a coalition that favors the current system over one simply reduced in size won't necessarily favor the current system over a more sophisticated alternative that, for example, alters the structure of benefits, hurting some beneficiaries more than others. Nevertheless, the fact that democracies must undertake changes to programs with a large and growing natural constituency of voters presents a significant challenge to government budget adjustments over the longer term.

#### **IV. Impacts on Tax Policy**

Governments in developed economies raise revenue using four primary taxes: individual income taxes, corporate income taxes, payroll taxes, and consumption taxes (primarily value added taxes). Other taxes, such as excise taxes and estate/inheritance/wealth taxes, are present as well, but typically account for a small share of revenues. The arguments in favor of the different approaches to taxation have been well worked out in the literature on taxation, with the main factors of economic efficiency, distributional equity and simplicity and ease of administration being used in evaluating the approaches.

While distributional concerns are often represented in a static, cross-section context, in which tax burdens are expressed by income class, the distribution of taxes across generations is also relevant, for different tax bases are concentrated among different generations. Distributional concerns across generations may seem of little consequence, since age is not an exogenous characteristic and each individual passes through the different stages of life. But, a transition from one tax system to another at a given point in time hits different generations at different stages of life, which can lead to different generational burdens and important efficiency effects as well.

Two important examples of such combined distributional and efficiency effects come from the analysis of a shift from income taxes to one of two alternative tax bases that eliminate intertemporal saving distortions, consumption taxes and labor income taxes. As discussed in Auerbach and Kotlikoff (1987), a transition from an income tax to a consumption tax, by shifting tax burdens to the elderly, not only hurts older generations and helps younger generations as of the time of the tax reform, and hence can have large distributional effects; it also can improve the efficiency of the tax system, beyond the efficiency gain delivered by eliminating the

intertemporal distortion, by effectively imposing a capital levy on existing wealth. The capital levy occurs because the consumption that previously accumulated assets will finance in the future will now be subject to a tax, and this efficient tax provides revenue that allows a reduction of future distortionary taxes.

On the other hand, a switch from an income tax to a labor income tax, by shifting burdens to the young, not only hurts younger generations and helps older generations at the time of the tax reform, but also can *reduce* efficiency, in spite of the fact that the intertemporal distortion has been eliminated. By reducing the future taxes that asset-owners have to pay, a reduction in capital income taxes will not only reduce intertemporal distortions, but in the short run will also effectively provide a windfall to owners of existing wealth, many of whom may have short planning horizons and therefore mostly will simply experience an income effect. These windfalls must be paid for by raising distortionary taxes on labor income, and the efficiency loss from the need to pay for windfalls with distortionary taxes can more than fully offset the efficiency gains from eliminating the intertemporal distortion.

Societal aging affects the relative merits of different tax bases. First, as a simple matter of revenue, the relative sizes of the different bases will change and hence so will their revenue generating capacity for given tax rates. For example, standard life-cycle analysis as well as empirical evidence suggests the existence of a hump-shaped saving pattern, and in particular increasing consumption-income ratios as the population ages and a larger share of the population is using principal as well as income from assets to finance consumption. Thus, increases in the old-age dependency ratio would be expected to increase the consumption-income ratio, making consumption taxes, in principle, a stronger potential revenue source.<sup>10</sup>

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<sup>10</sup> This conclusion is tempered to the extent that consumption items concentrated among the elderly, such as health care, are either exempt from taxation or government-provided.

Likewise, an increase in the elderly share of the population would be expected to increase the economy's ratio of capital to labor, reflecting the prior wealth accumulation of older individuals. In a closed economy, this would have an uncertain impact on the relative shares of capital income and labor income, with the production elasticity of substitution determining the outcome; but in an open economy, with factor prices less sensitive to changes in the ratio of domestically-owned capital to labor, one would expect an increase in the capital share of income. Thus, the capital income component would become more significant as a share of income and hence also as a potential tax base. On the other hand, labor income taxes would fall on a smaller tax base, relative to overall income.

Of course, the relative sizes of the different tax bases don't provide all the necessary information about the relative attractiveness of different taxes. However, analysis of efficiency effects does yield similar results. For example, an increase in the dependence on consumption taxes will result in a higher capital levy with an older population, assuming that a larger elderly cohort is associated with increased asset-holding; hence, there will be a bigger efficiency gain from such a tax shift. On the other hand, a reduction in capital income taxes accomplished via a transition to labor income taxation will produce larger windfalls to asset-holders and therefore make such a tax shift even less attractive. Thus, the efficiency differences between consumption taxes and labor income taxes will be magnified by societal aging, because the different effects of the two taxes on existing wealth will be magnified.<sup>11</sup>

To illustrate this last point, Table 1 presents results from simulations based on the Auerbach-Kotlikoff (1987) dynamic overlapping generations model, using the model's baseline

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<sup>11</sup> A corollary of this conclusion is that taxes on intergenerational wealth transfers, such as estate and inheritance taxes, will be more efficient with an older population at the time of their enactment or increase, because of the higher concentration of wealth among those of advanced age.

assumptions regarding tastes and technology.<sup>12</sup> The table shows both the long-run welfare gains (which result from changes in both the distribution of the tax burden and in economic efficiency) and pure efficiency gains (which exclude the effects of intergenerational transfers) that result from immediate transitions from a 30 percent proportional income tax to either a proportional consumption tax or a proportional labor income tax. As in the original Auerbach-Kotlikoff analysis, transitions to a consumption tax are projected to produce long-run efficiency gains and even larger long-run welfare gains, because of transfers in the tax burden to older transition generations. For labor income taxation, the results are reversed, as long-run generations lose as a consequence of both reductions in efficiency and transfers to older generations.

The two rows of the table show results for annual population growth rates of 1 percent and 2 percent. For the lower population growth rate, in which the economy has an older population, the welfare and efficiency gains are larger under a transition to a consumption tax, and the welfare and efficiency losses are larger under a transition to a labor income tax. As the discussion above suggested, when older generations account for a larger share of the population, the transition effects that make these two tax reforms differ with respect to both efficiency and intergenerational transfers are magnified.

## **V. Stabilization Policy**

What of the macroeconomic effects of societal aging, and the nature of fiscal responses?

We can distinguish longer-term and cyclical issues, although there is little to say about the former. A lower birth rate translates into a lower rate of aggregate economic growth, *ceteris*

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<sup>12</sup> These assumptions include a nested CES utility function with intertemporal elasticity of 0.25 and intratemporal elasticity between contemporaneous consumption and leisure of 0.8, a utility weight of 1.5 on leisure relative to consumption, a pure rate of time preference of 0.015, Cobb-Douglas production using capital and labor, and an empirically estimated age-wage profile.

*paribus*. This, in itself, has no obvious implications for fiscal policy, other than that estimates of potential output and labor force growth will need to reflect this underlying trend. There is no obvious reason why fiscal policy, or for that matter monetary policy, will be otherwise influenced by this change in trend growth, given that it is a gradual and predictable ongoing process.

As to cyclical issues, societal aging may influence both automatic stabilizers and discretionary fiscal policy. Automatic stabilizers exist on both the tax and spending sides. On the tax side, revenues rise and fall with income, providing a stabilizing force that depends on both the tax structure – in particular, the elasticity of tax revenues with respect to income – as well as the short-run responsiveness of aggregate demand to changes in tax payments. As discussed above, there may be reasons for modifying the tax structure in response to societal aging. Even without changes in the structure of taxation itself, tax revenues are likely to shift among different tax bases, for example with consumption taxes growing in importance relative to income taxes with the expected increase in the consumption-income ratio. The impact of this shift on the strength of automatic stabilizers is ambiguous, for there are effects that push in opposite directions.

On one hand, consumption tax revenues tend to be less responsive to the cycle, precisely because of consumption smoothing. This may weaken the ability of the tax system to serve as an automatic stabilizer, although if individuals are smoothing consumption, then the impact of changes in current tax payments on current consumption may not be very significant in any case. On the other hand, the shift toward older consumers should, according to the life-cycle model, tend to increase the marginal propensity to consume per unit change in tax revenues, making automatic stabilizers stronger.

On the spending side, the strong shift in the composition of government spending toward old-age entitlement programs may make the automatic spending response to output more procyclical, to the extent that decisions to claim benefits, in particular for retirement and disability pensions (which also tend to be concentrated among older workers), increase with weakness in the labor market.<sup>13</sup>

As to discretionary policy, a shift in tax structure may strengthen the tools available to stimulate aggregate demand. For example, an increased reliance on consumption taxes would enhance the ability of government to affect not simply disposable income of taxpayers but also their intertemporal consumption decisions through the use of temporary adjustments in the consumption tax rate.<sup>14</sup> Stimulus measures that rely on substitution effects rather than income effects have a further advantage related to societal aging, in particular to the budget stress discussed above. To the extent that governments cannot credibly commit to sustained fiscal stimulus, or find it unwise to do so, this works in favor of price-based stimulus – a temporary tax cut is likely to be more effective than a more sustained one, because the substitution effect is strengthened. Thus, governments, which over a prolonged period of time are likely to be dealing with the budget stress of population aging, may at the same time gain more effective tools for influencing aggregate demand.

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<sup>13</sup> Empirical evidence for OECD countries suggests that disability claims increase in recessions, with this increase attributable primarily to weak employment conditions rather than declines in health. See Benítez-Silva et al. (2010). As to retirement, the evidence is less clear, in part because individuals who depend on their own wealth in addition to government pensions to finance retirement consumption may experience negative wealth shocks in recession that may encourage individuals to delay retirement. See Gustman et al. (2011).

<sup>14</sup> Indeed, such a policy was adopted by the United Kingdom during the recent recession, via a temporary reduction in the VAT rate beginning late in 2008. See Crossley et al. (2009).

## **VI. Conclusions**

Societal aging has several implications for the conduct of fiscal policy, beginning with the considerable stress put on public sector finances because of large, unfunded and age-based entitlement programs. There are other effects as well, some of which will present further challenges to fiscal policy actions, and others that may ease the path somewhat. Even if existing programs can be modified, a growing share of government budgets will be devoted to old-age entitlement programs, and both economics and politics suggest that this will reduce the flexibility of budget determinations.

An aging population also has implications for the design of tax policy, making certain tax bases – in particular, consumption taxes, and wealth transfer taxes as well – more productive and efficient. As to stabilization policy, the consequences of aging are less clear, both with respect to the effectiveness of automatic stabilizers and the ability of government to take effective discretionary actions.



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**Table 1. Efficiency and Long-Run Welfare Gains:  
Transition from a 30% Income Tax**

New System:	Consumption Tax		Labor Income Tax	
Population Growth Rate (percent):	Long-Run Welfare Gain	Efficiency Gain	Long-Run Welfare Gain	Efficiency Gain
1	6.29	1.71	-3.46	-2.31
2	5.57	1.34	-3.15	-1.59

Notes:

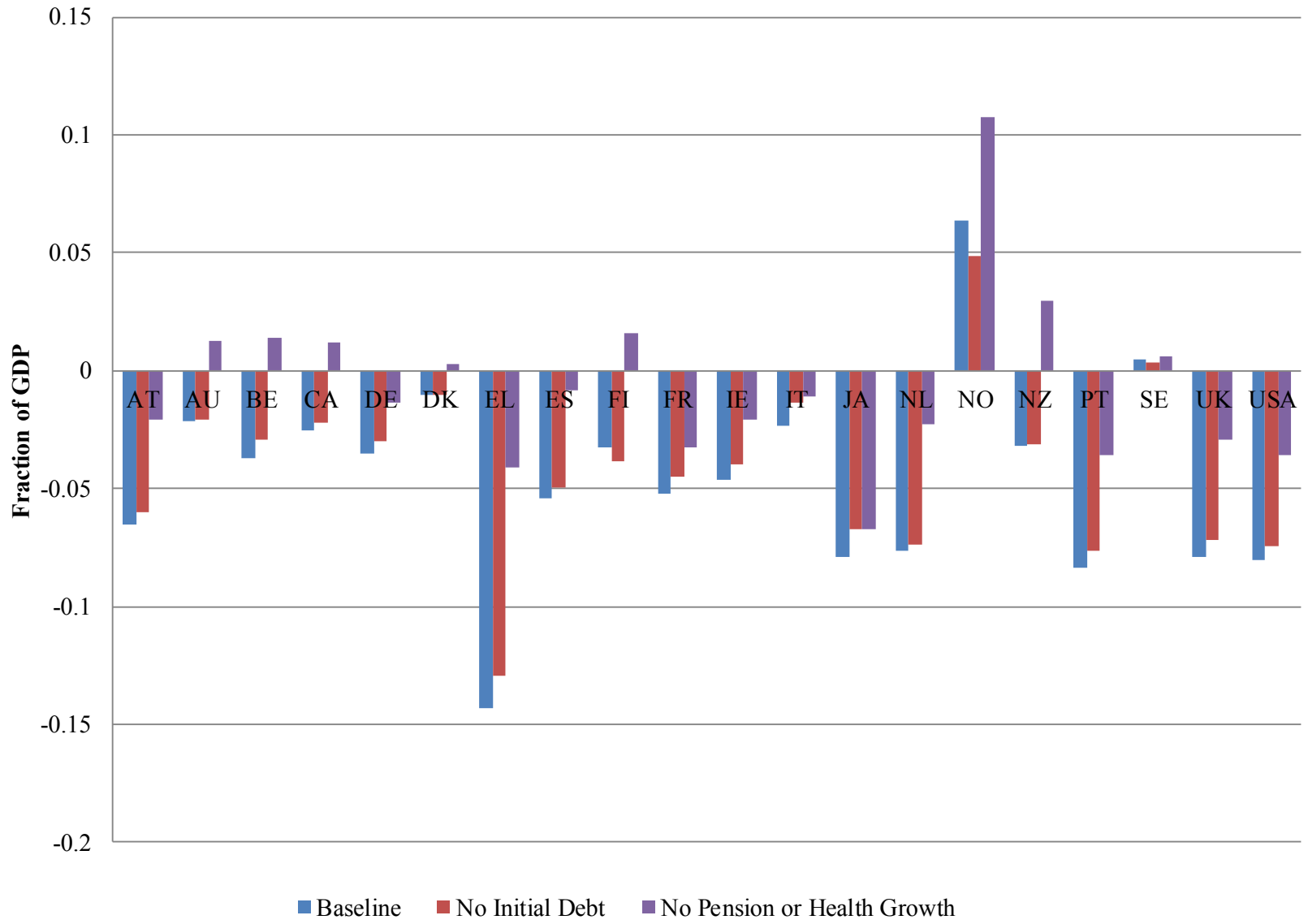
Taste and technology parameters are taken from the base case in Auerbach and Kotlikoff (1987).

All other taxes and national debt are set to zero, for simplicity.

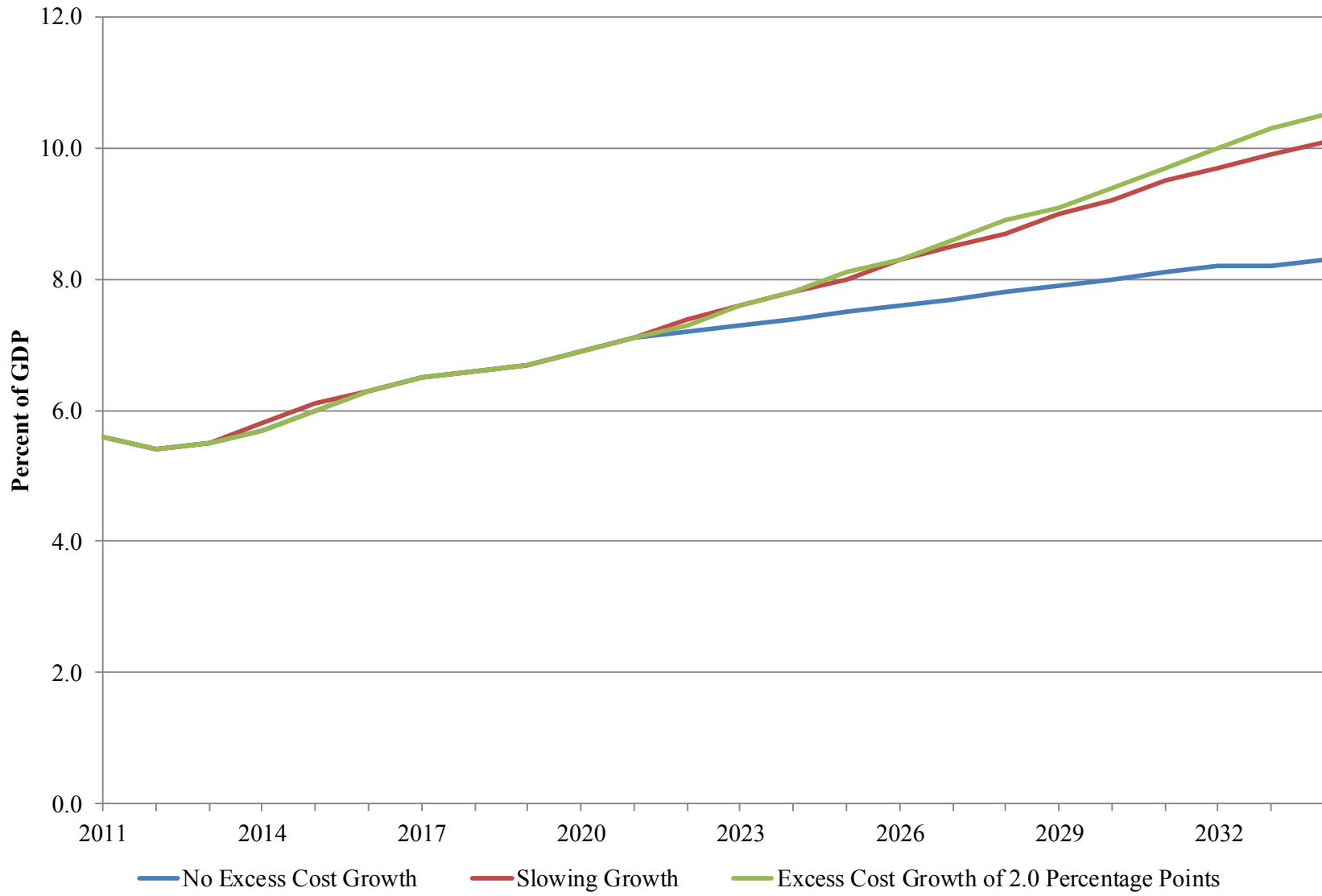
Long-run welfare gains are expressed as percent increases in lifetime resources of generations in the long run.

As in Auerbach and Kotlikoff (1987), efficiency gains are welfare gains of post-reform generations when gains or losses of transition generations are neutralized using lump-sum taxes and transfers and remaining gains or losses are spread evenly among post-reform generations.

**Figure 1. Fiscal Gaps through 2060**

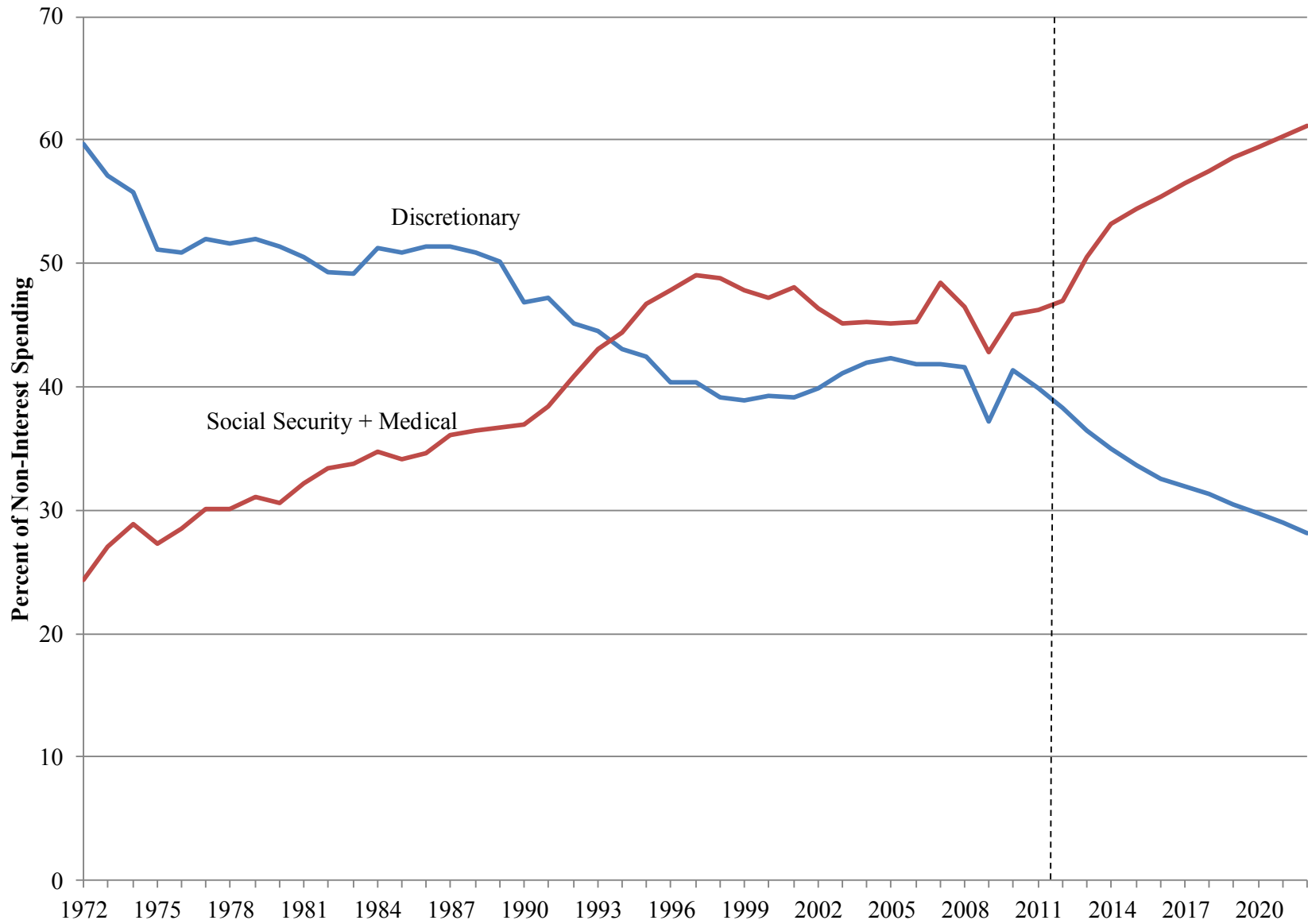


**Figure 2. Mandatory Federal Health Spending Under CBO's Alternative Fiscal Scenario and Different Assumptions About Excess Cost Growth After 2021**



Source: CBO (2011)

**Figure 3. Share of U.S. Federal Non-Interest Spending, 1972-2022**



Source: CBO (2012)