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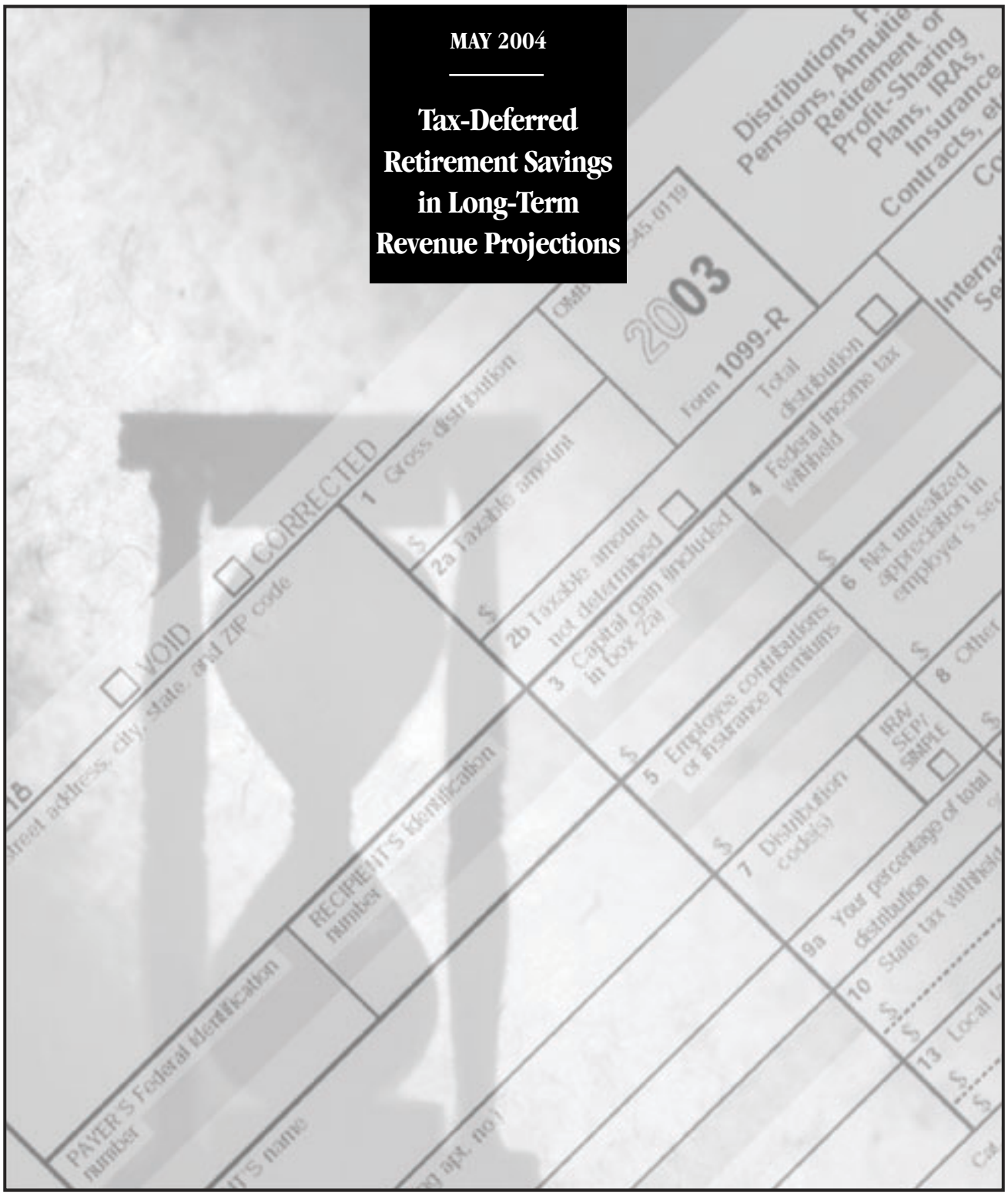
Tax-Deferred Retirement Savings in Long-Term Revenue Projections



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May 2004

The Congress of the United States
Congressional Budget Office

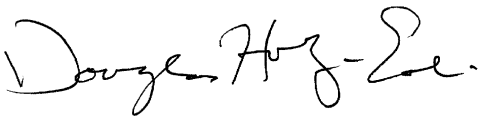
Preface

This Congressional Budget Office (CBO) paper, requested by the Senate Finance Committee, examines how long-term revenue projections are affected by explicitly incorporating tax-deferred retirement savings. Using data from tax returns in a model that it constructed, CBO estimates that federal revenue will increase by 0.5 percent of gross domestic product over the next 75 years as a result of tax-deferred retirement accounts. About one-half of that increase will occur in the next 25 years.

The paper first describes the "life-cycle" of retirement accounts and explains the revenue implications of each phase. It then illustrates how revenues from retirement accounts are affected by demographic bulges such as the baby boom and by tax incentives available outside of retirement accounts, such as lower rates on capital gains and dividends. Finally, it considers alternative scenarios to the base case in the model in order to illustrate the effect of using different assumptions about such factors as the economy, tax policies, and taxpayers' behavior in saving for retirement.

Paul Burnham of CBO's Tax Analysis Division wrote the paper under the direction of Roberton Williams and G. Thomas Woodward. Within CBO, Paul Cullinan, Robert Dennis, Douglas Hamilton, Arlene Holen, Benjamin Page, John Sabelhaus, John Sturrock, and David Weiner provided useful comments and assistance. In addition, Julia Coronado, Michael Boskin, Alan Auerbach, William Gale, and Peter Orszag provided valuable criticism and suggestions.

John Skeen and John McMurray edited the manuscript, with assistance from Allan Keaton. Denise Williams prepared early drafts of text. Lenny Skutnik produced the printed copies, and Annette Kalicki prepared the electronic versions for CBO's World Wide Web site (www.cbo.gov).



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May 2004

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Summary and Introduction

As baby boomers retire and draw on their pensions and individual retirement accounts (IRAs), increasing amounts of taxable income will be generated. Contributions to those retirement plans are largely untaxed, tending to reduce taxable income and tax receipts when the contributions are made. If both the structure of existing retirement plans and the tax law remain unchanged, taxable distributions from the plans will become relatively more important with the aging of the population, tending to boost future taxable income and receipts, not only in nominal terms but also as a percentage of gross domestic product (GDP). In effect, some potential tax revenues have been shifted from the past and the present to the future.

The question is, "How much?" The answer has a direct bearing on long-term budget projections. This report examines the extent of the shift in the pattern of income tax receipts that is in store as these deferred taxes are realized over the coming decades. The Congressional Budget Office (CBO) estimates that deferred taxes will modestly increase income tax receipts as a percentage of GDP. At the end of 75 years, the effect is to make receipts about 0.5 percent of GDP higher than in 2003, with about one-half of the rise in the next 25 years (see Figure 1). Although a substantial stock of such potentially taxable funds has been accumulated, their effect on future budgets will be modest because the tax-deferred status of new contributions to retirement plans and of the investment returns on existing assets will offset much of the anticipated taxes on withdrawals.

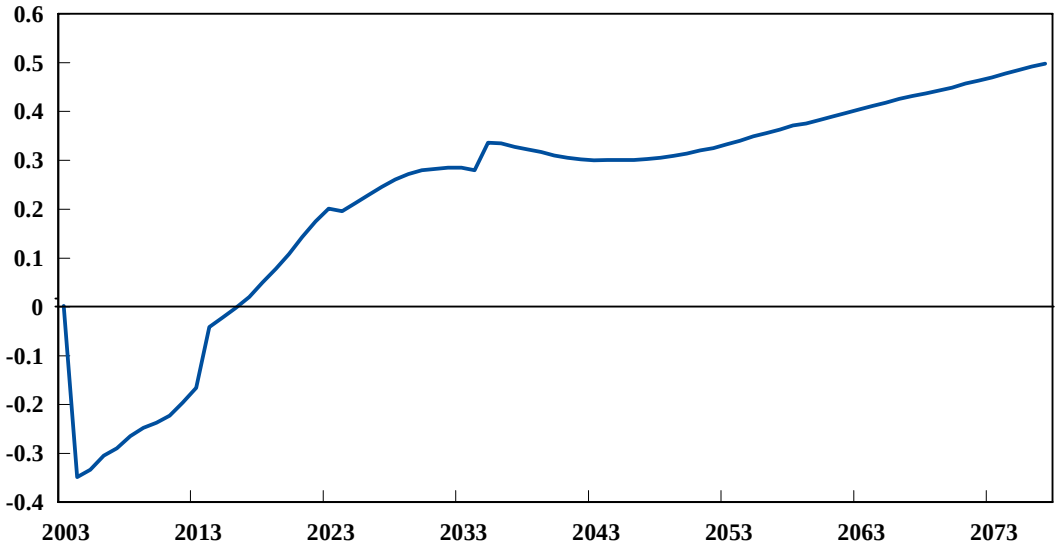
Those results hold true under a variety of assumptions about GDP growth, inflation, earnings in the plans, and other factors. The estimates are most sensitive to assumptions about the growth of new contributions and the degree to which taxpayers switch to Roth IRAs and "back-loaded" 401(k) accounts, which receive a different form of favorable tax treatment.

A key feature of this analysis is that it examines budget projections—specifically, the effects of existing tax-deferred retirement plans on the pattern of future tax receipts. For this exercise, projections of GDP used to estimate future revenues already implicitly reflect the savings response resulting from the existence of tax-deferred retirement plans, as well as other impacts on corporate capital, profitability, corporate income taxes, and so forth.

Figure 1.

The Effects of Tax-Deferred Retirement Plans on Income Tax Receipts, 2003 to 2078

(Percentage of GDP)



Source: Congressional Budget Office.

Notes: Data are normalized to zero in 2003.

The initial dip in revenues is associated with restoring pension plans to a fully funded status and has no effect on the long-term results.

In contrast, another type of study examines the overall effect of introducing tax-deferred retirement plans, including those on GDP. In such an exercise, the analysis must separately calculate the tax receipts that would have been generated in the absence of those plans and the presence of them and then compare the two. As a result, the conclusions of such studies would tend to be highly sensitive to the assumption made about the additional saving stimulated by the plans' tax-deferred status. Not surprisingly, the difference in the conclusions from those two types of studies derives from the difference in the questions addressed (see Box 1 on page 4).

Tax-Deferred Retirement Plans and Their Fiscal Significance

Tax deferral is a common characteristic of many private retirement plans. Those Congress has enacted a variety of statutes that establish tax incentives for retirement saving and define the conditions under which they may be used. The incentives, by their very nature, are designed to be of financial benefit to the

taxpayers who use them. At the same time, however, those benefits directly affect the federal budget.

How Tax Deferral Works

The mechanics of tax deferral are straightforward. Contributions to an employment-based retirement plan are not included in the employee's taxable income; similarly, most contributions to traditional IRAs are excluded from taxable income. Investment income accrues within those plans tax free, and taxes are due only when the funds are withdrawn. Because the reduction in tax liability comes primarily at the front end of the process, when contributions are made, this type of tax incentive is known as a "front-loaded" plan.

Consequently, a taxpayer can reduce his or her overall tax liability by contributing to a front-loaded retirement plan instead of to a taxable account. Consider a 45-year-old taxpayer in the 15 percent tax bracket who wants to save $1,000 in before-tax earned income to use in retirement. One option would be to pay the 15 percent tax on the earned income and deposit the remaining $850 in a taxable account that earned 6 percent interest annually. Because interest on that deposit is taxed at 15 percent each year, the effective (after-tax) interest rate on the deposit is only 5.1 percent—the 6 percent before-tax interest rate reduced by the 15 percent tax. By age 60, the taxpayer will have accumulated $1,793, which can be withdrawn without incurring any further taxes.[1]

Alternatively, the taxpayer could contribute the full $1,000 to a tax-deferred retirement account, where it would compound at the full 6 percent interest rate. At age 60, the taxpayer will have accumulated $2,397 but must pay a 15 percent tax—or $359—upon withdrawing the savings from the account. After taxes, there will be $2,037, or $245 more than with a regular savings account.

Sometimes, no up-front tax benefit is available in a retirement plan, but interest is still allowed to accumulate tax free until withdrawal. In that case (referred to here as a deferred-liability incentive), the initial deposit would be only $850, but it would compound at the full 6 percent interest rate, yielding $2,037 at age 60. The participant would then pay a tax of $178 on the $1,187 of accumulated interest and have $1,859, or $67 more than with a regular savings account.

The above examples all assume that the individual's tax rate remains constant throughout the cycle of contributions and withdrawals. The tax benefits are even greater if the tax rate declines after retirement. Conversely, a higher tax rate after retirement reduces the benefits. For a taxpayer in the 15 percent bracket prior to

1. If the investment income was in the form of a capital gain realized at age 60 and taxed at a rate of 10 percent, the net accumulation would be $1,918.

Box 1.

Projections Versus Cost Estimates of Deferred Tax Revenues

Two important questions have arisen regarding the effects on revenues of deferring taxes on retirement plans. First, how would actual revenues differ from those in a world in which such plans did not exist? Second, how will tax deferral affect projected revenues in the future relative to the present, given that such tax treatment exists?

The first question is closely related to a policy analysis or *revenue cost estimate*: how would revenues be different if tax-deferred plans were introduced into an economy that did not have them? It applies to decisions about creating, expanding, or contracting the scope of deferral in the tax system. If comprehensive, such an estimate would take into account the full feedback effects of the plans on saving, investment, and the growth of gross domestic product (GDP). Those changes would, in turn, affect other tax sources within and in addition to the individual income tax. The answer to the question compares predicted revenues to those in a "counterfactual"—a parallel situation in which that tax treatment does not exist—and indicates how the overall existence of tax deferral affects revenues. The result reveals the revenue loss or gain (if any) that would be associated with the change in law.

The second question is associated with a *revenue projection*: what will the stream of revenues be in the future? It applies strictly to the issue of projecting future revenues. The analysis starts with the existing tax system, including tax-deferred plans, and measures how much the taxes associated with deferral change from one year to the next. The analysis does not require the construction of a counterfactual because the tax law is unchanged. Instead, it is a comparison across time. The result tells how the pattern of receipts will differ in the future from what they are now because the environment in which tax deferral operates is changing.

Answering the two questions requires different methods. For the sake of illustrating the revenue-projection approach, imagine a relatively simple tax system in which taxes are levied on total output at a single rate with only one exception: contributions to retirement plans are tax deferred, so that income is taxed not when it is earned but when it is distributed in retirement later on. To further simplify matters, ignore the buildup of earnings in tax-deferred plans and consider only the contributions and distributions. Finally, assume that GDP is growing smoothly over time.

If an exceptionally large cohort of workers such as the baby-boom generation is advancing through time in the workforce, tax deferral moves some revenues from the early years to the later ones. Instead of growing steadily, like GDP, the stream of revenues would at first grow more slowly, as large numbers of workers made deductible contributions, but then would grow faster, as they retired and took large distributions. Hence, as the figure shows, the revenue pattern looks like the solid, curved line. In 75 years, revenues would be at point A.

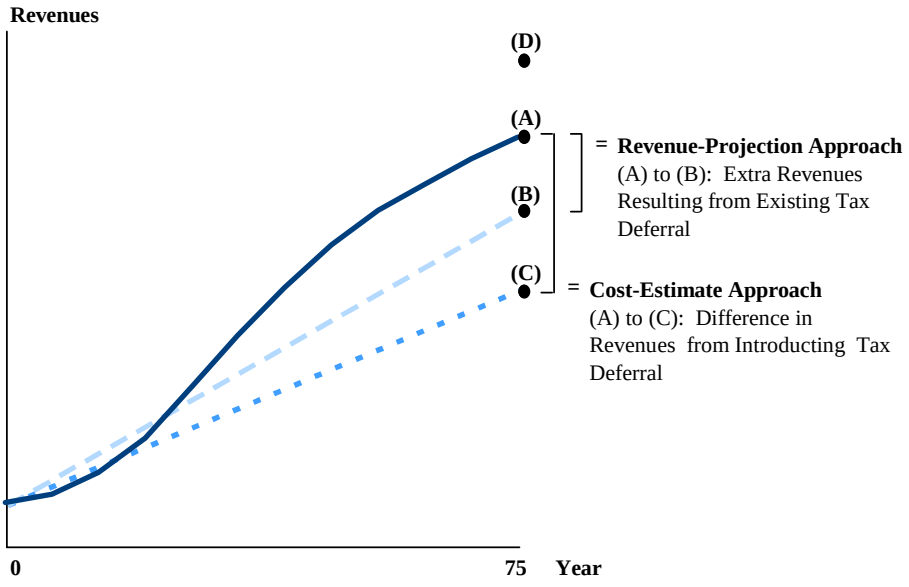
Box 1.

Continued

In contrast, if revenues grew at the same smooth rate as GDP (the dashed line), they would be at point B. Consequently, the distance between A and B represents the extra receipts resulting from tax deferral when the large cohort of workers has retired.

Alternatively, analyzing the issue from the perspective of cost estimating would take into account that some of the saving that went into contributions might never have occurred in the absence of tax deferral. Any such additional saving would increase the capital stock and, eventually, the taxable income of the owners of that capital. Consequently, the appropriate comparison would be between point A and point C, that lower level of receipts associated with the lower growth rate of income (represented by the dotted line)—a comparison between the economy with the retirement plans and a world without them.[1]

The figure also illustrates the pitfall of mixing the methods associated with the two questions. In particular, one should not introduce the effects of new saving into a revenue projection based on an existing system of tax deferral. The dashed line and point B already incorporate additional saving and the growth effects of tax-deferred saving—the distance from C to B. Adding that effect to the difference from B to A (shown as point D) would double-count and, therefore, significantly overstate the revenue gains.



1. The figure as drawn assumes that the plans raise saving and boost economic growth. That assumption is for illustration alone and is not meant to suggest that new saving is substantial. If little new saving is associated with the plans, in their absence receipts would be higher.

retirement, the benefit of deferring taxes does not disappear until the postretirement tax rate reaches approximately 25 percent.

Types of Tax-Deferred Plans

The tax code recognizes a variety of retirement plans that offer either front-loaded or deferred-liability benefits. Employment-based plans offering front-loaded benefits are of two types: defined-benefit and defined-contribution plans. Defined-benefit plans (which are based on various factors that may include years of service and earnings history) promise specific benefits in retirement, and the employer is responsible for accumulating sufficient funds to pay the pension. Workers receive fixed benefits regardless of the returns on invested funds in the retirement plan. Defined-contribution plans, by contrast, specify only how much the employer will contribute annually; payments in retirement depend on what happens to the invested funds. Poor returns on investment yield lower income in retirement, while higher returns result in increased retirement income. Many defined-contribution plans allow employees to make pretax contributions on their own behalf. Such plans are typically known as 401(k) plans.[2]

Traditional IRAs offer either front-loaded or deferred-liability benefits depending on the income of participants and whether they or (or their spouses) are covered by an employment-based plan. All lower-income participants and those higher-income participants who are not covered by an employment-based plan are eligible to claim a deduction for their IRA contributions, thus receiving front-loaded benefits. All others can still contribute but cannot claim a deduction, thus receiving deferred-liability benefits only on the account's investment earnings.

Since 1998, back-loaded benefits have also been available to certain taxpayers through Roth IRAs. Like an IRA with deferred-liability benefits, a Roth IRA has nondeductible contributions, and investment income accrues tax free. But unlike the nondeductible IRA, Roth IRA has withdrawals that are altogether nontaxable. As long as tax rates remain constant over the cycle of contributions and withdrawals, the ultimate tax benefits of Roth IRAs relative to regular savings are exactly the same as those of deductible IRAs.[3]

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2. Other plans that allow pretax employee contributions can be offered only by governments, nonprofit institutions, and small businesses. Examples of such plans include 403(b) plans, 457 plans, the federal Thrift Savings Plan, and what are termed saving incentive match plans for employees. For more information, see *CBO's On-Line Guide to Tax Incentives for Retirement Saving*, available at http://www.cbo.gov/showdoc.cfm?index=4572&sequence=0.

3. The tax benefits associated with a back-loaded plan are equal to those associated with a deferred-liability plan ($67 in the examples above) plus the tax paid on accumulated interest under such a plan ($178) because that tax would not be due in the back-loaded plan. The sum of those two amounts is $245, the same as the tax benefits under a front-loaded plan.

Individuals can also purchase annuities, which, like defined-benefit plans, remove investment risk from the buyer and place it on the seller (usually a life insurance company).[4] Such annuities can be purchased within an IRA, but most are purchased with after-tax funds and thus provide only deferred-liability tax benefits. Those not purchased within an IRA are referred to here as "nonqualified annuities" because they do not qualify for front-loaded tax benefits.

As of the end of 2002, $10.1 trillion was in tax-deferred retirement plans,[5] of which $9.0 trillion was taxable upon withdrawal.[6] Despite the recent trend toward defined-contribution plans, most of those funds were still in defined-benefit plans: $3.1 trillion in private plans (both employment-based pensions and individual annuities) and $2.9 trillion in government plans.[7] The remaining $4.1 trillion was in private-sector defined-contribution plans and IRAs.

The Phases of the Retirement Saving System

A tax-deferred retirement plan typically goes through two distinct phases in its "life cycle." The first phase—referred to as the funding phase—corresponds to the participant's working years, when he or she makes contributions to the plan, causing it to steadily increase in value. The second phase—referred to as the depletion phase—corresponds to the participant's retirement years, when contributions cease and the participant draws down the funds in the plan.

Aggregated over all participants, the system of tax-deferred retirement saving experiences something similar to the funding phase but may or may not experience something similar to the depletion phase. When applied to the full system, the funding phase is defined as the period during which aggregate contributions exceed aggregate withdrawals. The excess of contributions over withdrawals increases the level of assets in the system, and the investment returns on those assets furthers their growth.

When aggregate withdrawals exceed aggregate contributions, however, the system typically enters a maintenance phase rather than a depletion phase. During a

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4. Annuities in which investment risk is shared by the buyer and the seller are also available; they proved popular during the stock market boom of the late 1990s.

5. Federal Reserve Board, "Flow of Funds Accounts of the United States," March 4, 2004 Release, Tables L225 and L225i, available at www.federalreserve.gov/releases/Z1/20040304/.

6. The $1.1 trillion that CBO estimates was not taxable upon withdrawal represents amounts contributed on an after-tax basis that will not be taxed again, including purchases of nonqualified annuities, nondeductible IRA contributions, employee contributions to certain defined-contribution plans before they became 401(k) plans, and most employee contributions to defined-benefit plans.

7. The "Flow of Funds" does not break down government plans between defined-benefit and defined-contribution plans. CBO estimates the portion in defined-contribution plans to be between 15 percent and 20 percent of the total.

maintenance phase, assets typically continue to accumulate because investment income more than fills the gap between contributions and withdrawals.

If withdrawals ever become so large that investment income is insufficient to cover the gap between contributions and withdrawals, the system enters a depletion phase and assets begin to decline. That phase can occur temporarily if investment returns are weak, the ratio of retirees to workers is exceptionally large, or retirees begin withdrawing substantially higher percentages of their assets each year than previously. But only if there are no new tax-deferred contributions is the phase inevitable—otherwise, the maintenance phase can, in principle, continue indefinitely.[8]

According to the Employee Benefits Security Administration, private defined-contribution plans were still in a funding phase as of 1998.[9] Private defined-benefit plans, however, have been in a maintenance phase since 1985. Government retirement plans also entered a maintenance phase during the early 1990s.[10] The only occasions when assets declined in any of those types of plans (signifying a temporary depletion phase) were years in which the stock market declined. Even the Civil Service Retirement System, which has accepted no new participants since 1983, is not projected to enter its depletion phase until 2006, according the Office of Personnel Management.[11]

Accounting for Tax Deferral

The fiscal implications of tax deferral can be thought of as a series of annual tax differences—or the difference each year between, on the one hand, the gain in revenues from the taxation of withdrawals from retirement plans and, on the other hand, the loss of revenues from deferring the taxes on contributions and the investment income from the plans' assets.[12] In principle, the pattern of tax differences associated with the three phases of the retirement saving system seem

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8. Even then, the depletion phase is inevitable only if participants are required to take distributions instead of passing the assets on to their heirs.

9. Department of Labor, Pension and Welfare Benefits Administration, "Abstract of 1998 Form 5500 Annual Reports," *Private Pension Plan Bulletin*, no. 11 (Winter 2002), Tables E14 and E17, available at www.dol.gov/ebsa/PDF/1998pensionplanbulletin.PDF. The Pension and Welfare Benefits Administration changed its name to the Employee Benefits Security Administration in 2003.

10. U.S. Bureau of the Census, *Statistical Abstract of the United States: 2002* (December 2002), Table 521, available at www.census.gov/prod/www/statistical-abstract-02.html. The deferral cycle for federal retirement plans should be understood solely in terms of its implications for the income tax liability of participants.

11. Office of Personnel Management, *Civil Service Retirement & Disability Fund Report for the Fiscal Year Ended September 30, 2001* (December 2003).

12. The tax difference is conceptually the same as a tax expenditure but with the opposite sign.

straightforward. The funding phase and the maintenance phase, when contributions and investment income exceed withdrawals, can be expected to be characterized by lower revenues for the government—in other words, a negative tax difference. During the depletion phase, however, the excess of taxable withdrawals over tax-deferred contributions and investment income can be expected to generate higher revenues, or a positive tax difference. As the collective system of retirement plans moves from negative to positive tax differences, revenues increase as a percentage of GDP.

However, moving from the phases of the retirement saving system in principle to an actual series of tax differences is complicated by three issues. First, as explained, the system as a whole may never enter a depletion phase; it may stay in the maintenance phase indefinitely. Second, shifting demographics can profoundly alter the progression of flows and the sequence of phases. Third, the tax treatment of investment income that accrues outside of retirement plans can alter the translation of the progression through phases into an effect on revenue flows. Beginning with a simple case in which only the funding and depletion phases occur, a series of examples illustrates those three key points.

Simple Case. If the pattern for all tax deferral looked like that for a single participant, a progression through the depletion phase could be expected. As a result, one could expect negative tax differences as contributions are made and positive tax differences as withdrawals occur. In the example illustrated in Table 1, retirement plans receive tax-deferred contributions equal to 4 percent of income for two periods, then distribute all of their assets in a third period. Income grows at 10 percent per period, and assets earn a 30 percent return in each period. Each period sees the introduction of a new cohort of workers, each the same size as the first cohort.[13]

In this example, tax deferral is introduced in period 1 (during which only one cohort is allowed to participate) and discontinued after period 2 (after a second cohort has been introduced). Thus, only one cohort gets the full benefit of the tax deferral. Furthermore, investment income accruing outside of tax-deferred retirement plans is taxed at regular rates (in this case, 20 percent).

Periods 1 and 2 represent the funding phase, when contributions exceed withdrawals. The tax difference is negative in both periods. Because the tax deferral is first introduced in period 1, only one cohort is making contributions in

13. A number of other factors affecting income are ignored for the sake of clarity of exposition.

Table 1.

Effects of an Instance of Tax Deferral on the Flows into and out of Retirement Plans

	Period 1	Period 2	Period 3	Period 4	Period 5
Income	20,000	22,000	24,200	26,620	29,282
Contributions	400	880	0	0	0
Investment Income	120	420	172	0	0
Withdrawals	0	0	1,248	744	0
End-of-Year Assets	520	1,820	744	0	0
Tax Difference					
Dollars	-104	-260	215	149	0
Percentage of income	-0.5	-1.2	0.9	0.6	0

Source: Congressional Budget Office.

that period. In period 2, however, two cohorts are contributing, increasing the tax difference.

Periods 3 and 4 represent the depletion phase, when withdrawals exceed the sum of contributions and investment income. The tax difference is positive in both periods. Because period 3 includes the withdrawals of a cohort that contributed in two periods, whereas period 4 includes the withdrawals of a cohort that contributed in only one period, the tax difference is greater in period 3.

Ongoing Tax Deferral. If deferral is a permanent feature of the tax code, new cohorts begin contributing to retirement plans even as old ones withdraw funds. As a result, even as revenues are generated by withdrawals from retirement plans, new contributions remove income from the taxable base at the same time, offsetting the revenue gain. That scenario raises the prospect of an indefinite maintenance phase in which depletion—for the system as a whole—never occurs. Table 2 shows what happens to the earlier example if tax deferral continues. Periods 1 and 2 still represent the funding phase. Beginning in period 3, however, the system moves into a maintenance phase, as contributions drop below withdrawals but investment income more than makes up the difference.

The example illustrates three important points. First, with steady growth in income and stable patterns of saving for retirement, the depletion phase may never occur. Under such circumstances, it would occur only if the tax deferral was

Table 2.

Effects of Ongoing Tax Deferral on the Flows into and out of Retirement Plans

	Period 1	Period 2	Period 3	Period 4	Period 5
Income	20,000	22,000	24,200	26,620	29,282
Contributions	400	880	968	1,065	1,171
Investment Income	120	420	462	508	559
Withdrawals	0	0	1,248	1,373	1,510
End-of-Year Assets	520	1,820	2,002	2,202	2,422
Tax Difference					
Dollars	-104	-260	-36	-40	-44
Percentage of income	-0.5	-1.2	-0.2	-0.2	-0.2

Source: Congressional Budget Office.

terminated. Second, following from the first, it is very possible that the annual tax difference remains negative. There may never be a period in which deferral results in a positive annual tax difference. Third, even if deferral never results in a positive tax difference in any given year, it may still cause a relative improvement in the fiscal position over time. In the early stages of the system, during initial funding, receipts are depressed more than later during the maintenance phase. As a consequence, a negative tax difference during the funding period will overstate the tax difference that can be expected later during maintenance, so over time the fiscal picture may get better.

Demographic Effects. In contrast to the example in Table 2, the population has not grown steadily over time. Indeed, it is the existence of a demographic bulge—the large cohort of baby boomers—that has partly motivated the discussion of the effects of tax deferral on the budget. As the taxpayers who make up that cohort retire in large numbers and make taxable withdrawals from their retirement plans, a smaller cohort of new workers is taking their place in making contributions—raising the possibility that tax deferral may result in a positive tax difference for a period of years.

Table 3 illustrates the effect of a baby-boom cohort, introduced in period 4, that is 10 percent larger than the other cohorts. In this example, the higher contributions in periods 4 and 5 drive the tax difference more negative, although the system remains in a maintenance phase. (In fact, a cohort could be sufficiently large to trigger a temporary reversion to the funding phase.) In period 6, when the large cohort withdraws its funds, the system still remains in a maintenance phase

Table 3.

Effects of a Baby-Boom Cohort on the Flows into and out of Tax-Deferred Retirement Plans

	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6	Period 7
Income	20,000	22,000	24,200	27,951	30,746	32,210	35,431
Contributions	400	880	968	1,118	1,230	1,288	1,417
Investment Income	120	420	462	524	597	615	676
Withdrawals	0	0	1,248	1,373	1,510	1,827	1,827
End-of-Year Assets	520	1,820	2,002	2,271	2,589	2,665	2,931
Tax Difference							
Dollars	-104	-260	-36	-54	-63	-15	-53
Percentage of income	-0.5	-1.2	-0.2	-0.2	-0.2	*	-0.2

Source: Congressional Budget Office.

Note: * = between -0.05 percent and zero.

(although a slightly larger cohort would trigger a temporary depletion phase). The system returns to equilibrium (where it was in period 3) in period 7 after the baby-boom cohort leaves the scene.

In this example, the government can expect an increase in revenues equal to 0.2 percent of income when the economy moves from period 5 to period 6. That transition is analogous to what the real-world economy faces in the near future—a baby-boom cohort that will stop contributing to the retirement system and begin withdrawing from it.

The Taxation of Investment Income. As important as the presence of a baby-boom cohort is in influencing the flows into and out of the tax-deferred retirement plans, another factor potentially influences the effects of tax deferral on revenue projections just as much. Under current law, capital gains and dividends earned outside of tax-deferred plans are taxed at lower rates than regular income is. Withdrawals from retirement plans, however, are taxed at regular rates. Thus, the flows into and out of retirement plans do not translate directly to tax differences. Even unchanging flows of contributions, earnings, and withdrawals do not result in unchanging tax differences.

A lower tax rate on investment income outside of retirement plans has two effects on the revenue flows associated with tax deferral, as shown in Table 4. First, it reduces the negative tax difference during the funding phase. In periods 1 and 2, the revenues not collected (because the earnings accrue in retirement plans) are

Table 4.

Tax Differences Associated with Tax-Deferred Retirement Plans Using Different Tax Rates on Investment Income

	Period 1	Period 2	Period 3	Period 4	Period 5
Uniform 20 Percent Tax Rate (From Table 2)					
Dollars	-104	-260	-36	-40	-44
Percentage of income	-0.5	-1.2	-0.2	-0.2	-0.2
Lower 12 Percent Tax Rate on Investment Income					
Dollars	-94	-226	1	1	1
Percentage of income	-0.5	-1.0	*	*	*

Source: Congressional Budget Office.

Note: * = between zero and 0.05 percent.

less than they would be if the tax rate that would otherwise have been imposed was greater. Second, it has a similar effect during the maintenance phase (periods 3 through 5). During the maintenance phase, like the funding phase, balances in the plans continue to grow (earnings in retirement plans exceed the amount by which contributions fall short of withdrawals); but because earnings are taxed at a lower rate, the tax difference is not as great as it would be if the tax rates were the same. Indeed, additional revenues associated with the excess of withdrawals over contributions can be greater than the forgone revenues associated with the earnings. Balances in the plans could be growing, but the tax difference under some circumstances could be positive.

Accounting for the tax rate differential is critical to projecting the effects of deferral over time because its effect on the tax difference tends to change even within the maintenance phase. Even when the net flow into the plans (contributions plus earnings minus withdrawals) remains a stable fraction of GDP, the tax difference can change. If investment earnings and the difference between withdrawals and contributions grow relative to GDP by the same dollar amount, the net flow into the plans remains a constant fraction of GDP. However, a 20 percent tax on the difference between withdrawals and contributions (a positive number in the maintenance phase) exceeds the lower tax on an equal amount of investment income, resulting in a net fiscal improvement over time. (That effect, however, requires a more complex example than illustrated in Table 4.)

Projections of Flows into and out of Retirement Plans and the Associated Revenues

As described, projecting the effects of tax deferral on future receipts requires estimates of the flow of contributions, the flow of withdrawals, and the earnings on the balances in the retirement plans. Also needed are the tax rates relevant to those flows, including the rates relevant to earnings outside of the plans. From those figures, it is possible to calculate a measure of the tax difference resulting from deferred taxes: the taxes not collected on contributions and earnings netted against the taxes collected on withdrawals.

Using projections of output for the next 75 years, CBO estimated the flows of contributions to, earnings on, and withdrawals from tax-deferred retirement savings.[14] CBO then applied the relevant tax rates to derive the annual tax differences.[15] The resulting tax difference in any year, expressed as a percentage of GDP, can then be compared to that in the current year to determine how much more in taxes relative to GDP can be expected than currently yielded.

According to those projections, defined-contribution plans and IRAs collectively are still in the funding phase but will enter a maintenance phase in 2012, from which they will not emerge during the 75-year period. During that period, contributions and investment income will exceed withdrawals by increasing amounts in almost every year. Throughout the maintenance phase, the net flow of funds (that is, contributions plus investment income minus withdrawals) into such plans will be around 5 percent of GDP per year, down from 6.4 percent in 2003.

Defined-benefit plans have been in a maintenance phase but because, by law, they must be fully funded, CBO assumed that the plans would temporarily revert to a funding phase between 2004 and 2014 in order to be restored to that status.[16] Thereafter, they will remain in a maintenance phase through the end of the 75-year projection period, with the annual net flow of funds into the plans hovering around 3 percent of GDP, roughly the same level as in 2003.

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14. Although the time horizon is ultimately an arbitrary choice, CBO used a 75-year period to allow sufficient time for the vast majority of current employees to complete their cycle of contributions and withdrawals.

15. CBO's model is a variation of the one used to make similar projections for the agency's 10-year budget baseline. Similarly, the tax rates approximate those generated by the microsimulation income tax model that CBO uses for the baseline.

16. By law, qualified private plans whose investment experience results in underfunding must amortize their deficiency over a five-year period. (The Pension Funding Equity Act of 2004 temporarily relaxes funding requirements for private plans.) Federal law does not address underfunded state and local plans. In its base case, CBO assumed that state and local plans would stretch their payments out over the 2004-2014 period and that private plans would be afforded some legislative or administrative relief.

Applying the relevant tax rates and normalizing to zero in 2003 yields a measure of how the receipts-to-GDP ratio will change over the next 75 years as a result of the plans. Except for the near-term period in which defined-benefit plans must be funded, future years show a growth of receipts relative to GDP. But the effects are relatively modest. By 2078, receipts are projected to be about 0.5 percentage points of GDP higher than in 2003 because of the deferred taxes.

The Structure of CBO's Model

CBO's model simulates the mechanics of defined-contribution and defined-benefit plans, generating different projections for each year for both sexes and for various age groups (see Appendix A for full details). CBO derived age- and sex-specific parameters by examining contributions and withdrawals in a base year, 1997. A key assumption behind the model is that the behavior observed for an age group in the base year will be repeated by other workers when they reach that age in later years. The end product of the model is a set of estimates of tax-deferred contributions, total investment income, and taxable distributions for each year between 2003 and 2078.

The part of the model that simulates defined-contribution plans uses assets in the base year as a starting point, then adds contributions and investment income and subtracts withdrawals to advance to the next year's level of assets. Contributions are linked to wage growth, investment income is determined by the projected rate of return, and withdrawals are a share of assets that varies by age and sex but remains fixed over time. The same modeling approach is appropriate for IRAs.

The part of the model that simulates defined-benefit plans works differently. It simulates the future by identifying new retirees each year, estimating the average benefits that they will receive, and then (after accounting for deaths) projecting the benefits of both existing and new retirees forward to the next year. Having estimated the benefits that have been promised, the model then calculates the contributions and investment income required to meet the resulting obligations. That modeling approach applies to private defined-benefit plans, state and local plans, and nonqualified individual annuities. For federally administered plans, the model uses 75-year projections of contributions, investment income, and distributions produced by the administering agencies—adjusted to conform to CBO's forecast of inflation.

To the extent possible, the model relies on data from 1997 tax returns and information returns such as Forms W-2, 5498, and 1099-R. When necessary, however, it uses supplementary data from other sources. CBO tested the model by comparing its results to actual experience over the period 1998 through 2001. On the basis of that comparison, CBO adjusted certain parameters, particularly those relating to the mix of assets in each type of account and the incidence of rollovers

to reflect revealed changes in behavior over that period relative to behavior in 1997.

To calculate the tax difference, CBO used effective marginal tax rates based on its tax projection models. CBO used a marginal tax rate of 20 percent for contributions and withdrawals.[17] That rate approximates the current effective income tax rate under the provisions of the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA).[18] For earnings, CBO computed the tax receipts forgone by deferral using a lower rate of 12 percent for dividends and realized capital gains, which is consistent with the rates in the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA).[19] CBO applied the regular tax rate of 20 percent to interest income and a zero rate to unrealized capital gains, which are not taxed.[20] The model uses the same rates throughout the 75-year time span in order to isolate the effects of tax deferral from other phenomena that may or may not—depending on policy choices—change the ratio of receipts to GDP.

Defined-Contribution Plans and IRAs

Defined-contribution plans and IRAs are characterized over the projection period by tax-deferred contributions that are flat relative to GDP at roughly 2 percent (see Figure 2). Asset levels are high enough at the start of the period that the return on those assets generates investment income (5.5 percent of GDP in 2003) that exceeds withdrawals (1.4 percent of GDP in 2003). As the pool of retirees increases over time relative to the number of workers, withdrawals increase as a percentage of GDP, reaching 6.0 percent by 2078. At no time, however, do withdrawals ever exceed investment income. Hence, the net flow of funds into tax-deferred IRAs and defined-contribution plans does not reverse but remains stable over time, hovering around 5 percent of GDP from 2004 on.

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17. An oft-cited rationale for deferring taxes is that one's marginal tax rate should be lower in retirement than it is during one's working years. However, empirical evidence suggests that in any given year the average marginal tax rate of people contributing to tax-deferred retirement plans is similar to the average marginal tax rate of those making withdrawals. Brianna Dusseault and Jonathan Skinner reach the same conclusion in "Did Individual Retirement Accounts Actually *Raise* Revenue?" *Tax Notes*, February 7, 2000, p. 852.

18. Most important, EGTRRA introduced a 10 percent marginal tax rate and reduced the top four marginal tax rates by roughly 10 percent in phases between 2001 and 2006. All provisions of the act expire in 2011, but this analysis assumes that the lower rates remain in effect indefinitely.

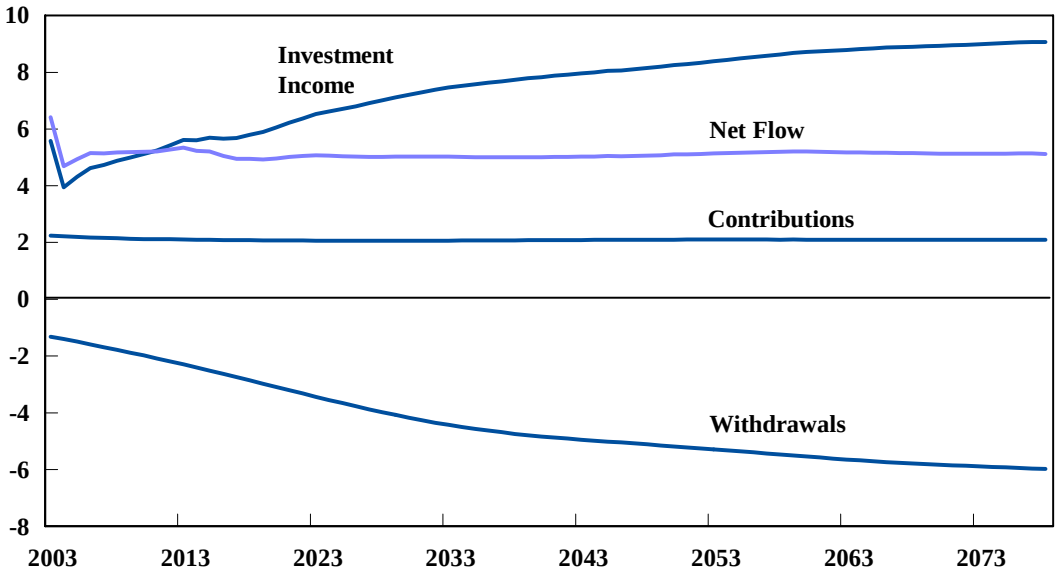
19. JGTRRA accelerated the rate reductions scheduled to occur under EGTRRA in 2006 to 2003 and reduced the maximum tax rate on dividends and capital gains to 15 percent. The rate reductions continue to expire in 2011, but the lower rates on dividends and capital gains expire in 2009. This analysis, however, assumes that the lower rates remain in effect indefinitely.

20. The interest in question is that on bonds actually held in tax-deferred plans. As there is no economic rationale for holding tax-exempt bonds in a tax-deferred plan, the presumption is that all such interest would otherwise be taxable.

Figure 2.

The Flow of Funds into and out of Defined-Contribution Plans and IRAs

(Percentage of GDP)



Source: Congressional Budget Office.

Because of the lower tax rates on certain types of investment income, the mix of assets in retirement plans matters when applying tax rates to estimate the tax difference. IRAs and defined-contribution plans tend to be more heavily invested in stocks than defined-benefit plans are, which has fiscal consequences. The investment income generated by stocks is—outside of retirement plans—taxed at a lower rate than the investment income generated by bonds. Thus, the negative tax difference from IRAs and defined-contribution plans is ameliorated somewhat when compared with that from defined-benefit plans because of the mix of assets in those plans.

When the tax deferral associated with contributions and investment income is compared with the tax on withdrawals, however, the tax difference still remains negative throughout the 75-year period (see Figure 3). The trend, however, is toward zero. The tax difference from defined-contribution plans and IRAs goes from -0.5 percent of GDP in 2003 to -0.1 percent in 2078.

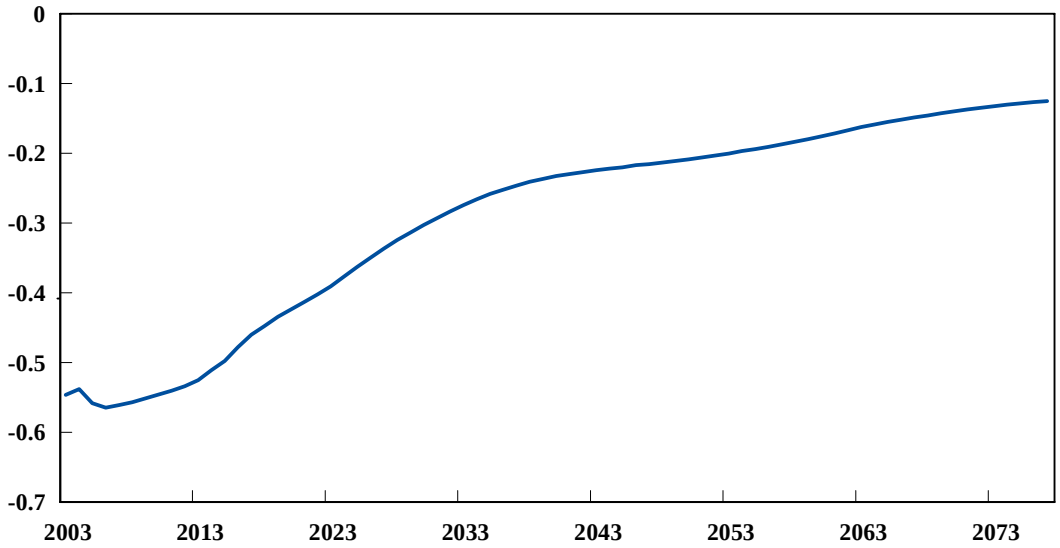
Defined-Benefit Plans

The flows of defined-benefit plans differ from those of defined-contribution plans and IRAs over the 75-year projection period in a variety of ways. Unlike defined-contribution plans, defined-benefit plans are projected to have distributions that

Figure 3.

Tax Differences from Defined-Contribution Plans and IRAs

(Percentage of GDP)



Source: Congressional Budget Office.

are relatively flat as a percentage of GDP. From 2.9 percent of GDP in 2003, distributions increase to 3.5 percent by 2021 as the baby boomers retire then level off (see Figure 4).

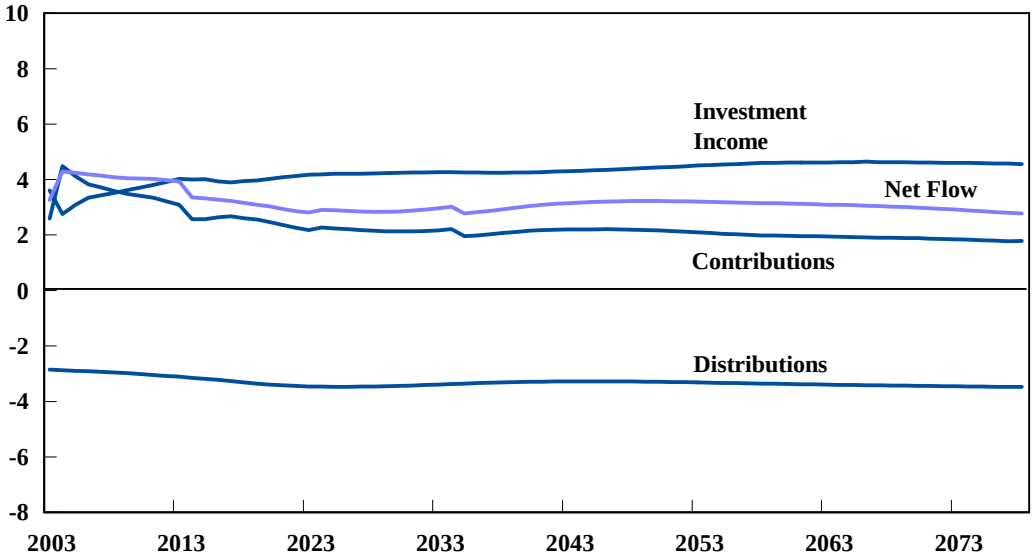
The pattern of contributions also differs. While contributions to defined-contribution plans are projected to remain a constant percentage of GDP, contributions to defined-benefit plans are projected to decline over time. After a brief spike in the short run, contributions as a percentage of GDP are projected to drop from 2.5 percent to 1.7 percent by 2078. In a stable economy, investment returns in excess of GDP growth play an increasingly important role over time in funding promised benefits in defined-benefit plans, thereby reducing the need for contributions.

The brief spike in contributions results from the assumption that defined-benefit plans will have to make additional contributions over the next several years to return to a fully funded status. Collectively, both private defined-benefit plans and state and local plans were underfunded at the end of 2002. As a result, some of those plans are making exceptionally large contributions in 2004 just to meet minimum funding standards, and they will have to continue making extra payments for several years to return to fully funded status. In its model, CBO assumes that those extra contributions will be made over 10 years (although

Figure 4.

The Flow of Funds into and out of Defined-Benefit Plans

(Percentage of GDP)



Source: Congressional Budget Office.

Congressional action beyond a recent measure providing brief relief could either shorten or lengthen that period), resulting in substantially higher projections of tax-deferred contributions as a percentage of wages in those years than in either earlier or later years.[21]

The assumption about the period required for such funding—indeed, if full funding occurs at all—does not appreciably affect the conclusions about the effects of defined-benefit plans on revenues over time. If the plans are not fully funded—reducing the taxes deferred now—they will not pay full benefits later, reducing the distributions that will be taxed later (an issue addressed in more detail below).

The remaining decline in contributions results largely from employers' shift away from defined-benefit plans. Most conspicuous is the assumption of virtually no growth in federal employment. Furthermore, an older workforce participating in state and local plans results in slower employment growth in that sector, where defined-benefit plans are ubiquitous, than in the private sector, where they are not.

21. A smaller spike in contributions will occur between 2024 and 2034. Those additional contributions are mandated by law to ensure that the Military Service Retirement System is able to meet its long-term obligations.

For defined-benefit plans, investment income exceeds withdrawals throughout the period. Its rate of growth relative to GDP, however, is much slower than for defined-contribution plans because defined-benefit plans are funded only to the extent needed to pay promised benefits. That structure imposes an implicit cap on plans' assets and on the returns that they can earn. Thus, investment income offsets withdrawals just enough to keep the net income flow relatively flat as a percentage of GDP, fluctuating between 2.7 percent and 3.4 percent except during the period when extra contributions are being made to achieve full funding. During that short period, net flows drop from 4.3 percent of GDP to 3.3 percent.

The patterns do not change significantly when tax rates are applied to estimate the annual tax difference (see Figure 5). Investment income in defined-benefit plans is much more likely to be in the form of interest than is investment income in defined-contribution plans. Hence, the lower tax rate on dividends and realized capital gains and the exemption for unrealized gains play less of a role than they do for defined-contribution plans. Rising rapidly from -0.6 percent of GDP in 2004 to -0.4 percent in 2014, the tax difference then fluctuates between -0.2 percent and -0.4 percent of GDP for the remainder of the period.

The Combined Effects on Projected Receipts

Combining all types of plans yields a net flow of funds into all tax-deferred retirement plans that fluctuates between 7.7 percent and 9.6 percent of GDP over the 75-year period (see Figure 6). From 2015 on, the percentage never deviates from 8.0 by more than 0.3 percentage points.

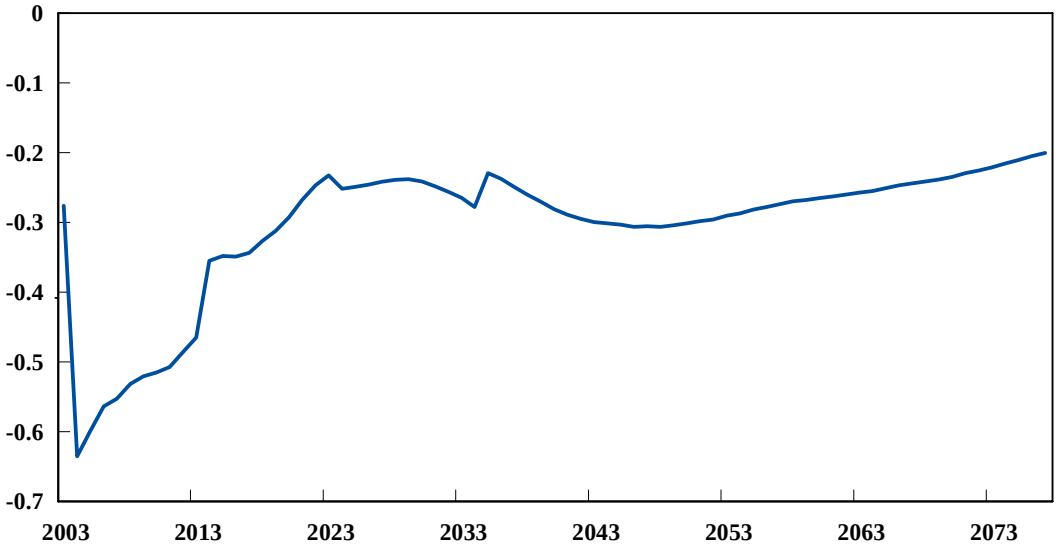
In contrast to the flow of funds, the tax difference—while always negative—shows a distinct trend over time, namely, toward zero. Between 2003 and 2078, the tax difference changes from -0.8 percent to -0.3 percent of GDP (see Figure 7). In other words, CBO projects that the fiscal improvement resulting from tax-deferred retirement plans will be 0.5 percent of GDP over the next 75 years.

How can the net flow of funds into tax-deferred retirement plans be a fairly constant percentage of GDP, while the tax difference associated with those plans is not? The answer lies in the relationship between withdrawals and investment income and the different tax treatment afforded each. In order for the net flow of funds to remain a constant share of GDP, the *difference* between withdrawals and investment income must also be a constant share of GDP (as contributions also remain a relatively fixed percentage of GDP). The *ratio* of withdrawals to investment income, however, changes over time as both flows increase as a share of GDP. Because withdrawals are initially the smaller flow, the same increase in both means that the ratio of withdrawals to investment income increases over time. Because withdrawals are taxed at a higher rate than investment income, the positive tax effect associated with withdrawals grows faster than does the negative

Figure 5.

Tax Differences from Defined-Benefit Plans

(Percentage of GDP)

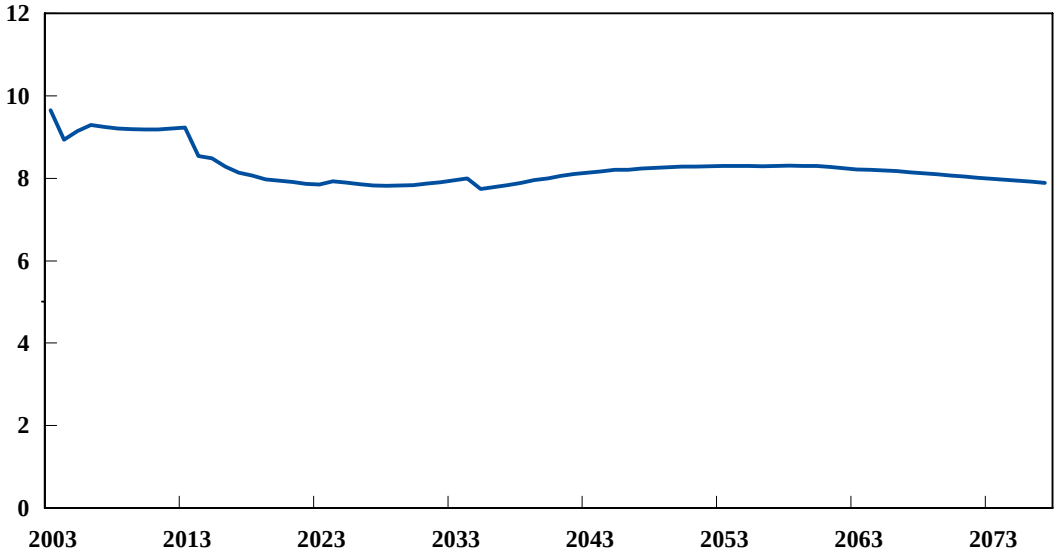


Source: Congressional Budget Office.

Figure 6.

Net Flow of Funds into and out of All Tax-Deferred Retirement Plans

(Percentage of GDP)

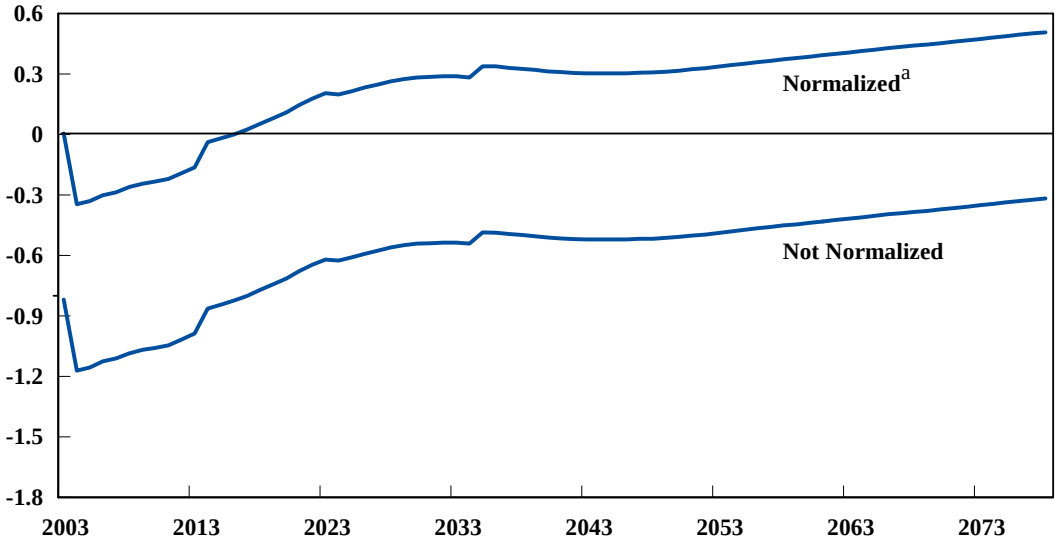


Source: Congressional Budget Office.

Figure 7.

Tax Differences from All Tax-Deferred Retirement Plans

(Percentage of GDP)



Source: Congressional Budget Office.

a. Data are normalized to zero in 2003.

tax effect associated with investment income—hence, the forecast of increasing revenues due to tax-deferred retirement plans.

Alternative Scenarios

In the base case described above, CBO made certain assumptions concerning the long-term state of the economy, the policy environment during the forecast period, and the future behavior of both individuals and firms. CBO also simulated several alternative scenarios in which it changed those assumptions (see Appendix B for full details). The purpose of the alternative scenarios is to demonstrate how CBO's conclusions about the effects of deferred taxes on federal revenues would vary under different assumed circumstances.

Economic Variables

In the base case, CBO adopted values for economic variables consistent with its long-term economic projections.[22] For the most part, those projections include an average value for each economic variable that applies in every year. In any given year, the economic reality will inevitably be different from the projections—sometimes dramatically. Over time, however, the errors should offset one another, leading to an outcome similar to that implied by the projections. For this analysis

22. Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003).

of deferred taxes, CBO tested some alternative assumptions about the average values of four key variables: inflation, real wage growth, interest rates, and the return on equities.[23]

Each test involved increasing or decreasing the rates used in the base case by 1 percentage point, illustrating how an identical change in each variable affects the model's results differently. For example, a 1 percentage point increase in inflation and a 1 percentage point increase in real wage growth both imply a 1 percentage point increase in GDP, but they do not imply the same thing about receipts resulting from tax-deferred retirement plans. The sensitivity test results thus help to clarify the role of each economic variable in the model and demonstrate the robustness of the model with respect to those variables. One should not, however, extrapolate the robustness of the model to represent the robustness of the retirement system in a changing economy. The model is narrowly focused and cannot reflect all of the interactions between the retirement system and the rest of the economy.

Under any of the economic scenarios tested, a modest increase in receipts as a percentage of GDP over the next 75 years occurs (see Table 5). The results are most sensitive to changes in the return on equities and real wage growth. Furthermore, the return on equities is the only variable for which a higher value leads to higher receipts relative to GDP.

Policy Environment

The policy environment in the base case is roughly consistent with

- Marginal tax rates under JGTRRA extended indefinitely,
- Restoration of private and state and local defined-benefit plans to a fully funded status over the 2004-2014 period, and
- No Roth IRAs or equivalent 401(k) plans.

As an alternative to the JGTRRA tax rates, CBO measured the tax differences associated with tax-deferred retirement plans using tax rates consistent with those in place prior to EGTRRA (which, under current law, will become effective again in 2011). The result was a smaller fiscal improvement than in the base case (see Table 6). The increase in receipts to GDP over 75 years was only 0.26 percent instead of 0.50 percent.

23. Each of the variables was tested independently of the others, although there is correlation among them in the economy.

Table 5.

Effects of Tax-Deferred Retirement Plans Under Different Economic Assumptions

Economic Variable	Base Case Value (Percent per year)	Fiscal Improvement as a Percentage of GDP		
		Low-Growth Scenario	Base Case	High-Growth Scenario
Inflation	2.5	0.57	0.50	0.44
Real Wage Growth	1.3	0.62	0.50	0.39
Interest Rates	GDP growth + 1.0	0.54	0.50	0.46
Return on Equities	GDP growth + 5.0	0.39	0.50	0.62

Source: Congressional Budget Office.

Notes: In the low-growth scenario, the values for the economic variables are 1 percentage point lower than for the base case; in the high-growth scenario, they are 1 percentage point higher.

The fiscal improvement is over a 75-year period.

As an alternative to the 10-year period for restoring nonfederal defined-benefit plans to a fully funded status, CBO also simulated periods of five years and 20 years. Those simulations demonstrate that the period of time over which full funding is restored has no effect on the long-term fiscal improvement.

Since 1998, workers and their spouses have been allowed to contribute to Roth IRAs. Under EGTRRA, 401(k) participants will also be able to contribute to back-loaded 401(k) plans beginning in 2006. As the data underlying the patterns of contributions and withdrawals in CBO's model are for 1997, they do not contain the effect of allowing back-loaded plans. Had the model accounted for Roth IRAs, the fiscal improvement over 75 years would have been 0.47 percent of GDP instead of 0.50 percent. Because contributions to defined-contribution plans are potentially much larger than to Roth IRAs, however, accounting for back-loaded 401(k)s as well would have resulted in a fiscal improvement of only 0.19 percent of GDP.

Firms' and Individuals' Behavior

The base case generally assumes that the behavior exhibited by firms and individuals in 1997 remains unchanged throughout the 75-year projection period. CBO tested alternatives that allow for different behavior in three respects: firms continuing to phase out defined-benefit plans in favor of more defined-contribution plans, individual contributions growing over time at different rates, and individuals withdrawing funds at a higher or lower rate than in 1997.

Table 6.

Effects of Tax-Deferred Retirement Plans Under Alternative Policies

(Percentage of GDP)

Policy	Fiscal Improvement
Base Case	0.50
Pre-EGTRRA Tax Rates	0.26
Alternative Funding Periods	0.50
Inclusion of Back-Loaded Plans	
Roth IRAs	0.47
Roth IRAs and 401(k) plans	0.19

Source: Congressional Budget Office.

Notes: EGTRRA = Economic Growth and Tax Relief Reconciliation Act of 2001; JGTRRA = Jobs and Growth Tax Relief Reconciliation Act of 2003.

CBO's base case extends indefinitely the marginal tax rates under JGTRRA, restores private and state and local defined-benefit plans to a fully funded status from 2004 to 2014, and includes no Roth IRAs or equivalent back-loaded 401(k) plans.

The fiscal improvement is over a 75-year period.

The assumption implicit in the base case that participation in private defined-contribution and defined-benefit plans remains unchanged throughout the 75-year period overlooks the trend evident since the early 1980s away from defined-benefit plans and toward defined-contribution plans. As an alternative, CBO simulated the flows into and out of retirement plans as if all nonfederal retirement assets were in defined-contribution plans. That approach represents an upper bound on how the estimates might have differed had the trend toward defined-contribution plans been incorporated into the model. The simulation shows that the results after 75 years, a 0.54 percentage point boost in revenues as a share of GDP, are quite similar to those under the base case (see Table 7).

The base case assumes that contributions to both IRAs and defined-contribution plans increase from their 1997 levels with nominal wage growth. Two alternatives that CBO simulated, one in which contributions remain at 1997 levels and one in which they increase with inflation, would result in a smaller tax difference in each year than does the base case; under those scenarios, revenues in 2078 would be 0.2 percent of GDP higher than under the base case. A third alternative, in which contributions increase in 2008 to reflect higher limits under EGTRRA then increase with wage growth, would always result in a larger tax difference than does the base case; under that scenario, revenues in 2078 would be less than 0.1

percent of GDP lower. A final alternative, in which contributions increase in 2008 to reflect higher limits under EGTRRA then increase with inflation, would have a mixed impact on the tax difference. Initially, the higher contributions would increase the negative tax difference, but by 2078, the negative tax difference would be smaller than in the base case, and revenues as a percentage of GDP would actually be comparable to those under the first two alternatives.

According to empirical evidence, people withdrew significantly different shares of their assets in IRAs and defined-contribution plans in 1998 through 2001 than they did in 1997. To illustrate the fiscal implications of such changes in behavior, CBO simulated two alternative assumptions under which participants withdrew 10 percent less and 10 percent more of their assets than participants did in 1997. In the first instance, tax receipts as a share of GDP would be one-twentieth of a percentage point higher than those in the base case; in the second instance, a similar amount lower.

Table 7.

Effects of Tax-Deferred Retirement Plans Under Different Assumptions About Firms' and Individuals' Behavior

(Percentage of GDP)

Behavioral Assumption	Fiscal Improvement
Base Case	0.50
Firms shift immediately to defined-contribution plans	0.54
Contributions	
Remain at 1997 level	0.72
Increase with inflation	0.69
Increase to EGTRRA limits and then with wage growth	0.47
Increase to EGTRRA limits and then with inflation	0.72
Individuals' Withdrawal Rates	
Are 10 percent higher than in 1997	0.504
Are 10 percent lower than in 1997	0.494

Source: Congressional Budget Office.

Notes: EGTRRA = Economic Growth and Tax Relief Reconciliation Act of 2001.

The fiscal improvement is over a 75-year period.

Appendix A: CBO's Model for Projecting Long-Term Flows Into and Out of Retirement Plans

The Congressional Budget Office (CBO) constructed a model to simulate the mechanics of retirement plans over the long term. The model relies mostly on 1997 tax data—the latest year for which complete data were available—but uses other data where necessary. The model consists of two modules: one for individual retirement accounts (IRAs) and defined-contribution plans, and the other for defined-benefit plans.

Data Sources

The model relies primarily on "microdata," that is, information on each individual respondent rather than aggregate amounts. CBO aggregated those microdata into one-year age/sex cohorts.

Whenever possible, CBO used as its source of microdata a stratified random sample of approximately 100,000 individual income tax returns for the year 1997 and their associated information returns provided by the Statistics of Income Division (SOI) of the Internal Revenue Service (IRS). Data from the following tax forms proved particularly useful:

- *Forms 1040, 1040A, and 1040EZ,* the basic individual income tax return filed by taxpayers: the data from this form were used as a check on the data from the information returns. Also, the form is the only source of data on deductible IRA contributions.

- *Form W-2,* an information return sent by employers to employees that reports primarily their taxable wages and the taxes withheld: it is also the only source of data on amounts of deferred compensation (usually 401(k) contributions) and taxpayers' coverage by an employment-based retirement plan.

- *Form 5498*, an information return sent by IRA trustees to IRA owners that reports their annual contributions (whether or not they are deductible), the rollovers received, and the end-of-year balances.[1]

- *Form 1099-R*, an information return sent by IRA trustees or administrators of employment-based retirement plans to recipients of distributions from those plans: it reports the total amount of the distributions, the taxable portion thereof, and the sources of those distributions as either IRAs or an employment-based retirement plan. It does not necessarily indicate whether the employment-based plans are defined-benefit or defined-contribution plans, but the "plan name" field occasionally provides enough information to distinguish between the two types.[2]

CBO also used a supplemental file provided by SOI containing the age and sex of all taxpayers in a sample between 1987 and 2000.

For data not available from SOI, CBO relied on the 1998 Survey of Consumer Finances (SCF), conducted by the Federal Reserve Board. With the SCF, the Federal Reserve Board collects more complete data on contributions to and balances of retirement plans than the IRS does, but the survey is based on a small sample (of fewer than 7,000 households) and depends largely on the memories and recordkeeping practices of voluntary participants. Nevertheless, the SCF data are considered to be high-quality and are widely used in studies of the distribution of wealth in the United States. For CBO's model, the survey was the source of data on balances in 401(k) plans and provided the information necessary to impute employers' contributions to defined-contribution plans.[3]

Defined-Contribution Plans and IRAs

The basic structure of the module to project withdrawals from defined-contribution plans and IRAs has been set forth by Sabelhaus.[4] His model covered IRAs only, but the principles underlying a combined model of IRAs and defined-contribution plans are the same. The module used in this analysis expands upon Sabelhaus's work by utilizing more robust data whenever they are available and

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1. For more information on the refining of the W-2 and the 5498 data files, see Congressional Budget Office, *Utilization of Tax Incentives for Retirement Saving* (August 2003), Appendix A.

2. For more information on the refining of the 1099-R data file, see Paul Burnham, *The Taxation of Distributions from Retirement Savings Plans*, Technical Paper 2004-06 (April 2004), Appendix A, available at www.cbo.gov.

3. For details of the imputation procedure, see Congressional Budget Office, *Utilization of Tax Incentives for Retirement Saving* (August 2003), Appendix C.

4. See John Sabelhaus, "Modeling IRA Accumulations and Withdrawals," *National Tax Journal*, vol. 53, no. 4 (December 2000), pp. 865-76.

by fully integrating information from the two types of plans and from defined-benefit plans.

The starting points for the module are age/sex distributions of the adult population and the assets in defined-contribution plans and IRAs for a base year—in this case, 1997. The population distribution came from the Social Security Administration (SSA), the distribution of IRA assets came from Form 5498 and SOI's age/sex file, and the distribution of assets in defined-contribution plans came from the SCF.[5]

The function of the module is to generate similar distributions for each future year and in the process generate estimates of tax-deferred contributions, investment income, and taxable withdrawals. To accomplish that goal, CBO replaced the population distribution for each year with SSA's middle-series projection. Then, CBO modeled the accumulation of assets in IRAs and defined-contribution plans in each subsequent year in six steps:

- Adding *new contributions*,
- Adding *internal rollovers* received (by IRAs from defined-contribution plans) and subtracting those paid out (by defined-contribution plans to IRAs),
- Adding *external rollovers* received (from defined-benefit plans),
- Adding the *return on investments*,
- Subtracting *nonrollover withdrawals*, and
- *Redistributing assets* of deceased participants among beneficiaries.

After executing those steps, CBO shifted the asset balance up to the next age group and repeated the steps for another year (see Box A-1).

Contributions. Data on contributions to IRAs are available from Form 5498, and the deductible portion can be identified on Form 1040. Data on employees' contributions to defined-contribution plans are available from Form W-2. CBO assumed that any contributions not associated with 401(k) or 403(b) plans were made after tax. CBO imputed employers' contributions on the basis of the ratio of employers' to employees' contributions in the SCF. Using those data, CBO

5. Because they are based on samples that were not stratified by either age or sex, raw tabulations from SOI files and the SCF produced erratic jumps from one age group to the next. To reduce that effect, CBO smoothed the data using a 10-year kernel-smoothing technique.

Box A-1.

Illustration of the Defined-Contribution Module for a Sample Cohort

Consider the cohort of 915,128 females born in 1937. According to the data, women in that cohort held $13,553.6 million in assets in defined-contribution plans at the end of 1997 when they were 60 (see line 1, below). To that amount, the model adds contributions in 1998 (line 2), which are calculated by increasing the average contribution of 61-year olds in 1997 of $3,245 by 6.25 percent to account for wage growth and assigning that amount to the 13 percent of the cohort who actively participated in such plans. The model also adds rollovers from defined-benefit plans (line 3) and assets from deceased parents and husbands (line 5). Investment income accrues on the original balance plus half of contributions and other income (under the assumption that they are deposited regularly throughout the year) at a rate of approximately 14 percent (line 4). The model then assigns approximately 6 percent of assets (after the full year's income is added) to be rolled over to an IRA (line 6). Of the remaining balance, the model assigns just over 2 percent to be withdrawn (line 7). That leaves a balance of $14,918.7 million (line 8) with which to start the process over in 1999.

Accumulation of Assets Held in Defined-Contribution Plans in 1998 by Females Born in 1937

(Millions of Dollars)

		Key Parameters	Amount
(1)	Beginning-of-Year Assets		$13,553.6
	Plus		
(2)	Contributions	13% of participants x $3,450	409.1
(3)	Rollovers from Defined-Benefit Plans		18.2
(4)	Investment Income	14% of balance after half year's contributions and other income (reflecting rate of return in 1998)	1,928.9
(5)	Net Redistributions Due to Deaths		340.4
	Minus		
(6)	Rollovers to IRAs	6% of balance after full year's income	1,019.7
(7)	Withdrawals	2% of balance after full year's income and rollovers	11.8
(8)	End-of-Year Assets		14,918.7

calculated the following parameters by age/sex class: the percentage of the population making contributions, the average contribution amount, and the deductible share of the contributions. In the model, the average contribution amount increases over time at the same rate as the growth in average wages, and contributions are added to assets each year.

Internal Rollovers. Rollovers from one IRA to another do not affect the accumulation of IRA assets, so the model ignores them. However, it keeps track of rollovers from defined-contribution plans to IRAs so that different rates of return can be applied as appropriate. Data on direct rollovers (that is, those that go directly from qualified plans to IRAs) are available from Form 1099-R. Data on indirect rollovers (that is, those paid by qualified plans to participants and then later deposited in IRAs) can be inferred from the difference between total rollovers received (as reported on Form 5498) and direct rollovers. CBO used those data to calculate the percentage of assets in defined-contribution plans rolled over to IRAs.[6]

External Rollovers. CBO calculated rollovers from defined-benefit plans as part of the defined-benefit module (described below) and split the amounts generated between the assets held in both IRAs and defined-contribution plans in each year.

Return on Investments. In the model, the rate of return on investments is the only major parameter that does not vary by age. CBO expressed nominal rates of return as markups above nominal GDP growth, with the defaults set at 5.0 percent for stocks and 1.0 percent for bonds.[7] Under CBO's assumptions, IRA portfolios consisted of 78 percent stocks and 22 percent bonds, and portfolios for defined-contribution plans, 56 percent stocks and 44 percent bonds.[8] To account for management fees, CBO subtracted 50 basis points. The weighted average rate of return in excess of GDP growth was thus 3.62 percent for IRAs and 2.74 percent for defined-contribution plans. Table A-1 shows the actual rates of return used at 15-year intervals.

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6. The starting distribution of assets is an end-of-year figure. In years after 1997, that figure cannot be known until distributions and rollovers have been estimated. To avoid a simultaneity problem, the parameter values in 1997 were calculated after withdrawals and rollovers had been added back into (or subtracted out of) end-of-year assets.

7. The markup on stocks was designed to hit a real rate of return of 7.0 percent in the short term, which is approximately the historical average. The markup on bonds reflects the average over the 2003-2022 period implied by CBO's long-term economic forecast; see Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003).

8. CBO tested the portfolio splits by applying the weighted average rates of return associated with different splits to 1997 assets, adjusting for contributions and withdrawals, and comparing the results to actual reported assets in 1998 through 2001. The splits selected were those that resulted in the best approximations of actual assets in all four years. Using the same split each year implies an annual rebalancing of portfolios.

Table A-1.

Rates of Return Used in the Defined-Contribution/IRA Module

(Percent)

		Rate of Return in	
	GDP Growth	IRAs	Defined-Contribution Plans
2003	3.73	7.18	6.14
2018	4.03	7.66	6.78
2033	4.19	7.81	6.93
2048	4.06	7.68	6.80
2063	4.06	7.68	6.80
2078	3.99	7.61	6.73

Source: Congressional Budget Office.

Nonrollover Withdrawals. Data on withdrawals that were not rolled over and the taxable portion thereof are available from Form 1099-R. CBO used those data to calculate the percentage of assets withdrawn and the percentage of those withdrawals that were taxable by age/sex class.[9] CBO then subtracted the withdrawals from assets in each year.

Redistribution of Assets at Death. For each year, CBO applied a survival rate and then redistributed the assets held by people assumed to have died. On the basis of 1997 data, CBO assumed that a certain percentage of people in each age/sex class who died were married; their assets were redistributed to members of the opposite sex on the basis of the average age difference between spouses: three years younger if the decedent was male or three years older if female. The assets attributable to unmarried decedents were redistributed on the basis of the average age difference between parents and children: 29 years younger if the decedent was male or 26 years younger if female. The redistributed assets of single decedents were then subjected to mandatory withdrawal and taxation over a five-year period.

Defined-Benefit Plans

The nature of traditional defined-benefit plans makes it unnecessary to link benefits to asset levels; benefits are instead set by formula. Instead of assets, the starting point of the defined-benefit module is a distribution of plan participants, both those accumulating the right to future benefits during their careers ("active")

9. To avoid a simultaneity problem, the asset base used as the denominator is 1997 end-of-year assets plus 1997 withdrawals.

and those receiving benefits after their retirement ("retired"). The model maintains the average benefits of participants retired as of 1997 until they die (indexing, when appropriate, for inflation), then identifies new retirees in each year and assigns them an appropriate average benefit, which they likewise receive until they die (see Box A-2). Asset levels are, however, needed to estimate investment income and contributions. Beginning with 1997 assets, the model estimates investment income on the basis of the same rates of return on stocks and bonds used in the defined-contribution/IRA module. Then, it estimates the level of contributions in each year that would be required to fully fund the benefits previously calculated. Three different types of plans are modeled separately: state and local government plans, private qualified plans, and nonqualified annuities.

Active Participants. Active participants in qualified plans in the base year can be identified using Form W-2. The model keeps track of the number of active participants in each age/sex class primarily so that it can "retire" some of them as they age and thereby know when to begin counting the distributions they receive. Also, the model simulates death prior to retirement, as well as the entry of some older workers into the labor force.

CBO applied employment growth rates to each class of active participants to get the size of the class in the next year.[10] CBO then applied a survival rate to the active participants in each age/sex class and if the size of a class exceeded the number of survivors from the previous year, attributed the difference to new participants.

Retired Participants. The model tracks not just the number of retired participants by age/sex class but also keeps track of when they retired because that affects the size of their pension. CBO identified the retired participants in the base year from Form 1099-R and applied population growth rates and survival rates, just as it did for active participants. Then, CBO adjusted the number of retired participants in each age/sex class to maintain the same ratio of retired participants to total participants in that class over time. Because the percentage retired increases with age, that adjustment typically involved reclassifying as "retired" some participants who had been active in the previous year.

Distribution Amounts. For people who were retired in the base year, CBO assigned the same average taxable distribution (fully or partially indexed for inflation if they were in a government plan) until they died (at no later than age 89). For people who retired in later years, it assigned a higher average pension,

10. Although the Social Security Administration does not project employment levels, CBO used population growth rates from SSA's middle series for that purpose under the assumption that employment covered by private or state and local defined-benefit plans in any given cohort would grow at the same rate as the population in that cohort.

Box A-2.

Illustration of the Defined-Benefit Module for a Sample Cohort

Consider the cohort of males born in 1934. According to the data, 288,900 men in that cohort participated in a private defined-benefit plan in 1997 when they were 63 years old. Of those, 24 percent (or 67,800) were active participants; the remaining 76 percent (or 221,100) were retirees receiving benefits averaging $10,000. The total amount of benefits received in that year, therefore, was $2.211 billion.

According to population growth rates from the Social Security Administration, the total number of 64-year-old participants in 1998 would have been 287,300—an decrease of 0.6 percent. For that age group, however, the model assumes that a higher percentage of participants, or 80 percent, received benefits than was the case for 63-year-olds. That assumption yields 58,000 64-year-old males who were active participants and 229,300 who were retired and receiving benefits from a private defined-benefit plan in 1998.

However, only 98.14 percent of 63-year-old recipients in 1997 would have survived to 1998. Hence, the number of original retirees (that is, those receiving an average benefit of $10,000) would be 217,000. The remaining 12,300 recipients would be new retirees who would receive higher benefits. That benefit is calculated by multiplying the average benefit received by 64-year-olds in 1998 ($9,787) by the change in five-year average wages between the year in which the typical recipient in 1997 retired and 1998 (1.049) for a total of $10,270. All together, the benefits received in 1998 would be $2.296 billion.

Benefits from Private Defined Benefit Plans Received by Males Born in 1934

		Original Retirees		New Retirees		Total Benefits (Billions of dollars)
	Workers (Thousands)	Number (Thousands)	Average Benefit	Number (Thousands)	Average Benefit	
1997	67.8	221.1	$10,000	n.a.	n.a.	$2.211
1998	58.0	217.0	$10,000	12.3	$10,270	$2.296

based on the growth in average wages between the year in which the average recipient in 1997 retired (estimated to be 1990) and the year the later retirees left the workforce.[11]

11. Calculations using 1990 as the base year showed the closest match to actual taxable distributions between 1998 and 2001.

CBO calculated amounts rolled over to IRAs and 401(k)s (and used by that module as "external rollovers") in each year as a percentage of taxable distributions, after initially estimating those percentages by age/sex class in the base year.

Contributions and Investment Earnings. Although they are not needed to project taxable distributions, deductible contributions and tax-exempt investment earnings both affect revenues and therefore must be projected. The fundamental principle followed in projecting those amounts was to ensure that all of the projected benefits would be fully funded. Hence, the model estimates the additional liability incurred by plans in each year and sets the sum of contributions and investment income equal to that amount. The most straightforward method of estimating the liability increment for a particular year is to calculate the lifetime benefits that would be collected by participants projected to retire in that year.[12] All benefits to be paid through 2078 were available from the model's projections of distributions. For people whose retirement would extend beyond 2078, benefits were projected to continue at the same level (partially adjusted for inflation in the case of participants in state and local government plans) until age 89.

CBO estimated investment income as a certain percentage of total assets depending on the typical split between stocks and bonds for each type of plan. In the model, stocks constitute 64 percent of the assets in private plans, 38 percent of the assets in state and local plans, and 20 percent of the assets in nonqualified annuities.[13] Using the markups over GDP growth and management fees described above for defined-contribution plans, CBO then determined these weighted average rates of return in excess of GDP growth: for private plans, 3.06 percentage points; for state and local plans, 2.02 percentage points; and for nonqualified annuities, 1.30 percentage points. Table A-2 shows the actual rates of return used at 15-year intervals.

For all types of plans, CBO generally calculated contributions as the difference between the annual liability increment and total investment income. For 2004 through 2013, however, the model assumes additional contributions equal to 10 percent of the amount by which plans were underfunded in 2003. Alternative time

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12. Actual defined-benefit plans use much more complex formulas to estimate annual liability increments.

13. As with defined-contribution plans and IRAs, CBO tested the portfolio splits for private and state and local plans by applying the weighted average rates of return associated with each split to 1997 assets, adjusting for contributions and withdrawals, and comparing the results to actual reported assets in 1998 through 2001. The splits selected were those that resulted in the best approximations of actual assets in all four years. The share of nonqualified annuity assets invested in stocks is based on amounts from the mid-1990s reported in American Council of Life Insurance, *1998 Life Insurance Factbook* (Washington, D.C., 1998), Table 6.9.

Table A-2.

Rates of Return Used in the Defined-Benefit Module

(Percent)

		Rate of Return in		
	GDP Growth	Private Plans	State and Local Plans	Nonqualified Annuities
2003	3.73	6.52	5.29	4.43
2018	4.03	7.10	6.06	5.34
2033	4.19	7.25	6.21	5.49
2048	4.06	7.12	6.08	5.36
2063	4.06	7.12	6.08	5.36
2078	3.99	7.05	6.01	5.29

Source: Congressional Budget Office.

periods for the restoration of full funding are presented in the body of this paper and Appendix B.

Federally Administered Plans. The assumption that employment growth in each age/sex class is proportional to population growth in that class works well for private-sector and state and local plans. Using that assumption for the federal government, however, would greatly overstate the growth in federal employment and would also skew the age distribution—particularly for the military. Rather than construct a separate set of age/sex-specific growth rates for federally administered plans, CBO based its projections for those plans on ones provided by the administering agencies.[14] Each agency has its own long-term forecasting model with at least a 75-year horizon and uses its own assumptions concerning employment levels, average wage growth, rates of return, and inflation. CBO retained the agencies' assumptions for employment, average wage growth, and rates of return but adjusted their projections to be consistent with benefits indexed to CBO's forecast of the consumer price index rather than the agencies' forecasts.

14. The administering U.S. agencies are these: for federal civilian pensions, the Office of Personnel Management; for military pensions, the Defense Finance and Accounting Service, Department of Defense; and for the Railroad Retirement Account, the Railroad Retirement Board.

Appendix B:
The Details of Alternative Scenarios

The Congressional Budget Office (CBO) simulated a variety of alternative scenarios to test the robustness of its model. The parameters that CBO changed to perform those simulations fall into three categories: economic, policy-related, and behavioral.

Economic Variables

CBO changed four economic variables: inflation, real wage growth, interest rates, and the rate of return on equities. The base case for each of those variables came from CBO's long-term economic projections.[1] The alternatives add and subtract 1 percentage point from the base case. By changing each parameter by the same amount, it is possible to illustrate how each variable affects the results. CBO tested the variables separately from one another even though they are correlated in the economy.

Inflation

The base case assumes that the consumer price index grows at an annual rate of 2.5 percent. CBO tested scenarios in which inflation was 1 percentage point lower (1.5 percent) or higher (3.5 percent) than in the base case.

Because a change in inflation also changes nominal gross domestic product (GDP), one might expect it not to affect the tax differences from tax-deferred plans. But inflation affects different parts of the retirement saving system at different times, so until a change has worked its way completely through the system, the annual tax difference will be different from that in the base case. In the alternatives, that return to equilibrium does not occur during the 75-year period largely because assets are passed to survivors who do not immediately withdraw them, although the differences from the base case narrow (see Figure B-1).

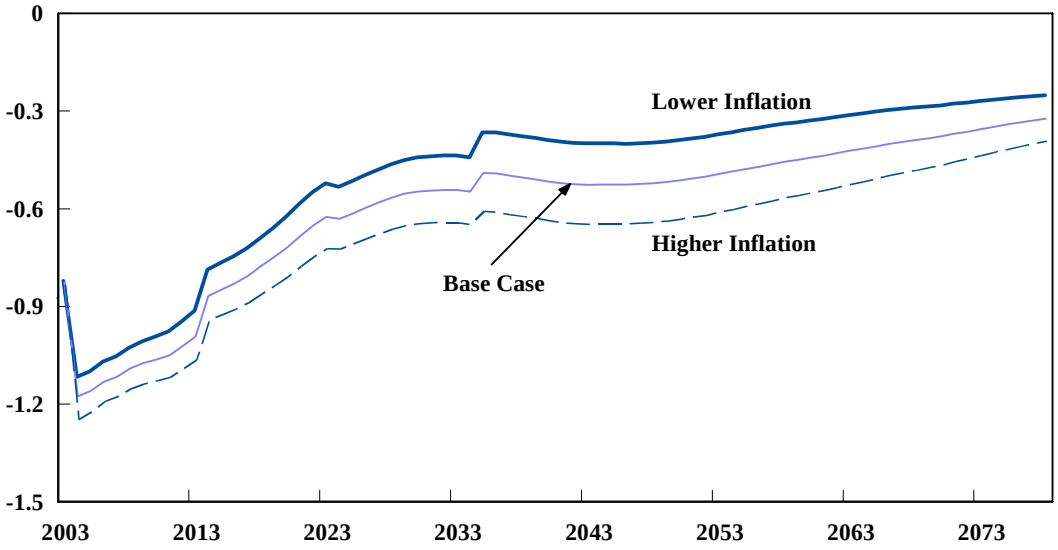
With defined-contribution plans, inflation increases wages—which, in turn, increases contributions—and investment income. The increase in contributions

1. Congressional Budget Office, *The Long-Term Budget Outlook* (December 2003).

Figure B-1.

Sensitivity of Tax Differences to Inflation

(Percentage of GDP)



Note: The base case—relying on CBO's long-term economic projections—assumes that the consumer price index grows at an annual rate of 2.5 percent. The scenario with lower inflation assumes 1.5 percent; the scenario with higher inflation, 3.5 percent.

Source: Congressional Budget Office.

keeps pace with the increase in GDP. Withdrawals also increase with higher inflation because they are based on asset levels, but the effect on withdrawals lags and does not initially keep pace with the increase in GDP. The net effect of higher inflation on contributions and withdrawals during the 75-year period is to increase asset levels relative to GDP, which increases investment income relative to GDP. The tax difference with higher inflation, therefore, is more negative than in the base case in each year of the period.

In the case of private defined-benefit plans, which are not indexed, inflation has no direct effect on distributions but increases them indirectly by increasing the wages used to calculate future benefits. As with defined-contribution plans, that effect lags and does not keep pace with the increase in GDP. That lag results in increasing assets as a share of GDP and the return that they earn. Contributions drop as a percentage of GDP, primarily because the higher level of investment income makes the same level of contributions unnecessary.

With indexed defined-benefit plans, all of the same effects occur as with unindexed plans but with one additional effect—the direct increase in distributions resulting from indexing. That increase reduces the extent to which distributions drop as a percentage of GDP. Overall, the impact of inflation on

defined-benefit plans is similar to that on defined-contribution plans; that is, the immediate effect on investment income and the lagged effect on withdrawals result in a tax difference that is more negative than in the base case in each year of the 75-year period. The lower contributions as a percentage of GDP and the indexing of distributions, however, mitigate the negative tax difference compared with that associated with defined-contribution plans.

Although higher inflation results in a tax difference that is more negative than in the base case, the gap begins to decrease after 2044. If inflation was 1 percentage point higher than in the base case, the fiscal improvement attributable to tax-deferred plans would be 0.19 percent of GDP between 2003 and 2044, compared with an improvement under the base case of 0.30 percent of GDP. Between 2044 and 2078, however, the improvement under higher inflation would be 0.26 percent of GDP, while the improvement under the base case is only 0.20 percent. Under the scenario with lower inflation, the improvement between 2003 and 2044 would be 0.42 percent of GDP, but between 2044 and 2078, it would be only 0.15 percent of GDP.

Real Wage Growth

The base case assumes that real wages grow at an average annual rate of around 1.3 percent, with the variance much higher in the first 15 years than later on. CBO tested scenarios in which real wage growth was 1 percentage point lower or higher than in the base case each year.

With defined-contribution plans, real wage growth has the same impact as inflation. In each year, higher real wage growth makes the tax difference more negative than in the base case.

With defined-benefit plans, the only difference between the effect of inflation and the effect of real wage growth is that the latter involves no direct increase in distributions from indexed plans. The effect is still to increase the net flow of funds into tax-deferred plans but by slightly more than is generated by higher inflation because the mitigating factor of indexed distributions is missing.

If real wage growth was 1 percentage point higher than in the base case, the fiscal improvement over the 75-year period would be 0.39 percent of GDP instead of 0.50 percent; if it was 1 percentage point lower than in the base case, the fiscal improvement would be 0.62 percent of GDP (see Figure B-2).

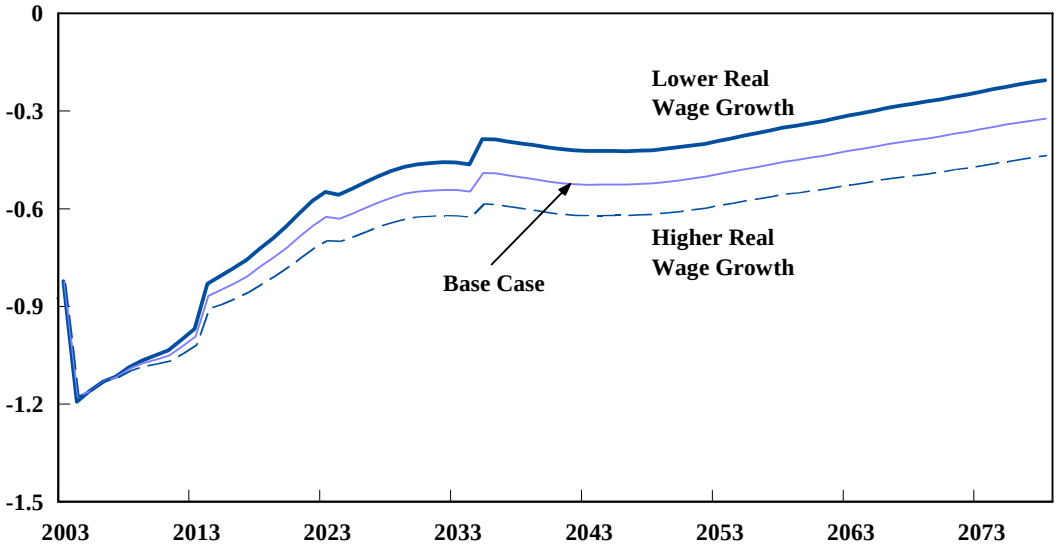
Interest Rates

The base case assumes an annual interest rate that is 1 percentage point above the growth rate of GDP. Over the long term, that amounts to a nominal interest rate of approximately 5.1 percent. CBO tested scenarios in which the markup over GDP

Figure B-2.

Sensitivity of Tax Differences to Real Wage Growth

(Percentage of GDP)



Note: The base case—relying on CBO's long-term economic projections—assumes that real wages grow at an average annual rate of about 1.3 percent with greater variation in the first 15 years. The alternative scenarios assume that real wage growth is 1 percentage point lower and 1 percentage point higher than in the base case each year.

Source: Congressional Budget Office.

growth was zero and 2 percentage points, translating to nominal rates of 4.1 percent and 6.1 percent.

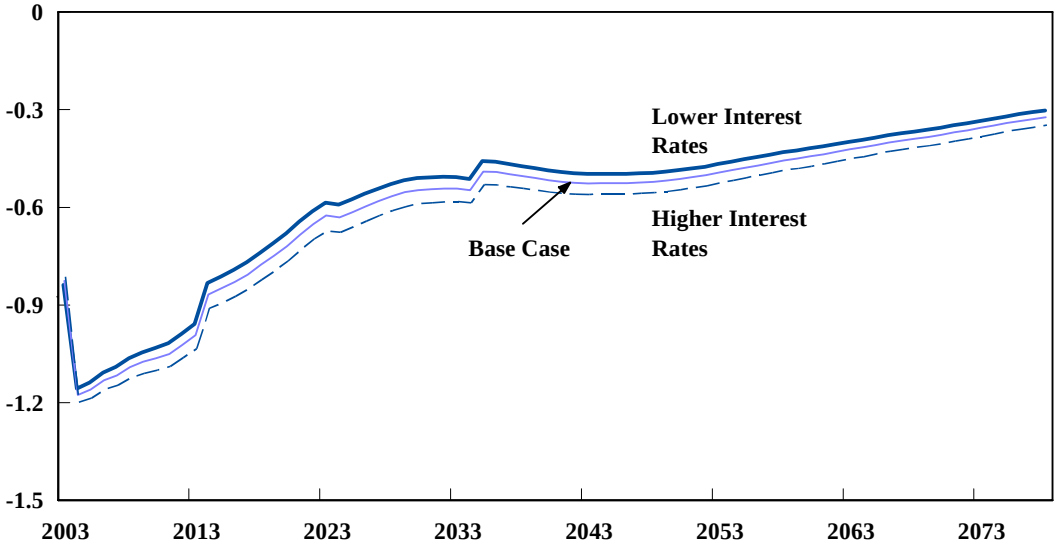
With defined-contribution plans, a higher interest rate increases investment income and, therefore, distributions. It has no impact on contributions. With defined-benefit plans, a higher interest rate also increases investment income but, by definition, does not increase distributions. Hence, fewer contributions are required. Overall, then, a higher rate of return implies higher investment income, higher distributions, and lower contributions.

The biggest impact is on investment income, while the effects on withdrawals and contributions partially offset each other. The higher investment income resulting from the higher interest rate is thus the largest contributor to the increase in the net flow of funds into the plans, and—because interest income would otherwise be fully taxable—in the negative tax difference (see Figure B-3). The impact of the assumption about interest rates is, however, small. Instead of a fiscal improvement of 0.50 percent of GDP over 75 years, as in the base case, the improvement would be 0.46 percent of GDP if interest rates were 1 percentage point higher and 0.54 percent of GDP if interest rates were 1 percentage point lower.

Figure B-3.

Sensitivity of Tax Differences to Interest Rates

(Percentage of GDP)



Note: The base case—relying on CBO's long-term economic projections—assumes that interest rates are 1 percentage point above the growth rate of GDP, or a nominal rate of approximately 5.1 percent over the long term. The scenarios with lower and higher interest rates assume long-term nominal rates to be 4.1 percent and 6.1 percent, respectively.

Source: Congressional Budget Office.

Rate of Return on Equities

The base case assumes an annual real rate of return on equities of 5 percentage points above the growth rate of GDP. In the short-term, that results in an overall real return of 7 percent, which is roughly the historical average. As real GDP growth slows after the baby boomers retire, however, the overall real return drops to 6.3 percent. CBO tested scenarios in which the markup over GDP growth was 4 and 6 percentage points.

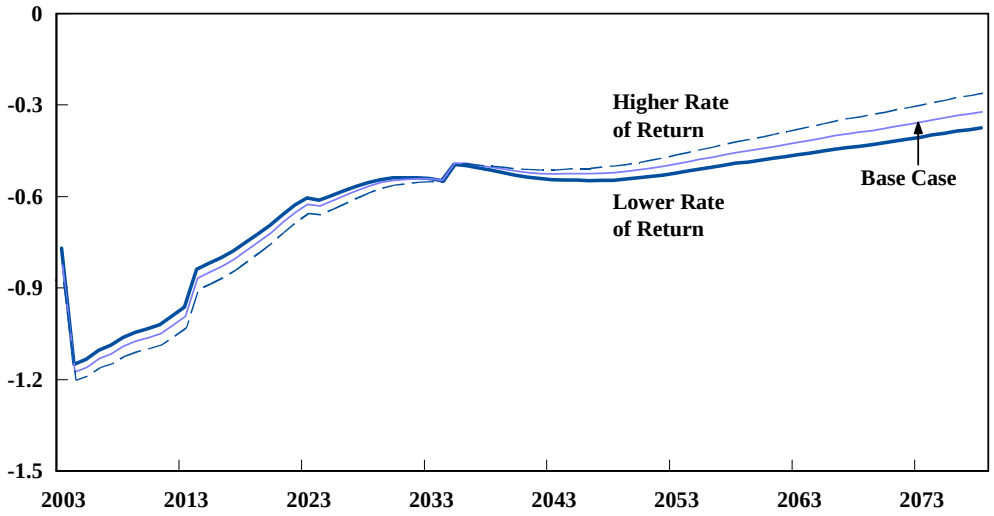
A change in the rate of return on equities has the same qualitative effects on defined-contribution and defined-benefit plans as a change in interest rates does. Because a greater percentage of assets in retirement plans is held as equities than is held as debt, however, the magnitude of the effects is larger. That difference is most obvious with respect to the net flow of funds into retirement plans, which is greater by 2.1 percent of GDP in 2078 with the higher return on equities than in the base case, while the comparable difference with higher interest rates was only 0.9 percent of GDP.

The fiscal improvement due to the higher rate of return on equities is also more pronounced over 75 years than that due to higher interest rates (see Figure B-4).

Figure B-4.

Sensitivity of Tax Differences to the Rate of Return on Equities

(Percentage of GDP)



Note: The base case—relying on CBO's long-term economic projections—assumes that the rate of return on equities is 5 percentage points above the growth rate of GDP, or an overall rate of return of approximately 7 percent. The alternative scenarios assume rates of return of 4 percentage points above the growth rate of GDP and 6 percentage points higher.

Source: Congressional Budget Office.

The lower tax rate on dividends and realized capital gains, however, produces an interesting effect on the annual tax differences. Initially, the tax difference is similar to that from higher interest rates; that is, a higher rate of return increases the negative tax difference. But eventually the effect of higher withdrawals, which are taxed at regular rates, exceeds that of the higher dividends and capital gains, which are taxed at lower rates. By 2037, the higher rate of return actually results in smaller negative tax differences, and the lower rate of return in larger negative tax differences. If the rate of return on equities was 1 percentage point higher than in the base case, the fiscal improvement would be 0.62 percent of GDP instead of 0.50 percent; if the rate was 1 percentage point lower than in the base case, the fiscal improvement would be 0.39 percent of GDP.[2]

2. Setting interest rates and the return on equities equal to GDP growth does not materially affect the fiscal improvement over 75 years relative to that in the base case.

Policy Environment

The base case assumes a policy environment that incorporates actual conditions at several different points in time, but does not correspond with actual law at any single point in time. For example, it incorporates the following assumptions:

- Marginal tax rates under the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA) are extended indefinitely rather than expiring in 2011;
- Private and state and local defined-benefit plans are restored to a fully funded status over a 10-year period, although the statute for private plans specifies five years; and
- Roth IRAs or the equivalent 401(k) plans are not included because CBO's model relies on data from 1997, before such plans existed.

The alternative scenarios investigate whether the policy variables selected for the base case bias the conclusions.

Tax Rates

The base case assumes a continuation of the tax rates in the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) and JGTRRA, including lower rates for dividends and realized capital gains than for other types of income. The rates in the base case are lower than the ones that would exist if EGTRRA and JGTRRA were allowed to expire.

As an alternative, CBO measured tax differences from tax-deferred plans using tax rates consistent with those in place prior to EGTRRA (see Table B-1). The result of the higher tax rates in the alternative scenario is a smaller fiscal improvement than in the base case (see Figure B-5). The increase in receipts as a share of GDP over 75 years would be only 0.3 percent instead of 0.5 percent. The difference derives largely from the rates applied to dividends and realized capital gains. In both cases, the net flow of funds into tax-deferred retirement plans remains relatively flat as a share of GDP. Under the base case, however, the tax differences from those plans decline over time because the rates used to calculate the deferred taxes on dividends and capital gains are distinctly lower than those used to calculate taxes on distributions. Under the alternative scenario, the difference between those tax rates is less in the case of capital gains, and the rates are the same in the case of dividends—thereby reducing the fiscal improvement.

Full Funding of Defined-Benefit Plans

The base case assumes that the underfunding of private and state and local defined-benefit plans will be corrected in 10 years. However, the statutory

Table B-1.

Tax Rates Applied in CBO's Base Case and in an Alternative Scenario, by Type of Income

(Percent)

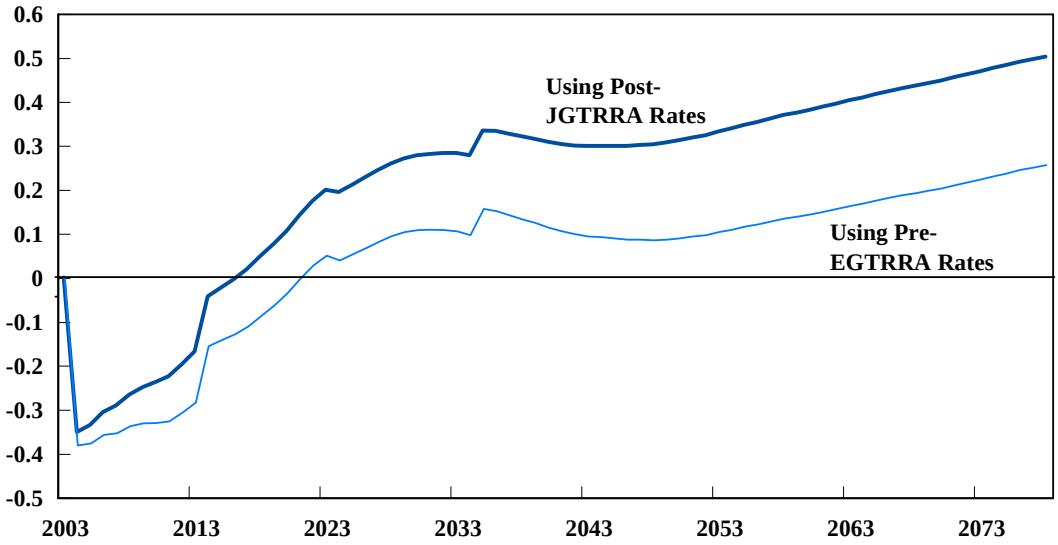
	Base Case	Alternative
Contributions	20.0	22.0
Withdrawals	20.0	22.0
Interest	20.0	22.0
Dividends	12.0	22.0
Realized Capital Gains	12.0	15.4
Unrealized Capital Gains	0	0

Source: Congressional Budget Office.

Figure B-5.

Fiscal Improvement Due to Tax-Deferred Retirement Plans Under Different Assumptions About Tax Rates

(Percentage of GDP)



Notes: EGTRRA = Economic Growth and Tax Relief Reconciliation Act of 2001; JGTRRA = Jobs and Growth Tax Relief Reconciliation Act of 2003.

Amounts are normalized to zero in 2003.

Source: Congressional Budget Office.

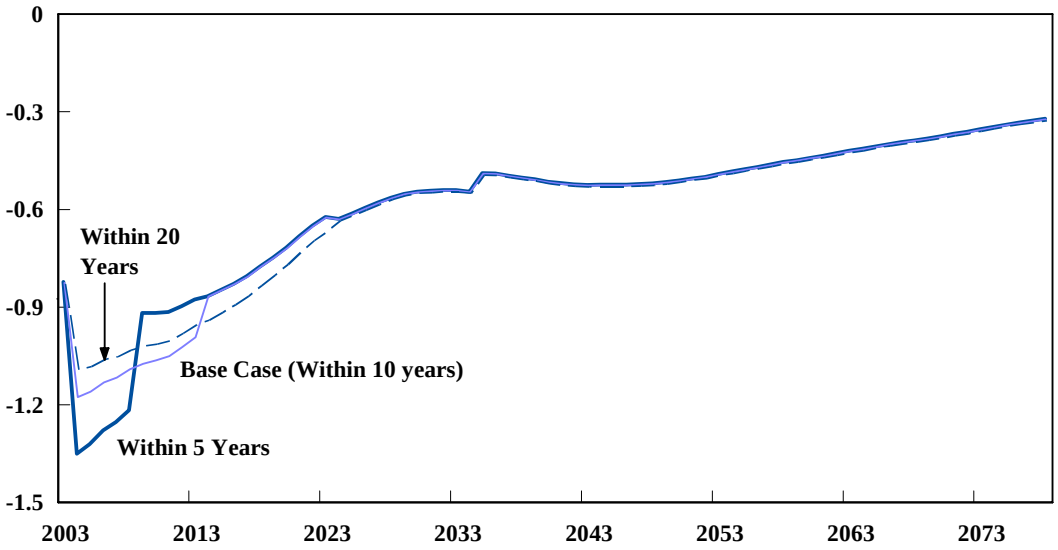
standard for private plans is five years, although the Internal Revenue Service can grant administrative waivers to that requirement, and recent legislation effectively loosened it. Thus, the actual period over which additional contributions will be made is highly uncertain. In its alternative scenarios, CBO simulated periods of five years and 20 years over which nonfederal defined-benefit plans would be restored to full funding.

The period of time over which full funding is restored has no long-term impact on the fiscal improvement resulting from tax-deferred retirement plans. Extending the period merely smooths out the large negative tax differences associated with such a high level of tax-deferred contributions, while shortening the period magnifies the negative differences within that period (see Figure B-6). In any case, once full funding is restored, the results revert to those in the base case.

Figure B-6.

Tax Differences Under Different Assumptions About When Nonfederal Defined-Benefit Plans Have Full Funding Restored

(Percentage of GDP)



Source: Congressional Budget Office.

Back-Loaded Plans

Since 1998, workers and their spouses have been allowed to contribute to Roth IRAs. Under EGTRRA, 401(k) participants will also be able to contribute to back-loaded 401(k)s beginning in 2006. In his 2005 budget, the President also proposes a significant expansion of back-loaded plans, extending to accounts not intended for retirement purposes.

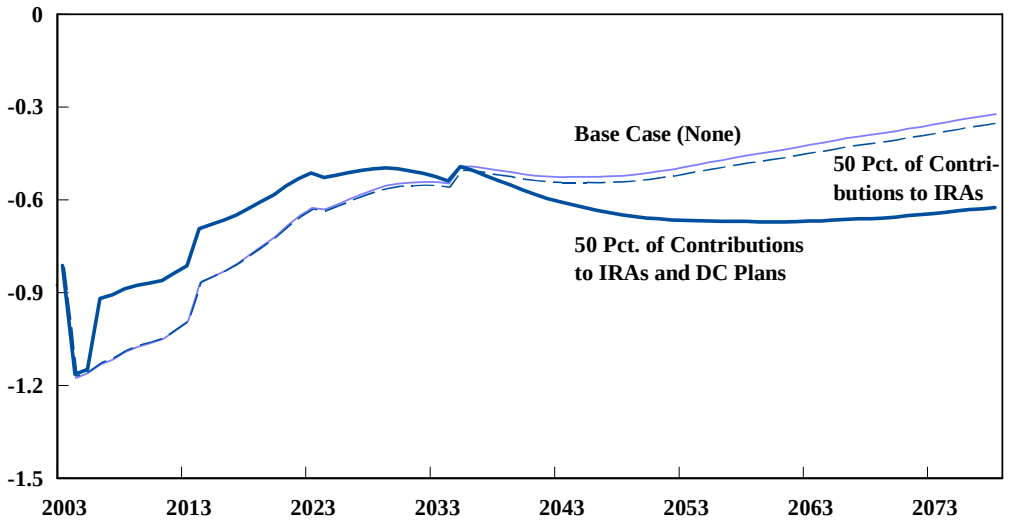
Because the data underlying the patterns of contributions and withdrawals in CBO's model are for 1997, they do not contain the effect of allowing back-loaded plans. Nevertheless, approximating some of the key conditions of back-loaded plans is possible. In an alternative scenario, to simulate the effect of Roth IRAs, CBO cut contributions to traditional IRAs in half, assumed that the other half were dedicated to Roth IRAs, and then recalculated distributions on the basis of the subsequent asset levels. To simulate the effect of back-loaded 401(k)s, CBO applied the same assumptions to defined-contribution plans beginning in 2006.

Initially, both back-loaded plans reduce the negative tax differences of retirement plans, as fewer tax-deferred contributions are made (see Figure B-7). By the mid-2030s, however, the impact of nontaxable withdrawals exceeds that of the after-tax contributions, and the tax differences become more negative.

Figure B-7.

Tax Differences Under Different Assumptions About Contributions to Back-Loaded Plans

(Percentage of GDP)



Note: DC = defined contribution.

Source: Congressional Budget Office.

The impact of Roth IRAs, as simulated, is very small. Instead of an improvement in tax receipts of 0.50 percent of GDP over 75 years, as in the base case, the figure with Roth IRAs included would be 0.47 percent. Because contributions to defined-contribution plans are much larger than (nonrollover) contributions to IRAs, however, the fiscal impact of back-loaded 401(k)s is potentially much larger than that of Roth IRAs. In the early years, they would increase revenues in comparison to those in the base case by as much as 0.2 percent of GDP, but by 2078 they would reduce revenues by 0.3 percent of GDP more than in the base

case. Instead of the fiscal improvement of the base case, the improvement with back-loaded defined-contribution plans would be only 0.19 percent of GDP.

Briefly, if taxpayers shift significantly toward back-loaded retirement plans in preference to tax deferral, near-term receipts relative to GDP would increase. But in the longer run, less improvement would occur. The immediate effect would be like partially ending tax deferral, which brings money back into the taxable revenue stream, but because the exemption from taxation in the future would be funding the near-term gain, tax receipts would be lost in the long term.

Firms' and Individuals' Behavior

The base case also assumes that, with a few exceptions, firms' behavior in offering plans and individuals' behavior in contributing to and withdrawing from the plans remains as it was in 1997. To test the effect of those assumptions, CBO simulated some alternative behavior.

The Trend Toward Defined-Contribution Plans

By using 1997 data, the base case implicitly assumes that participation in private defined-contribution and defined-benefit plans remains unchanged throughout the 75-year period. That would be counter to the trend evident since the early 1980s away from defined-benefit plans and toward defined-contribution plans. Because defined-contribution plans are simulated differently from defined-benefit plans, one might suppose that incorporating the continuation of that trend would render different results.

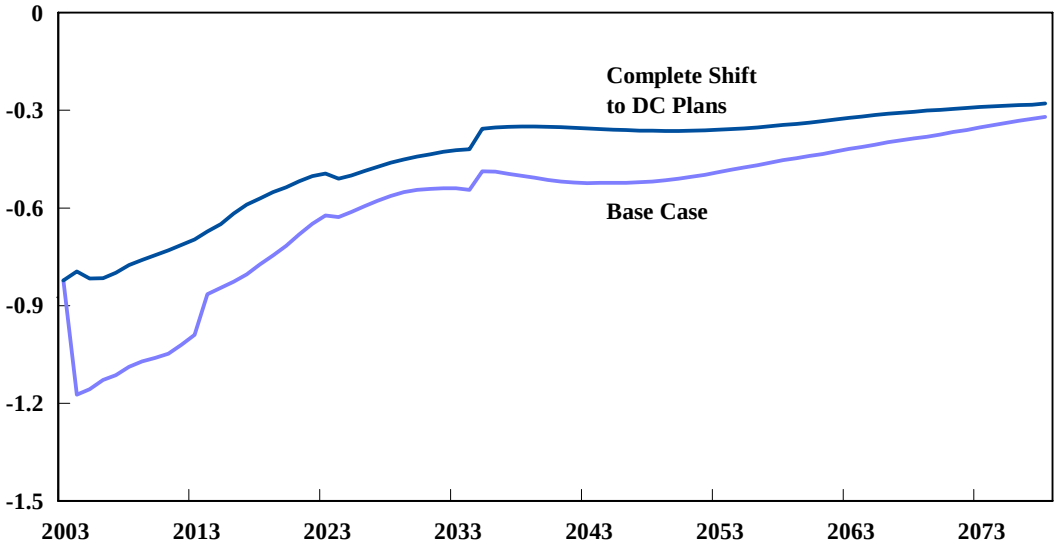
Although the flows associated with an ongoing shift toward defined-contribution plans are more complex than the model can simulate, CBO could test the bias introduced by ignoring the trend. To do so, CBO increased, by a uniform factor, the assets held in defined-contribution plans by each age/sex group to approximate how the assets in nonfederal defined-benefit plans might have been distributed if such plans had not existed in 1997. CBO then estimated the tax differences from tax-deferred plans using only the defined-contribution part of the model. That approach provides an upper bound on how the estimates might have differed from incorporating the trend toward defined-contribution plans.

In fact, the results after 75 years are quite similar to those under the base case (see Figure B-8). The biggest differences are evident in the early years of the forecast, when the base case assumes additional contributions to nonfederal defined-benefit plans to achieve a fully funded status. The associated increase in the negative tax differences from such plans is gone under this alternative scenario. As a result, the tax differences decline steadily through 2036, reflecting baby boomers' increased withdrawals from the plans. After 2036, when the baby boomers are dying, the

Figure B-8.

Tax Differences Under Different Assumptions About the Shift to Defined-Contribution Plans

(Percentage of GDP)



Notes: DC = defined contribution.

CBO's base case does not take into account a trend away from defined-benefit plans and toward defined-contribution plans. The alternative scenario supposes a complete shift to defined-contribution plans in 1997.

Source: Congressional Budget Office.

annual tax differences stabilize. Ultimately, the improvement over 75 years amounts to 0.5 percent of GDP—roughly the same as under the base case.

Different Contribution Levels

The base case assumes that contributions to both IRAs and defined-contribution plans increase from their 1997 levels with nominal wage growth. It does not directly allow for the increase in contribution limits contained in EGTRRA.[3] Nevertheless, it implicitly assumes that statutory limits will be increased in the future because the increases in contributions generated by wage growth will eventually outstrip those limits, which increase only with inflation.

3. Under EGTRRA, contribution limits for IRAs will increase in phases from $2,000 to $5,000 between 2001 and 2008, after which they will be indexed for inflation. For taxpayers age 50 and above, "catch-up" contributions of up to $1,000 over those limits will be allowed. Contribution limits for 401(k) plans will also increase in phases from $10,500 to $15,000 between 2001 and 2006, but because those limits were already indexed for inflation, the pre-EGTRRA limit in 2006 would have been $12,000. In addition, catch-up contributions of up to $5,000 will be allowed for taxpayers age 50 and above.

CBO simulated four alternative assumptions concerning the growth in contributions. Under the first alternative, 1997 levels were frozen throughout the 75-year period. Under the second alternative, contributions were assumed to increase with inflation throughout the period. Under the third and fourth alternatives, contributions to IRAs were increased by 150 percent and contributions to defined-contribution plans were increased by 25 percent beginning in 2008, approximating the increases in the limits specified by EGTRRA for that year. Under the third alternative, contributions were assumed to grow with wages after 2008; under the fourth alternative, they were assumed to grow with inflation.

A decrease in the growth of contributions during the 75-year period generally reduces the net flow of funds into tax-deferred retirement plans and the negative tax differences, and vice versa (see Figure B-9). Alternatives 1 and 2, in which contributions remain at 1997 levels or increase with inflation, result in smaller negative tax differences than does the base case. Under those scenarios, revenues in 2078 would be 0.2 percent of GDP higher than under the base case. Alternative 3, in which contributions increase in 2008 to reflect higher limits and then increase with wage growth, results in larger negative tax differences than does the base case. Under that scenario, revenues in 2078 would be less than 0.1 percent of GDP lower than under the base case.

Alternative 4, in which contributions increase in 2008 to reflect higher limits and then increase with inflation, has a mixed fiscal impact. Initially, the higher contributions increase the negative tax differences. Eventually, however, the contributions are overtaken by those in the base case (which grow with wages rather than inflation), and the negative tax differences are reduced relative to the base case. By 2078, revenues as a percentage of GDP would actually be comparable to those in alternatives 1 and 2.

Different Withdrawal Levels

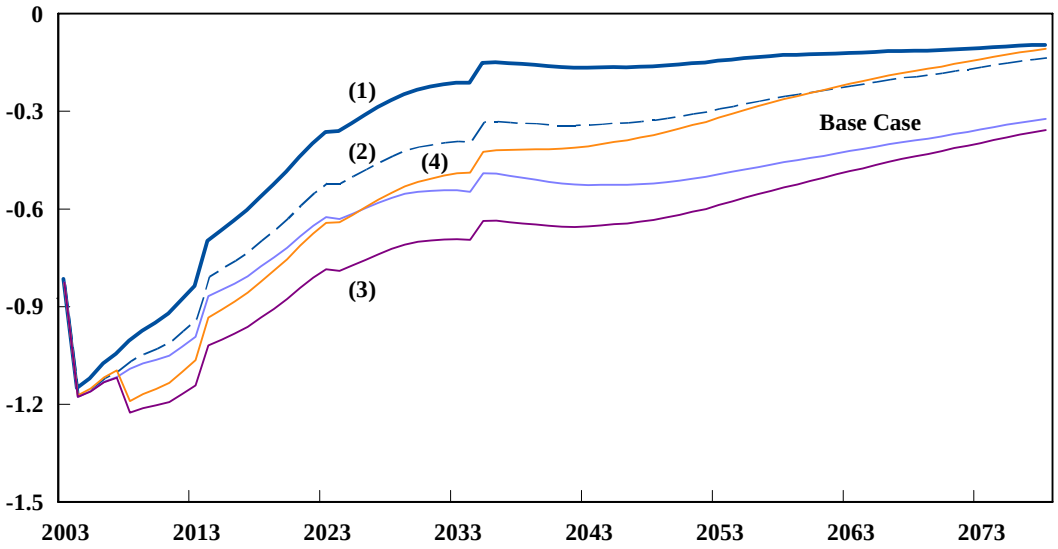
Empirical evidence indicates that people withdrew significantly different shares of their assets from IRAs and defined-contribution plans in 1998 through 2001 than they did in 1997. Generally, when asset levels surged in 1998 and 1999, withdrawals did not keep pace. Conversely, when asset levels declined in 2000 and 2001, withdrawal levels did not drop as fast. Instead, participants withdrew a higher percentage of assets than in 1997.

Legislative and administrative changes also can affect the level of withdrawals from IRAs and defined-contribution plans. Rules adopted in 2002 allowed distributions to be spread over a longer period of time, and legislation has been introduced to increase the age at which minimum distributions are required. Furthermore, if Social Security benefits were reduced as part of a reform program,

Figure B-9.

Tax Differences Under Different Assumptions About the Growth in Contributions to IRAs and Defined-Contribution Plans

(Percentage of GDP)



Notes: CBO's base case assumes that contributions to IRAs and defined-contribution plans increase with nominal wage growth. Based on 1997 data, it does not incorporate the increases in contribution limits provided for under the Economic Growth and Tax Relief Reconciliation Act (EGTRRA) of 2001.

Alternative 1 assumes no growth in contributions after 1997; alternative 2, that contributions increase with inflation; alternative 3, that they increase to correspond to the higher limits in EGTRRA in 2008 and thereafter with wages; and alternative 4, that they increase with the EGTRRA limits and thereafter with inflation.

Source: Congressional Budget Office.

retirees with IRAs or defined-contribution plans might increase their withdrawals to maintain the same standard of living.

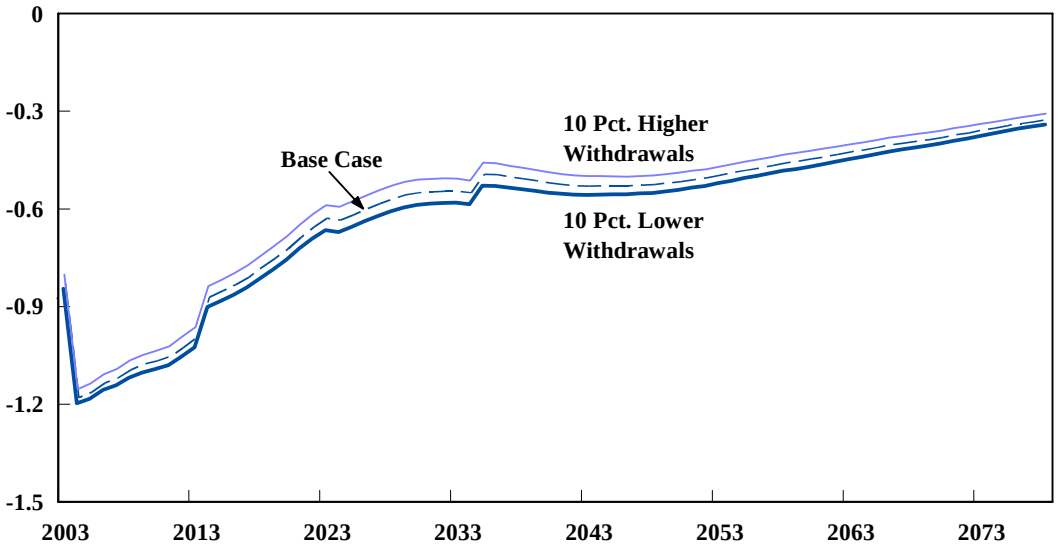
To illustrate the fiscal impact that any of those changes might have, CBO simulated two alternative assumptions under which participants in IRAs and defined-contribution plans withdrew 10 percent less and 10 percent more of their assets than they did in 1997. The results indicate that increasing the percentage of assets withdrawn in a given year decreases the net flow of funds into tax-deferred plans and the associated negative tax differences (see Figure B-10). Withdrawing a higher percentage of assets increases the positive tax effect of withdrawals but also reduces the negative tax effect of investment income because the increased withdrawals lower the asset levels earning such income. In fact, asset levels

eventually end up so much lower that withdrawing 10 percent more still yields less in nominal withdrawals by 2078 than in the base case.

Figure B-10.

Tax Differences Under Different Assumptions About Withdrawals from IRAs and Defined-Contribution Plans

(Percentage of GDP)



Source: Congressional Budget Office.