Distributional Effects of Defined Contribution Plans and Individual Retirement Accounts

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Contents

Abstract

This paper incorporates retirement saving incentives into the Tax Policy Center microsimulation model and analyzes the distributional effects of current tax preferences for saving. As a share of income, tax-preferred saving incentives provide the largest benefits to households with income between $75,000 and $500,000, roughly the 80th to 99th percentile of the income distribution. In 2004, the top 20 percent of tax filing units by income will receive 70 percent of the tax benefits from new contributions to defined contribution plans and almost 60 percent of IRA tax benefits.

Distributional Effects of Defined Contribution Plans and Individual Retirement Accounts

The federal government has subsidized retirement saving relative to other saving since the origins of the income tax in 1913. In 2003, the present value of the federal revenue loss from new contributions to employer pensions exceeded $184 billion (Office of Management and Budget 2004, table 18-4). Despite the magnitude of these revenue losses and the sizable role of tax-deferred saving in providing retirement income, the distributional effects of these programs have received little attention.[1] This paper helps fill that gap. We describe the development of a retirement saving module in the Tax Policy Center microsimulation model and present estimates of the current distribution of benefits from defined contribution plans and individual retirement arrangements.[2]

The distribution of pension benefits is not only an issue of fairness. First, evidence suggests that high-income, high-wealth households are more likely to finance contributions to tax-preferred accounts by shifting assets from other sources, rather than reducing their current consumption, whereas moderate-income households are more likely to finance contributions by reducing consumption.[3] Thus, retirement saving incentives targeted at high-income households may be relatively ineffective ways to raise private and national saving. Second, evidence suggests that high-income and high-wealth households are more likely to be accumulating adequate private wealth to maintain their preretirement living standards in retirement, and that low- and middle-income households are more likely to face problems accumulating adequate amounts for retirement. Thus, retirement saving programs targeted at households with high income and high wealth will not encourage saving where it is most needed.[4]

Measuring the benefits that workers receive from tax preferences for saving is not a simple task, however. For an Individual Retirement Account (IRA), for example, the benefit depends on marginal tax rates at the time of contribution, the time of withdrawal, and during the accumulation period; the length of time the contribution is held in the

[1] For exceptions to this general rule, see Congressional Budget Office (2003b), Even and MacPherson (2003), Gustman and Steinmeier (1998), and Joulfaian and Richardson (2001).

[2] We note that the tax treatment of pensions is a subsidy relative to an income tax, not a consumption tax.

[3] Early research on 401(k)s found that the saving plans raised saving at all levels of income (Poterba, Venti, and Wise 1995). Subsequent research, which has addressed a number of econometric issues in earlier work, tends to find that 401(k) plans have not raised the wealth of relatively high-income households, but may have raised wealth of low-income households (Benjamin 2001; Engen and Gale 2000; Chernozhukov and Hansen forthcoming).

[4] Congressional Budget Office (2003a) and Engen, Gale, Uccello (1999) review the literature on the adequacy of saving. For an important recent contribution, reaching a much more optimistic view than much of the previous literature on the adequacy of saving, see Scholz, Seshadri, and Khitatrakun (2003).

account; the nominal and real rate of return; and the timing and form of withdrawals. For employer-sponsored plans, the effects are substantially more complex. The benefit depends on the nature of any wage offsets to employer pension contributions. It also depends on the economic incidence of nondiscrimination rules (since that incidence indicates how one party's contribution affects the applicable or allowable contributions for other parties).[5]

We find that about 70 percent of tax benefits from new contributions to defined contribution (DC) plans accrue to the highest-income 20 percent of tax filing units in 2004, and more than half go to the top 10 percent. Because eligibility for IRAs was subject to income limits, the tax benefits associated with IRAs are somewhat less skewed by income than contributions to DC plans. Still, almost 60 percent of IRA tax benefits accrue to the top 20 percent of households and more than 85 percent of benefits go to households in the top 40 percent.

By income level, the largest benefits as a share of after-tax income accrue to households with income between $100,000 and $200,000. Sizable benefits also accrue to households with income between $75,000 and $500,000. Thus, pensions provide the largest benefits, relative to income, for households roughly in the 80th to 99th percentiles of the income distribution. The benefits provided to the very wealthiest households are a significantly smaller share of their income, but are larger in dollar terms, than the benefits provided to the 80th to 99th percentiles.

The next section summarizes the major tax incentives for saving addressed in this paper. The second section describes the Tax Policy Center Microsimulation Model. The third section and the appendix summarize the steps taken to model retirement saving programs. The fourth section provides the central results. The final section concludes.

Tax Incentives for Saving

We model most, but not all, defined contribution plans and individual retirement arrangements. Because of recent legislation—most notably, the Economic Growth and Tax Relief Reconciliation Act of 2001 (EGTRRA) and the Taxpayer Relief Act of 1997—a variety of retirement saving rules are evolving over time. We focus on the structure of saving incentives as of 2004.[6]

In a 401(k) plan, the most common defined contribution arrangement, both employees of for-profit private entities and their employers can make tax-deductible contributions. In 2004, employees may contribute up to $13,000; workers age 50 and

[5] In a utility-based model, the benefits of tax-deferred saving contributions would also depend on the extent to which the contribution represents a net addition to private saving and whether there is an option value associated with pension coverage even for those who do not actually participate. These issues, as well as the issues related to nondiscrimination rules, do not arise in standard distributional analysis, but are interesting avenues for future research.

[6] For an overview of tax incentives for saving, see Gale and Orszag (2003).

over in 2004 are permitted additional "catch-up contributions" of $3,000 a year. Employer plus employee contributions to all defined contribution plans for a given worker are limited in 2004 to $41,000 or 100 percent of earnings, whichever is lower. Employer contributions, if any, may be dependent on employee contributions (i.e., the employer may match employee contributions up to a certain point). Employers may choose to limit the amount contributed by employees to less than the statutory maximum. Assets in 401(k) plans are not taxed until they are withdrawn, when they face ordinary income taxes. If the account holder is younger than 59½ at the time of withdrawal, an additional 10 percent penalty is imposed, unless special hardship rules apply.

Separate code sections govern defined contribution plans similar to 401(k) plans that are offered by tax-exempt entities (section 403(b) plans) and state and local governments (section 457 plans). A Keogh account can be created by self-employed individuals and is subject to the same tax rules as a 401(k).

We model traditional and Roth individual retirement arrangements, also known as individual retirement accounts (IRAs). Traditional IRAs are taxed in roughly the same way as 401(k) plans, although contribution limits are lower. An individual under the age of 70½ can make a tax-deductible contribution of up to $3,000 (but not more than earnings), subject to income limits. For taxpayers with access to an employer plan, eligibility for deductible IRA contributions phases out with income between $65,000 to $75,000 for married taxpayers that file joint returns, $45,000 to $55,000 for singles and heads of household, and $0 to $10,000 for married couples that file separate returns. The phaseout range for a married filing joint taxpayer without access to an employer plan whose spouse is covered by an employer plan is $150,000–$160,000. Asset accumulations are not subject to tax until withdrawal. Distributions from IRAs are generally subject to income tax. Withdrawals before the age of 59½ are also subject to a 10 percent penalty unless they are used for specified purposes.[7] Minimum distribution rules stipulate that withdrawals must begin by age 70½ and impose other conditions on the frequency and size of withdrawals.

Contributions to a Roth IRA are not deductible, but qualified distributions are tax-free. In general, a withdrawal is a qualified distribution if it is taken at least five years after the initial contribution and the account owner reaches age 59½, is disabled, or spends the proceeds to purchase a primary residence (subject to the same rules as apply to a traditional IRA; see footnote 8). In addition, withdrawals made by a beneficiary upon death are not subject to the penalty. Other withdrawals are subject to a 10 percent penalty. There is no age limit for contributions to a Roth IRA, and minimum distribution rules do not apply. The maximum contribution to a Roth IRA phases out over the following income ranges: $95,000 to $110,000 for single and head of household returns, $150,000 to $160,000 for married filing joint returns, and $0 to $10,000 for married filing separate. The limit for total annual contributions to all types of IRAs is $3,000.

[7] The penalty is waived if the funds are used by an unemployed accountholder to pay medical insurance premiums; the withdrawal is used to pay for higher education expenses of a dependent, spouse, or grandchild; the withdrawal (up to $10,000) is used to buy a first-time primary residence; or the withdrawal is taken in the form of an annuity.

The "saver's credit" is a nonrefundable tax credit for low-income people who contribute to an IRA or an employer defined contribution pension plan (see Gale, Iwry, and Orszag 2004).[8] The maximum contribution eligible for the credit is $2,000 (not indexed for inflation). The maximum credit rate is 50 percent; the rate declines with income. The credit is available to individuals 18 or over who are not full-time students or claimed as a dependent on another taxpayer's return. The credit is in addition to any deduction or exclusion that would otherwise apply. The maximum income eligible for a credit is $50,000 on joint returns, $37,500 on head of household returns, and $25,000 on single returns.

The Tax Policy Center Microsimulation Model

The Tax Policy Center (TPC) has developed a large-scale microsimulation model of the U.S. federal income tax system to produce revenue and distribution estimates. The model is similar to those used by the Congressional Budget Office (CBO), the Joint Committee on Taxation (JCT), and the Treasury's Office of Tax Analysis (OTA). The model consists of three components: a database of tax returns from 1999 supplemented with demographic information; a statistical routine that "ages" or extrapolates the data to create a representative sample of filers and nonfilers for future years; and a detailed tax calculator and set of incidence assumptions that computes tax liability and tax burdens for filers under current law and alternative proposals.

Data

The tax model uses two data sources: the 1999 public-use file (PUF) produced by the Statistics of Income (SOI) Division of the Internal Revenue Service (IRS), and the 2000 Current Population Survey (CPS). The PUF contains 132,108 income tax records with detailed information from federal individual income tax returns filed in the 1999 calendar year. It provides key data on the level and sources of income and deductions, income tax liability, marginal tax rates, and use of particular credits, but it excludes most information about pensions and IRAs as well as demographic information such as age.

Additional information is mapped onto the PUF through a constrained statistical match with the March 2000 Current Population Survey (CPS) of the U.S. Census Bureau. The statistical match provides important information not reported on tax returns, including measures of earnings for head and spouse separately, their ages, the ages of their children, and transfer payments. The statistical match also generates a sample of individuals who do not file income tax returns ("nonfilers"). By combining the dataset of filers with the dataset of estimated nonfilers from the CPS, we are able to carry out

[8] In 2004, the saver's credit is allowed only after all other nonrefundable tax credits, including the child tax credit, have been claimed, and only to the extent of remaining income tax liability. Legislation passed in 2002 allowed the saver's credit to be taken before the child tax credit, which increased its value for some households eligible for the refundable child credit. That legislation was temporary, though; it only applied through 2004, and had not been extended as of the writing of this paper.

distributional analysis on the entire population rather than just the subset that files individual income tax returns.

Aging and Extrapolation Process

For the years from 2000 to 2013, we "age" the data based on forecasts and projections for the growth in various types of income from the CBO, the growth in the number of tax returns from the IRS, and the demographic composition of the population from the Bureau of the Census. We use actual 2000 and 2001 data when available. A two-step process produces a representative sample of the filing and nonfiling population in years beyond 1999. First, the dollar amounts for income, adjustments, deductions, and credits on each record are inflated by their appropriate per capita forecasted growth rates. For the major income sources such as wages, capital gains, and various types of nonwage income such as interest, dividends, Social Security benefits and others, we have specific forecasts for per capita growth. Most other items are assumed to grow at CBO's projected per capita personal income growth rate. In the second stage of the extrapolation process, the weights on each record are adjusted using a linear programming algorithm to ensure that the major income items, adjustments, and deductions match aggregate targets. For years beyond 1999 we do not target distributions for any item; wages and salaries, for example, grow at the same per capita rate regardless of income.

Tax Calculator

Based on the extrapolated data set, we simulate policy options using a detailed tax calculator that captures most features of the federal individual income tax system, including the alternative minimum tax (AMT). The model reflects the major income tax legislation enacted through 2003, including the Jobs and Growth Tax Relief Reconciliation Act of 2003 (JGTRRA), the Job Creation and Worker Assistance Act of 2002, and EGTRRA.

The model incorporates most major provisions of EGTRRA and JGTRRA, including the 10 percent tax bracket, and the changes in marginal tax rates, credits for children and for dependent care, itemized deduction limitations, personal exemption phaseouts, the AMT, and the marriage penalty provisions, which increased the standard deduction, 15 percent bracket, and earned income tax credit for married couples. It also includes JGTRRA's changes to the taxation of dividends and capital gains. The model assumes that the payer bears the burden of the individual income tax, the payroll tax, and the estate tax, and that owners of capital bear the burden of corporate income taxes.

Modeling Retirement Saving

We model the benefits of retirement saving in three steps. First, for each adult head and spouse in a tax unit, we use new data sources to generate estimates of defined contribution coverage and, conditional on coverage, the employer and employee contributions, if any. We also generate estimates of IRA participation by type of IRA,

and contributions conditional on participation. Second, we use the results of the estimation procedures to impute coverage and contributions to records in the PUF/CPS database. Third, we develop methods of calculating the value of the tax benefits associated with contributions.

Data Sources

To model retirement saving, we supplement the PUF and CPS data described above with information from the 2001 Federal Reserve Board of Governors' Survey of Consumer Finances (SCF) and the Survey of Income and Program Participation (SIPP).

Our principal data source for type of pension, pension participation, and contributions by employers and employees is the SCF, a stratified sample of about 4,400 households with detailed data on wealth and savings. The SCF has the best available data on pensions for a broad cross-section of the population, but does not report enough information to determine eligibility for deductible IRA contributions.

To measure eligibility and contributions to individual retirement accounts, we use pooled data from the 1984, 1990, 1992, and 1996 SIPP. We selected individuals who were full-time workers, not self-employed, and between 25 and 55 years old, and dropped records where tax, IRA, or pension data were missing. This yielded a sample of 40,188 households. SIPP participants are reinterviewed every four months for two years, creating new "waves" of data with additional information. Data on IRAs were derived from wave 7, and they refer to the tax year following the sample year—so the 1996 SIPP yields IRA data for tax year 1997. We calibrate our estimates for IRA participation and contributions to match data from Sailer and Nutter (forthcoming)

Estimation and Imputation of Retirement Saving Activity

The appendix describes the procedures used to estimate retirement saving activity in the SCF and SIPP and impute the results to records in the PUF/CPS database. Although the procedures are somewhat complex in practice, the basic approach is straightforward in principle. For defined contribution plans, we estimate the probability of coverage as a function of variables shared by the SCF and PUF/CPS database. Conditional on coverage, we use a similar set of variables to estimate actual and desired employer contributions and employee contributions. For IRAs, we estimate participation in each type of IRA, controlling for the fact that we observe some people already participating in traditional IRAs in the PUF. Then we estimate actual and desired contributions, given participation. With these estimates, we impute values for coverage and contributions onto the records in the PUF/CPS database.

Attributing the Value of a Retirement Saving Incentive

Once coverage and contributions are imputed onto the PUF/CPS database, it is still not entirely obvious how to measure the distribution of tax benefits from saving incentives.

The primary reason is that the tax savings tend to be spread over many years whereas distributional tables tend to be annual.

Looking simply at changes in annual tax liability (the approach currently employed by the JCT) is not a helpful solution because it can make economically equivalent tax breaks for saving appear very different. For example, traditional IRAs provide an up-front deduction and tax-free earnings during the accumulation phase, but withdrawals are taxable. Roth IRAs provide no up-front deduction, but earnings and withdrawals are tax-free. However, even though the pattern of tax payments is very different, the expected present value of lifetime taxes paid on the two accounts is equivalent for an equal after-tax contribution for taxpayers whose tax rates do not change, and both accounts provide identical after-tax retirement income under those assumptions.[9] Thus, it would be inappropriate and highly misleading to present the traditional IRA as a larger tax subsidy in the contribution phase and an additional tax during withdrawal, and the Roth IRA as the opposite.

Instead of looking at the current annual tax break, our methodology is similar to that developed by the U.S. Department of the Treasury (Cronin 1999). We define the benefit received by a tax filing unit in a given year as the present value of the tax benefits associated with their own contributions in that year to IRAs plus their own and their employer's contributions in that year to defined contribution pensions. Thus, a taxpayer with a positive balance in a 401(k) in 2004 but no employer or employee contributions in 2004 would be attributed no benefit from the 401(k) in 2004. The benefit from the 401(k) balances would be attributed to the years when contributions were made.

To undertake these calculations, we assume that the taxpayer's marginal tax rate does not change over time, and that amounts contributed will be left in the tax-free account until age 65, when they will be withdrawn in equal installments over the remaining life expectancy (17 years for men and 20 years for women).

We measure the value of tax subsidies in terms of the discounted present value of tax savings compared with an equivalent contribution made to a taxable account. For example, for a $2,000 contribution made to a traditional IRA by a taxpayer in the 25-percent tax bracket, the actual net-of-tax cost of the contribution is $1,500 ($2,000 minus the $500 in tax savings). Assuming a 6 percent rate of return on both accounts, that the tax bracket does not change, and that the taxpayer holds the account for 20 years and then withdraws it in equal installments over the next 10, he or she would pay taxes over a lifetime equal to $435.74 in present value. Put differently, the IRA would finance an

[9] For example, a contribution of X to a traditional IRA costs $X(1 - \tau)$ after accounting for the value of the tax deduction (τX), where τ is the tax rate. If the balance in the account grows tax-free at interest rate r for N years, it will be worth $X(1 + r)^N$, but withdrawals are fully taxed, so the after-tax proceeds are $X(1 + r)^N(1 - \tau)$ assuming that the money is withdrawn in a lump sum. If, instead, the same after-tax amount—$X(1 - \tau)$—were deposited into a Roth IRA, it would also grow tax-free at rate r, to a value of $X(1 - \tau)(1 + r)^N$. Withdrawals from the Roth IRA are not taxable, so the after-tax proceeds are the same in each case. The equivalence also holds if proceeds are withdrawn as an annuity. The Roth IRA would be worth more in retirement if tax rates rise, and less if they fall. Also, the same dollar contribution is worth more if made to a Roth IRA as explained below. See Burman, Gale, and Weiner (2001) for more discussion.

after-tax benefit that is worth $435.74 more in present value than the taxable account financed with the same initial after-tax investment. Thus, in this case, the tax subsidy would be worth about 22 percent of the initial contribution. (See the appendix.)

Several aspects of these estimates are worth noting. First, the estimated distributional effect ignores the extent to which contributions represent net additions to private saving, though the net effect on saving will affect the household's utility.[10] Second, we do not allow IRA eligibility or pension coverage—even in the absence of participation—to provide any "option value" to the worker. Third, for employer-based arrangements, we assume not only that workers as a whole bear the burden of employer contributions via wage adjustments, but also that each worker bears the burden of employer contributions made to his or her account. Lastly, we do not make any adjustments for the presence or operation of nondiscrimination rules.

Results

Distribution by Cash Income

We present the model results in terms of "cash income," a measure of income that is broader than adjusted gross income, better reflects economic status, and is similar to the measures used by government agencies.[11] Tables 1–9 and 11–14 report results by cash income percentile. For similar results by cash income level, see the appendix.

The present value of tax benefits attributable to contributions to DC plans and IRAs is substantial. Contributions made to the accounts in 2004 reduce the present value of income taxes by an average of $528 per tax filing unit, an average 1.2 percent of after-tax income (table 1). The tax benefits are concentrated at high incomes: 70 percent goes

[10] That is, the tables implicitly assume that the subsidy is entirely a windfall—that is, that taxable savings now become nontaxable. To the extent that taxpayers are being induced to alter their behavior and reduce current consumption, there is an opportunity cost to the new saving so the net gain will be less than the tax savings. This would imply that the actual distribution of benefits from retirement tax incentives will be more skewed toward the wealthy than illustrated in the table, since they are least likely to have to alter their behavior to take advantage of the subsidy.

[11] Cash income includes wages and salaries, employee contribution to tax-deferred retirement savings plans, business income or loss, farm income or loss, Schedule E income, interest income, taxable dividends, realized net capital gains, social security benefits received, unemployment compensation, energy assistance, Temporary Assistance for Needy Families (TANF), worker's compensation, veteran's benefits, supplemental security income, child support, disability benefits, taxable IRA distributions, total pension income, alimony received, and other income including foreign earned income. Cash income also includes imputed corporate income tax liability and the employer's share of payroll taxes. This puts the income measure on a pretax basis. See http://www.taxpolicycenter.org/TaxModel/income.cfm for more discussion of income measures. Note that since cash income is a broader measure than adjusted gross income (AGI), some people with low reported AGI actually appear in higher income quintiles because they have other income such as pension contributions or tax-exempt bond interest that does not appear in AGI. As a result, some people in higher income quintiles are eligible for income-tested tax benefits, and more people in the bottom quintile of cash income are subject to income tax than in the bottom quintile of AGI.

to the top quintile and 90 percent to the top 40 percent of the income distribution. By comparison, the bottom quintile gets almost no benefit from the income tax exclusion because few people in this category contribute to pensions or IRAs, those who do tend to contribute smaller shares of their income than do higher-income contributors, and the tax benefit per dollar of contribution is smaller, and in some cases worthless, because they face low or zero marginal income tax rates.[12] The distribution of the tax benefits from pensions is very similar to the distribution of all federal taxes by quintile.[13]

Although taxpayers with very high incomes receive the largest benefit in dollar terms ($4,111 on average in the top 1 percent, for example), benefits decline as a share of income at the very top. Benefits amount to 0.2 percent of income for the highest-income 0.1 percent of tax filing units, compared with about 1.4 percent for the top 10 percent. This decline as a share of income occurs because contributions are limited and thus decline as a share of income for those with very high incomes. IRAs are subject to even lower contribution limits than DC plans and are only available on a tax-deductible basis to those with very high incomes if they and their spouse do not have access to an employer pension.[14]

Appendix table 1 shows the distribution by cash income levels. The largest benefits, as a share of income, accrue to taxpayers with cash income between $75,000 and $500,000, who collectively receive about two-thirds of the benefits. The 0.6 percent of taxpayers with income above $500,000 receive 4.4 percent of the benefits. The 14 percent of tax units with income between $50,000 and $75,000 receive 15 percent of the benefits, as do the 65 percent of households with income below $50,000.

[12] The assumption that tax rates remain constant over a lifetime may distort the measured present value of tax benefits. For example, some low-income people may contribute to Roth IRAs in expectation that their contribution would otherwise be taxable when they reach retirement age. For them, the tax benefit can be very significant as they can effectively contribute out of pre-tax income, while all earnings and withdrawals are tax-free. On the other hand, individuals in the bottom quintile who contribute to a traditional IRA or DC plan account may pay tax upon withdrawal if their income increases even though they got no tax benefit from the contribution. In that case, their effective tax rate can be higher than it would have been on a contribution to a taxable account. Similarly, high-income people may contribute to a traditional IRA with the expectation that their tax rate in retirement will be lower. In that case, the actual tax benefit will be larger than reflected in our calculations.

[13] Estimates from the TPC model indicate that in 2004, the top 20 percent of households will pay 70 percent of all federal taxes, the fourth quintile will pay 18 percent, and the middle quintile will pay 8 percent.

[14] Highly compensated employees may also benefit from nonqualified deferred compensation plans. These plans are not limited in size, but employers may not claim a corporate tax deduction for amounts in the plan until they are actually paid out as compensation (at which point they are taxable to the recipient). There are also no payroll tax advantages. If employer and employee are taxed at the same rate, these plans provide no net tax benefit, but they can be beneficial when the employee expects to be taxed at lower rates in the future or if the employer can shelter its income from tax. Measuring the tax benefits of nonqualified plans is beyond the scope of this paper.

Defined Contribution Plans

The vast majority of tax benefits from contributory pension plans (92 percent) arise from DC plans sponsored by employers. As a result, the distribution of tax benefits from DC plans is very similar to the distribution of DC and IRA plans together (Compare table 2 to table 1).

Table 3 shows estimates for pension participation and contributions for married households with a head of working age (18 to 64) in 2001.[15] The likelihood of participating in an employer DC plan and the average contribution amount grow steadily with income. About 41 percent of household heads in the top quintile participate in DC plans, compared with only 4 percent in the bottom quintile. The participation rate is not markedly higher at the very top, but average contributions among participants grow steadily with income.

Employer contributions for heads of households follow a similar pattern, although the likelihood of an employer contribution grows even within the top quintile. About 48 percent of heads in the top 0.1 percent get an employer contribution, averaging almost $26,000, compared with only 28 percent overall, who get an average contribution of about $4,200.

For spouses, the probability of participating generally grows with income, but it actually declines within the top quintile. Spouses in the top 0.1 percent are half as likely to contribute to a DC pension plan as those in the top 10 percent overall. This may reflect the fact that spouses married to people with very high incomes are less likely to work in a high-paying job than those with moderately high incomes.

The average contribution of spouses who participate in a DC plan grows steadily with income, but the amount is always smaller than for similar heads, because spouses tend to have lower earnings. Similarly, the employer contribution follows the same pattern as for household heads, but is smaller for spouses.

The results for working-age singles (table 4) are very similar to those for household heads. The notable difference is in the overall averages, which are much lower for singles. This is because singles as a group have lower incomes than married people—that is, the average is more heavily weighted toward those with lower incomes.

[15] The Congressional Budget Office (2003b) looked at participation in and contribution to pension and IRA plans based on data from 1997. Their tables show statistics at the worker level rather than for households or tax units, but are broadly consistent with the estimates we present. CBO's participation rates are somewhat higher, especially for 401(k) type plans, but that is presumably because their sample is restricted to workers, whereas our sample includes all tax filing units, including those that are out of the work force (for example, because they are in school, retired, or unemployed). Contribution levels are lower, which may have occurred because contribution limits for IRAs and DC plans were significantly lower in 1997.

IRAs

As noted, new contributions to IRAs were a very small factor compared with DC pension plans in 2004. On average, contributions to IRAs in 2004 (not counting rollovers) garner tax benefits worth only about $42 per tax filing unit (table 5). The main reason the figure is so low is that the vast majority of low- and middle-income households do not contribute, even though they are eligible for tax-deductible contributions. In addition, most high-income households are ineligible for the deductions, and the contribution limit for IRAs is much lower than the combined employer and employee limit for DC plans. About 83 percent of the tax benefits of IRAs are concentrated between the 60th and 99th percentiles of the income distribution.

Overall, we estimate that only about 3 percent of tax units will contribute to a traditional IRA in 2004 and about the same percentage contributed to a Roth IRA (table 6). The likelihood of contributing to an IRA increases with income up to a point and then declines because most people with very high incomes are ineligible (especially for Roth IRAs). Among contributors, the average contribution to both kinds of accounts increases with income. The likelihood of making the maximum contribution also generally increases with income, although the trend is not so even.[16]

Saver's Credit

Table 7 shows the distributional effects of the saver's credit. The credit is used by about 5 percent of tax filing units overall, including roughly 7 to 9 percent of filing units in the middle three quintiles. The benefits are very modest as a share of after-tax income. About one-third of the benefits goes to each of the three middle quintiles (see Gale et al. 2004 for further discussion).

Policy Changes

The model may be used to simulate the effects of policy options. We considered two: making the saver's credit refundable in 2004 and accelerating the phased in pension and IRA limit increases to 2004. Making the saver's tax credit refundable (available to tax filers even if they do not owe income tax) would provide 87 percent of its benefits to the bottom 60 percent of taxpayers (table 8). The middle quintile would get 34 percent of the benefits, and the second quintile, 38 percent, but even the bottom 20 percent would get 15 percent of the tax savings. This is because many low-income taxpayers, especially those with children, owe little or no income tax and thus obtain limited or no benefit from a nonrefundable tax credit. The largest benefits from making the saver's credit refundable

[16] Possibly the explanation for this anomaly is that some taxpayers in the phaseout range for contributions to IRAs choose not to contribute the exact amount that they are eligible for (e.g., it may be easy to decide to contribute $2,000, but a tax filer who discovers she is eligible to contribute $1,300 may choose to round down to $1,000).

accrue to the second quintile because, among taxpayers who can benefit from refundability, they are most likely to have qualifying contributions.

Accelerating the EGTRRA limit increases (table 9) would provide little benefit to the bottom half of the income distribution. More than half of the benefits would go to the top 10 percent of the income distribution.

Distribution by Age

The tax benefits of IRAs and DC pension plans vary by age for several reasons. Younger people stand to gain the most from deferral of tax liability because they can hold onto their accounts for many years before they are required to begin making withdrawals. Earnings peak in the 40s and 50s, so older workers have more income available to defer and are also more likely to be working for an employer that offers a 401(k)-type plan. Older workers also face higher tax rates on average and thus benefit most from salary deferral (especially if they expect their tax rate to decline in retirement, although this is not accounted for in our estimates).

On balance, it appears that the tax benefits for DC plans and IRAs (including saver's credit) are worth the most to workers between 35 and 54 years old. In 2004, the present value of such tax benefits averaged about $900 for households with a head between 35 and 44 years old, and almost $800 for those between 45 and 54 (see table 10). The benefits are largest as a share of income—1.7 percent—for those between 25 and 44. The fraction declines for older workers in part because they are more likely to have defined benefit (DB) plans and thus contribute less to a DC plan. Not surprisingly, benefits are virtually nil for those over age 64 (recall that these estimates only apply to new contributions), and small for those under age 25.

Sensitivity Analysis

Besides reporting the main results by cash income percentile (table 1) and level (appendix table 1), we report several different sensitivity analyses here. One concern is that cross-sectional results may be artificially skewed because they combine differences in income among households that are the same age with differences in income among households that are on the same life-cycle income path but are currently of different ages. To address that concern, table 11 examines the distribution of benefits among households age 45 to 54. Comparing tables 1 and 11 shows that participation in pensions and the net average benefit ($789) are substantially higher in the 45 to 54 age group than in the population as a whole. Because households in this age group tend to have higher incomes and more access to pensions than the population at large, the benefits are somewhat more skewed by income. About 78 percent of pension and IRA tax subsidies accrue to 45 to 54-year-olds in the top quintile compared with 69 percent for the whole population.[17]

[17] We note that age is imputed on our database.

Table 12 reports the distributional effects of DC plans and IRAs, but classifies households by their economic income rather than their cash income. Economic income is a more comprehensive measure still, similar to the measure used by the Treasury Department from the early 1980s until 2001 (Cronin 1999). The primary difference relative to cash income is that economic income includes the imputed return to assets rather than the actual realized return reported on income tax returns.[18] In addition, income is adjusted for family size.[19] A comparison of tables 12 and 1 shows that the distribution of benefits is broadly similar across economic income percentiles and cash income percentiles. There is a somewhat higher concentration of benefits in the 80th to 99th percentile when classifying households by cash income.

The last two tables examine sensitivity to different parametric assumptions. Table 13 examines the distribution of benefits assuming that the tax rate that would have applied to the investment income from the contributions had they remained in taxable accounts was 10 percent, rather than the base case assumption that the household's statutory marginal tax rate would apply. Table 14 calculates the distribution of benefits with a nominal rate of return of 9 percent rather than the base case assumption of 6 percent. Comparing these two tables to table 1 shows that the changes naturally affect the estimated level of the benefit, but have little impact on the distribution of benefits.

Conclusion

A key, but underexamined, aspect of tax policy toward pensions is how such benefits are distributed across the population. This paper develops an enhanced version of the Tax Policy Center microsimulation tax model to examine this question. We find that about 70 percent of such tax benefits accrued to the highest-income 20 percent of tax filing units in 2004 and more than half went to the top 10 percent. Because eligibility for IRAs was subject to income limits, the tax benefits are less skewed by income than contributions to DC plans. Still, almost 60 percent of IRA tax benefits accrue to the top 20 percent of

[18] Economic income includes wages and salaries, other returns to labor, returns to capital, and other income. Returns to labor are measured as a percentage of business income, farm income, rental income, farm rental income, partnership income and income from small business corporation. Returns to capital are assumed to be the nominal risk-free rate on capital, measured as 6 percent of net worth. Other income includes royalty income, Social Security benefits received, unemployment compensation, supplemental security income, alimony received, TANF, worker's compensation, veteran's benefits, disability benefits, child support, energy assistance, food stamps, and school lunches. Finally, including employer's share of payroll taxes and corporate tax liability puts the income measure on a pretax basis. This measure is adjusted for family size using the CBO methodology. (See, for example, footnotes to Congressional Budget Office 2004.) This comprehensive measure is divided by the square root of the family size. So a married filing joint return with two children earning $100,000 would have the same family-size adjusted economic income as single person earning $50,000. For more discussion, see "Description of Income Measures" at http://www.taxpolicycenter.org/TaxModel/income.cfm.

[19] To adjust for family size, we use the methodology of Congressional Budget Office. Economic income is divided by the square root of family size—a rough adjustment for differences in ability to pay. See, for example, footnotes to tables in Congressional Budget Office (2004). No family size adjustment is done to compute cash income.

households. As a share of income, the benefits from DC plans and IRAs are highest households with income between $75,000 and $500,000, roughly the 80th to 99th percentile of the income distribution.

Several areas for further research could be fruitful. First, the distributional effects of DC plans could be enhanced by refining assumptions about the incidence of employer contributions, the option value of pension coverage and IRA eligibility, the role of nondiscrimination rules, and the relation between the benefit received and the net impact on saving. Second, the analysis could be extended to defined benefit plans. Third, for both types of pensions, the target effectiveness of tax subsidies for retirement saving could be examined by linking the income-related distribution of tax benefits from pension plans with income-related differences in both the effects of pensions on saving and the adequacy of current saving for retirement. All these issues represent promising directions for future research.

Appendix

This appendix provides details on estimation, imputation, and valuation procedures used to determine the distribution of retirement saving incentives.

Defined Contribution Plans

Estimation

We use the probit maximum likelihood estimator to estimate the likelihood of being covered by a DC plan. Under the probit model, the coverage is observed if and only if $X_1\beta_1 + \varepsilon_1 > 0$, where ε_1 is assumed to be a standard normal random variable with mean 0 and variance 1, *X* is a vector of explanatory variables, and β is a vector of parameters to be estimated. Conditional on coverage, we estimate contributions as a function of a similar set of variables.

The procedure is similar to the Heckman two-step estimator, with two differences. First, we estimate the second stage equation using censored regression techniques to account for the fact that contributions are limited by law. Second, we omit a Mills ratio correction in the second stage. This may yield biased coefficient estimates in the second stage, but that is not a relevant concern because we are interested in producing the best fit, conditional on the explanatory variables, rather than the best coefficient estimates.

For employee and employer contributions, we estimate an equation of the form $ln(y^*) = X_2\beta_2 + \varepsilon_2$, where y^* is the desired contribution (before application of statutory limits), and ε_2 is assumed to be normal with mean 0 and variance σ^2. The latent variable, y^*, is not observed. Instead, we observe *y*, defined as y^* when $y^* < L$, and *L* if $y^* > L$, where *L* is the statutory contribution limit. The upper limits for the censored regression are based on the law in effect in 2000. The maximum elective contribution to a 401(k) was the lesser of $10,500 or 25 percent of earnings, and the maximum total qualifying contribution (including both employer and employee contributions) was $30,000.[20]

The list of exogenous variables for each probit and censored regression is designed to be an exhaustive set of relevant variables that exist on both the SCF and the PUF. These variables include number of dependents, age (included as 10-year bracket dummies), income (as defined for purposes of the SCF), and the following components of income: income from a farm or business, tax-exempt interest income, taxable interest

[20] In some cases, earnings reported separately for each spouse were inconsistent with total household earnings. In that case, total earnings were apportioned among the spouses in proportion to their reported separate earnings. If positive household earnings were reported, but the individuals did not report earnings separately, we attributed the total amount to the head of household.
Some employees reported contributing more than the limit. We assumed that any excess contributions were made to a nonqualifying pension plan.

income, rental income from schedule E, pension income, taxable dividends, and realized capital gains (all defined as the natural logarithm of the income item plus one). We also include dummies for zero values of each income item; dummies for negative overall income, negative income from a business or farm, and negative capital income; as well as interactions between the negative income dummies and the appropriate negative income amount (defined as the natural logarithm of the absolute value of the income item plus one). In addition, we include dummies for whether the individual itemizes deductions on his or her federal tax return, and dummies for whether certain federal tax schedules are filed (C for business income, E for rental income, and F for farm income). The list of explanatory variables is identical for each equation, except for the employer contribution probit and level equations. Those equations include the natural logarithm of employee contributions as an explanatory variable, under the logic that employer contributions are often matching.

Equations are estimated separately for head of household and spouse, but are based on household-level values for the explanatory variables with the exception of age and earnings.[21] It is not appropriate in the SCF to simply run regressions or probits on the entire dataset because of its approach to missing variables. The SCF imputes missing values for a number of fields. To reflect the variance introduced by that process, the SCF database includes five replicates of each observation. Missing values are drawn randomly for each replicate from the estimated probability distribution of the imputed value, whereas nonmissing values are simply repeated. We estimate coefficients by computing each estimate separately for each sample replicate and then averaging the coefficient estimates.[22]

Imputation

Given the estimates of coverage and contributions from the SCF, we impute values to tax filing units in the PUF/CPS database. Imputation is done in three steps. First, we simulate whether the taxpayer has the item. For consistency, pension contributions are attributed only to tax returns that are not shown ineligible by virtue of their IRA contributions.[23]

[21] The SCF is a household-based survey that records only total income and wealth items for all individuals in the "primary economic unit" (PEU); it does not attribute shares of those amounts to individuals within the PEU. This provides a slight complication for those PEUs that consist of two unmarried individuals living together (with or without other financially interdependent members of the PEU). These individuals will show up in the income tax file as two single tax returns but will show up in the SCF as one unit. We assume that an unmarried couple living together with shared finances behaves like a married couple and thus include them in the married category when running the regressions. The results do not change significantly if these individuals are dropped from the analysis.

[22] We also correct the standard errors using the procedure supplied by the Federal Reserve Board, but it is not a particularly important adjustment given that we are not interested in the parameter estimates. The corrected estimates and standard errors from that procedure, as well as a measure of goodness-of-fit from the first replicate, are available upon request.

[23] Tax returns include data on contributions to traditional IRAs. Since taxpayers above certain AGI thresholds may not make contributions to IRAs if their employers offer a pension, any in those categories who report IRA contributions must not participate in an employer plan.

Using the estimated coefficients from the probit estimation and values of explanatory variables in the tax model database, we calculate Xb_1 (where b_1 refers to the probit estimate for β_1). We then calculate the threshold probability, $z = \Phi^{-1}(X_1 b_1)$, where Φ is the cumulative standard normal probability distribution, and draw a uniform random number, p, between 0 and 1. If $z < p$, we assign a nonzero value for the item.[24]

Second, we estimate employer and employee contribution levels for taxpayers with $z < p$. Using the estimated coefficients from the level equation (b_2) and values for explanatory variables in the PUF, we calculate Xb_2, the desired value for the item, y. In the limit, $E(y^*) = \exp(Xb_2 + s^2/2)$, where s is the estimated standard error for the level regression. However, in finite samples, $\exp(Xb_2 + s^2/2)$ can be a biased estimator, and the biases can be large if the errors are in fact nonnormal. We follow Duan (1983) and instead use a robust empirical "smearing adjustment" to match the sample means of predicted values with the sample mean of the actual SCF data. The adjustment basically amounts to multiplying $\exp(Xb_2)$ by a constant chosen to align the sample means.

Third, we adjust the imputed aggregates to match SCF totals. After the adjustment, the number of participants, employer, and employee contributions match approximately the totals reported in the SCF.

Calculating Gross Wages

After the imputation process is complete, we calculate gross wages by adding employer and employee contributions to DC pension plans to reported taxable wages and salaries. Unlike taxable wages, gross wages are invariant with respect to tax changes, assuming that employer contributions to pension plans and other fringe benefits are paid out of wages. By the same logic, we subtract the employer's portion of additional payroll taxes due on the additional cash compensation from gross wages. We use gross wages as a component of cash income.

IRAs

IRAs raise special issues for three reasons. First, IRA contributions are not reported on the SCF, which we resolve by using the 1996 SIPP. Second, no questions were asked about Roth IRAs in the 1996 SIPP (since the Roth IRA was first enacted in 1997) and there is currently no cross-section information available on Roth IRA contributions. Third, 1997 legislation phased in substantial increases to the income limits for contributions to traditional IRAs—not fully effective until 2007. This last point means that baseline contributions can be significantly greater in later years than the observed values for taxpayers who are at the limit in 1997.

[24] Without adjustment, this process can produce too many or too few individuals with pension contributions on the PUF dataset. We force the numbers to match published totals by shifting the threshold probabilities by a constant (up or down) so the simulated number of contributors matches the estimates on the SCF.

To calculate the IRA participation and contributions, we use a similar method to the one described above, modified to use information on the PUF about contributions to traditional IRAs. We distinguish between individuals who already contribute to a tax-deductible IRA in the PUF and all others.

Individuals who contribute to a tax-deductible IRA as indicated on the PUF in 1999 are assumed to also contribute to such an account in later years. For those who contribute the limit to an IRA in 1999, the desired contribution is at least the limit amount. We calculate the desired contribution based on the estimates from the censored regression equation. Suppose the limit in 1999 was L, the actual contribution was I, the vector of explanatory variables is X, the coefficient vector from the censored regression is denoted as β_3, and the error as ε_3, a random variable with mean 0 and variance σ_3^2. Let $\ln(I^*) = X\beta_3 + \varepsilon_3$ represent the desired contribution. The dependent variable is upward censored at $\ln(L)$, so the observed variable is $\ln(I) = \ln(I^*)$ when $I^* < L$ and $\ln(I) = \ln(L)$ otherwise. For limit contributors, the expectation of I^* is

$$E(I^* \mid I \geq L) = E(e^{X\beta_3+\varepsilon_3} \mid \varepsilon_3 \geq \ln(L) - X\beta_3).$$

It may be shown that

$$E(I^* \mid I \geq L) = e^{X\beta_3+\sigma_3^2/2} \frac{1-\Phi\left(\frac{\ln L - X\beta_3 - \sigma_3^2}{\sigma_3}\right)}{1-\Phi\left(\frac{\ln L - X\beta_3}{\sigma_3}\right)}.$$

We calculate a consistent estimator for this expected value using the estimates for the coefficient vector and standard error generated by the censored regression equation. This procedure guarantees that predicted contributions are at least as great as the 1999 limit, which means that these people will contribute more when the limit increases.[25]

For all other tax filing units, IRA participation depends on the results of probit equations estimated on the 1997 SIPP data (as described above for 401(k) plans), and the desired level of contribution depends on the predictions of a censored regression equation also estimated on the SIPP. To simplify, we assume that, when eligible for both types of IRA, these households all contribute to Roth IRAs, even if they become eligible for traditional IRAs as the limits increase. Because the present value of Roth and traditional IRAs is equivalent for an equal after-tax contribution (as discussed below), this assumption does not affect the distribution of tax benefits from IRAs overall. It may, however, lead to an overestimate of the share of IRA contributions in Roth IRAs, especially for those with higher incomes.[26]

[25] For alternative methods of imputing desired contributions, see Gale and Scholz (1994) and Venti and Wise (1990).

[26] On the other hand, it may be that more higher-income people will shift from traditional IRAs to Roth IRAs over time as awareness of the new (in 1997) program grows. In addition, those who would like to make an after-tax contribution of more than L $(1 - \tau)$, where L is the contribution limit and τ is the marginal

We use the estimated probit equation and censored regression estimates to predict whether tax filing units contribute to a Roth IRA and the amount of desired pre-tax contribution (since the traditional IRAs were all made on a pre-tax basis). The procedure is identical to that outlined for 401(k) participation and contributions, except for two modifications. First, the contribution is converted from a pre-tax to an after-tax contribution based on the taxpayer's marginal tax rate (subject to the applicable Roth IRA limit). Second, the estimates for participation and contribution levels are calibrated to match estimates based on IRS data from 2000 (Sailer and Nutter forthcoming.)

Other Policies

The Saver's Credit

The saver's credit is a nonrefundable tax credit equal to a share of employee contributions to DC pensions and contributions to IRAs. We model this credit simply as a reduction in tax based on the credit formula. Following standard distributional analysis conventions, no behavioral response is assumed—that is, we do not assume that saving increases when people have access to the credit. Thus, the credit calculation follows directly from our estimates of IRA and retirement plan contributions. For some scenarios, we assume that the credit is refundable. That means that tax filers get the full benefit of the credit even if it exceeds their income tax liability—even if they do not owe income tax at all.

Changes in Contribution and Income Limits

We simulate the effects of higher contribution limits and changes in income eligibility rules using an analogous procedure. We assume that people who are eligible to contribute in the baseline but do not contribute will not decide to contribute if their contribution limit increases (this assumption could be wrong if there are transaction costs), but those who do contribute in the baseline and are at the limit will increase their contribution, according to their desired contribution equation and adjustments described above. Changes in income limits for IRA contributions could also increase the number of contributors as some newly eligible people would contribute depending on the prediction of the probit participation equation, as discussed above.[27]

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income tax rate, can only do so through a Roth IRA. So, on balance, this simplifying assumption seems plausible until further data are available.

[27] This feature would be used to model recent proposals to eliminate income limits entirely for eligibility for contributions to Roth IRAs.

Theoretical Determination

We calculate the value of pension and IRA tax benefits by comparing the taxation to a taxable account holding a similar level of after-tax contributions. Consider a contribution of $1,000 to a traditional (deductible) IRA. The cost of that contribution is $1,000(1 – τ). Call that amount V_0. Assuming that, alternatively, that money would be contributed to a taxable account paying a rate of return r and taxed at constant rate, τ, the account would be worth

$$V_t = V_0 \, (1 + r(1 - \tau))^t \tag{1}$$

after t years, where $t = 1,\ldots, N$, and N is the year at which withdrawals start (at the end of the year). Assuming discounting at rate r, the present value of taxes during the N-year accumulation phase is

$$PV_N = \left[1 - \left(\frac{1 + r(1-\tau)}{1 + r}\right)^N\right] V_0 \tag{2}$$

If the money is withdrawn in a lump sum at the end of year N, this would be the present value of the tax benefits. We follow Cronin (1999) in assuming that the contribution period is until age 65 and then the money is withdrawn in equal portions starting at age 66 until the end of the life expectancy. Withdrawals are assumed to occur at the end of the year, after interest has accrued.

If life expectancy at age 65 is 65 + T, then the annual withdrawal, A, will solve the following equation

$$V_N = A\left[1 - (1 + r(1-\tau))^{-T}\right] \frac{1 + r(1-\tau)}{r(1-\tau)}, \tag{3}$$

where V_N is the value of the taxable account at age 65 (at the end of the year). It may be shown that the value of the taxable account during the retirement period is:

$$V_{N+j} = \gamma^j \left[V_N - A\frac{1 - \gamma^{-j}}{1 - \gamma^{-1}}\right], \tag{4}$$

where $\gamma \equiv 1 + r(1-\tau)$. Tax in period $N + j$ is

$$\theta_{N+j} = \gamma^{j-1} \left[V_N - A\frac{1 - \gamma^{-j}}{1 - \gamma^{-1}}\right] r\tau \, . \tag{5}$$

Thus, the present value of the taxes saved is

$$PV = PV_N + \sum_{j=1}^{T} \frac{\theta_{N+j}}{(1+r)^{N+j}}. \quad (6)$$

Parameter Assumptions

For a deductible IRA or 401(k) contribution, V_0 is the after-tax cost of the contribution (i.e., multiplied by $1 - \tau$). For a Roth IRA or 401(k), V_0 is the amount of the contribution. Thus, for someone in the 25 percent tax bracket, a $2,000 contribution to a traditional IRA would be analogous to a $1,500 contribution to a taxable account (V_0 = 1,500). A $2,000 contribution to a Roth IRA would be analogous to a $2,000 contribution to the taxable account (V_0 = 2000).

For this calculation, τ should be the marginal tax rate on earnings. For simplicity, assume that the tax rate on savings outside of retirement accounts is also τ (as assumed in the calculation above). In fact, the effective rate might be lower if, for example, the account pays returns in the form of capital gains or dividends. This assumption will thus tend to overstate the value of the retirement tax incentives.

We make a conservative assumption about the rate of return on the taxable account. We assume that r is 6 percent—3 percent inflation plus 3 percent real growth—as assumed in the 2003 SSA trustees report. To the extent that the taxable account would be invested in stocks or commercial bonds, there would be a risk premium that would raise the expected return. Thus, this assumption will tend to understate the value of retirement tax incentives, and thus to offset the bias from assuming full taxation of returns. Table 13 and 14 show that the net effects of these two assumptions on the distribution of benefits are small.

References

Benjamin, Daniel. 2001. "Does 401(k) Eligibility Increase Saving? Evidence from Propensity Score Subclassification." London: London School of Economics.

Burman, Leonard E., William G. Gale, and David Weiner. 2001. "The Taxation of Retirement Saving: Choosing between Front-Loaded and Back-Loaded Options." *National Tax Journal* 54(3): 689–702.

Chernozhukov, Victor, and Christian Hansen. Forthcoming. "The Impact of 401(k) Participation on the Wealth Distribution." *The Review of Economics and Statistics*.

Congressional Budget Office (CBO). 2003a. "Baby Boomers' Retirement Prospects: An Overview." Washington, DC: Congressional Budget Office.

———. 2003b. "Utilization of Tax Incentives for Retirement Saving." Washington, DC: Congressional Budget Office.

———. 2004. "Effective Federal Tax Rates: 1979–2001." Washington, DC: Congressional Budget Office.

Cronin, Julie-Anne. 1999. "U.S. Treasury Distributional Analysis Methodology." OTA Paper 85. Washington, DC: U.S. Department of the Treasury. http://www.ustreas.gov/offices/tax-policy/library/ota85.pdf.

Duan, Naihua. 1983. "Smearing Estimate: A Nonparametric Retransformation Method." *Journal of the American Statistical Association* 78(383): 605-610.

Engen, Eric, and William G. Gale. 2000. "The Effects of 401(k) Plans on Household Wealth: Differences across Earnings Groups." NBER Working Paper 8032. Cambridge, MA: National Bureau of Economic Research.

Engen, Eric, William G. Gale, and Cori E. Uccello. 1999. "The Adequacy of Household Saving." *Brookings Papers on Economic Activity* (2): 65–165.

Even, William, and David Macpherson. 2003. "The Distributional Consequences of the Shift to Defined Contribution Plans." Working Paper. Tallahassee, FL: Florida State University.

Gale, William G., and Peter R. Orszag. 2003. "Private Pensions: Issues and Options." In *Agenda for the Nation*, edited by Henry J. Aaron, James N. Lindsay, and Pietro S. Nivola. Washington, DC: The Brookings Institution.

Gale, William G., and John Karl Scholz. 1994. "IRAs and Household Saving." *American Economic Review* 84(5): 1233–60.

Gale, William G., J. Mark Iwry, and Peter R. Orszag. 2004. "The Saver's Credit: Issues and Options." *Tax Notes* 103(5): 597–612. .

Gustman, Alan L., and Thomas L. Steinmeier. 1998. "Changing Pensions in Cross-Section and Panel Data: Analysis with Employer-Provided Plan Descriptions." NBER Working Paper No. W6854. Cambridge, MA: National Bureau of Economic Research.

Hall, Matthew, and Peter Orszag. 2004. "Distributional Effects of Defined Contribution Plans and Individual Retirement Arrangements." Tax Policy Center Discussion Paper No. 15. Washington, DC: Tax Policy Center.

Joulfaian, David, and David Richardson. 2001. "Who Takes Advantage of Tax-Deferred Saving Programs? Evidence from Federal Income Tax Data." *National Tax Journal* 54(3): 669–88.

Office of Management and Budget. 2004. *Analytical Perspectives, Fiscal Year 2005*. Washington, DC: Office of Management and Budget.

Poterba, James M., Steven F. Venti, and David A. Wise. 1995. "Do 401(k) Contributions Crowd Out Other Personal Saving?" *Journal of Public Economics* 58(1): 1–32.

Sailer, Peter J., and Sarah E. Nutter. Forthcoming. "Accumulation and Distribution of Individual Retirement Arrangements, 2000." Statistics of Income Bulletin.

Scholz, John Karl, Ananth Seshadri, and Surachai Khitatrakun. 2003. "Are Americans Saving 'Optimally' for Retirement?" NBER Working Paper No. W10260. Cambridge, MA: National Bureau of Economic Research.

Venti, Steven F., and David A. Wise. 1990. "Have IRAs Increased U.S. Saving? Evidence from Consumer Expenditure Surveys." *Quarterly Journal of Economics* 105(3): 661–98.

Table 1
Tax Benefits of Defined Contribution Plans and IRAs[1]
by Cash Income Percentile, 2004

Cash Income Percentile[2]	Percent of Tax Units with Benefit[3]	Benefit as Percent of After-Tax Income[4]	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	2.0	0.1	0.2	-6
Second Quintile	12.7	0.4	2.9	-77
Middle Quintile	24.9	0.7	7.9	-208
Fourth Quintile	43.0	1.1	19.3	-509
Top Quintile	61.0	1.4	69.7	-1,838
All	28.7	1.2	100.0	-528
Addendum				
Top 10 Percent	63.8	1.4	48.6	-2,566
Top 5 Percent	61.9	1.2	30.4	-3,211
Top 1 Percent	53.3	0.6	7.8	-4,111
Top 0.5 Percent	51.6	0.4	4.0	-4,252
Top 0.1 Percent	51.4	0.2	0.9	-4,645

Source: Urban-Brookings Tax Policy Center Microsimulation Model.
(1) Distribution of the present value of lifetime tax benefits for new contributions made in 2004.

(2) Tax units with negative cash income are excluded from the lowest income class but are included in the totals. See http://www.taxpolicycenter.org/TaxModel/income.cfm for a description of cash income.
(3) Both filing and nonfiling units are included. Filers who can be claimed as dependents by other filers are excluded from the analysis.
(4) After-tax income is cash income less individual income tax net of refundable credits, payroll and estate tax liability, and imputed burden from corporate taxes.

Table 2
Tax Benefits of Defined Contribution Plans
by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	1.8	0.1	0.2	-6
Second Quintile	11.6	0.4	2.8	-69
Middle Quintile	21.7	0.6	7.5	-182
Fourth Quintile	36.8	0.9	18.6	-452
Top Quintile	53.0	1.3	70.8	-1,722
All	25.0	1.1	100.0	-486
Addendum				
Top 10 Percent	55.8	1.3	50.0	-2,433
Top 5 Percent	54.8	1.2	32.0	-3,108
Top 1 Percent	48.2	0.6	8.3	-4,031
Top 0.5 Percent	46.7	0.4	4.3	-4,176
Top 0.1 Percent	47.0	0.2	0.9	-4,587

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

Table 3

Participation and Contributions to Defined Contribution Plans[1]

Married Filing Joint Returns, by Cash Income Percentile, 2004

Cash Income Percentile	Tax Units		Elective Deferral Head		Elective Deferral Spouse		Employer Contribution Head		Employer Contribution Spouse	
	Working Age Population (thousands)	Percent of Total	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]
Lowest Quintile	3,467	7.5	3.5	816	3.0	499	4.2	683	2.7	384
Second Quintile	4,044	8.8	10.7	1,343	8.2	876	10.9	1,048	8.6	644
Middle Quintile	5,756	12.5	17.1	2,154	15.1	1,348	18.5	1,653	14.9	1,024
Fourth Quintile	12,329	26.8	27.3	3,401	24.7	2,193	27.8	2,507	25.4	1,819
Top Quintile	20,155	43.9	41.7	7,405	35.2	4,399	40.9	5,949	33.8	3,555
All	45,955	100.0	28.5	5,627	24.7	3,390	28.5	4,166	24.3	2,700
Addendum										
Top 10 Percent	10,522	22.9	45.4	9,160	36.1	5,312	44.7	7,788	33.7	4,382
Top 5 Percent	5,243	11.4	46.6	11,036	34.5	6,305	46.5	10,553	31.2	5,374
Top 1 Percent	997	2.2	42.6	12,937	27.7	8,621	46.5	19,733	23.8	8,484
Top 0.5 Percent	499	1.1	41.7	13,149	21.1	9,244	47.5	23,035	18.0	10,394
Top 0.1 Percent	100	0.2	43.5	13,558	17.4	10,966	48.5	25,802	15.6	15,337

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

(1) Sample is limited to households where the head is between 18 and 64 years of age. Percentile groups are in terms of the entire population.

(2) Among those who contribute to a defined contribution plan.

Table 4

Participation and Contributions to Defined Contribution Plans[1]

Single and Head of Household Returns, by Cash Income Percentile, 2004

Cash Income Percentile	Tax Units		Elective Deferral		Employer Contribution	
	Working Age Population (thousands)	Percent of Total	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]
Lowest Quintile	18,489	27.1	5.4	701	5.3	611
Second Quintile	17,371	25.4	14.9	1,292	14.5	1,103
Middle Quintile	16,651	24.4	23.1	2,141	22.4	1,745
Fourth Quintile	11,251	16.5	35.7	3,611	33.2	2,768
Top Quintile	4,224	6.2	40.4	7,335	38.9	6,129
All	68,311	100.0	19.2	2,968	18.4	2,357
Addendum						
Top 10 Percent	1,715	2.5	41.1	9,558	40.2	8,661
Top 5 Percent	810	1.2	40.2	11,321	38.8	11,934
Top 1 Percent	160	0.2	35.4	12,311	36.5	20,214
Top 0.5 Percent	81	0.1	34.4	12,814	34.7	22,558
Top 0.1 Percent	18	0.0	37.0	13,462	38.6	25,514

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

(1) Sample is limited to households where the head is between 18 and 64 years of age. Percentile groups are in terms of the entire population.

(2) Among those who contribute to a defined contribution plan.

Table 5
Tax Benefits of Roth and Traditional IRAs
by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	0.2	0.0	0.2	0
Second Quintile	1.3	0.0	3.5	-7
Middle Quintile	4.0	0.1	11.5	-24
Fourth Quintile	8.4	0.1	26.8	-56
Top Quintile	12.7	0.1	58.0	-121
All	5.3	0.1	100.0	-42
Addendum				
Top 10 Percent	13.3	0.1	34.9	-145
Top 5 Percent	10.8	0.0	15.2	-126
Top 1 Percent	5.9	0.0	2.0	-83
Top 0.5 Percent	6.0	0.0	1.0	-84
Top 0.1 Percent	4.4	0.0	0.1	-59

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

Table 6
Participation and Contributions to Roth and Traditional IRAs
by Cash Income Percentile, 2004

Cash Income Percentile	Tax Units		Traditional IRA			Roth IRA		
	Number (thousands)	Percent of Total	Percent who Contribute	Average Contribution[1]	Percent of Contributors at Limit	Percent who Contribute	Average Contribution[1]	Percent of Contributors at Limit
Lowest Quintile	28,143	19.6	0.2	1,918	40.0	0.3	2,189	29.6
Second Quintile	28,701	20.0	0.9	2,236	50.4	0.8	2,911	45.5
Middle Quintile	28,703	20.0	2.9	2,596	50.2	1.4	2,883	38.5
Fourth Quintile	28,704	20.0	4.5	2,868	36.8	4.0	3,117	36.9
Top Quintile	28,701	20.0	5.2	3,610	44.3	7.6	3,552	38.6
All	143,509	100.0	2.7	3,032	43.4	2.8	3,296	38.3
Addendum								
Top 10 Percent	14,351	10.0	5.5	4,015	51.9	7.9	3,723	41.2
Top 5 Percent	7,176	5.0	5.7	4,244	59.7	5.1	3,889	53.9
Top 1 Percent	1,435	1.0	4.6	5,022	77.3	1.4	5,371	84.6
Top 0.5 Percent	718	0.5	4.5	5,058	78.1	1.6	5,928	98.3
Top 0.1 Percent	144	0.1	4.3	5,000	77.4	0.2	6,141	100.0

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.
(1) Among those who contribute to an IRA.

Table 7
Tax Benefits of the Savers' Credit
by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	1.2	0.0	2.6	-2
Second Quintile	7.1	0.1	28.4	-20
Middle Quintile	9.1	0.1	36.7	-26
Fourth Quintile	8.0	0.0	31.2	-22
Top Quintile	0.2	0.0	1.1	-1
All	5.1	0.0	100.0	-14
Addendum				
Top 10 Percent	0.2	0.0	0.6	-1
Top 5 Percent	0.1	0.0	0.1	0
Top 1 Percent	0.0	0.0	0.0	0
Top 0.5 Percent	0.0	0.0	0.0	0
Top 0.1 Percent	0.0	0.0	0.0	0

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

Table 8
Tax Benefits of Making the Savers' Credit Refundable[1]
by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	4.8	0.2	14.6	-17
Second Quintile	8.6	0.3	38.2	-44
Middle Quintile	7.0	0.1	34.3	-39
Fourth Quintile	2.5	0.0	8.9	-10
Top Quintile	0.3	0.0	2.6	-3
All	4.6	0.1	100.0	-23
Addendum				
Top 10 Percent	0.2	0.0	1.3	-3
Top 5 Percent	0.1	0.0	0.4	-2
Top 1 Percent	0.1	0.0	0.1	-1
Top 0.5 Percent	0.1	0.0	0.0	-1
Top 0.1 Percent	0.1	0.0	0.0	-2

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.
(1) Baseline is current law.

Table 9

Tax Benefits of Accelerating DC and IRA Contribution Limit Increases[1]

by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	0.0	0.0	0.1	0
Second Quintile	0.6	0.0	2.1	-2
Middle Quintile	1.7	0.0	7.5	-7
Fourth Quintile	3.1	0.0	18.8	-18
Top Quintile	9.6	0.1	71.5	-69
All	3.0	0.0	100.0	-19
Addendum				
Top 10 Percent	14.6	0.1	54.4	-104
Top 5 Percent	22.2	0.1	38.1	-146
Top 1 Percent	34.8	0.0	10.7	-205
Top 0.5 Percent	36.2	0.0	4.7	-182
Top 0.1 Percent	39.1	0.0	0.7	-142

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.
(1) Baseline is current law.

Table 10
Tax Benefits of Defined Contribution Plans and IRAs
by Age of Household Head, 2004

Age Bracket	Tax Units			Benefit as Percent of After-Tax Income[3]	Share of Total Benefits	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 25	19,029	13.3	16.4	1.2	7.9	-316
25-34	26,480	18.5	34.3	1.7	22.9	-654
35-44	29,677	20.7	43.9	1.7	35.3	-900
45-54	23,920	16.7	43.5	1.3	24.9	-789
55-64	15,160	10.6	30.0	0.7	7.7	-384
? 65	29,243	20.4	3.5	0.1	1.3	-33
All	143,509	100.0	28.7	1.2	100.0	-528

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

Table 11
Tax Benefits of DC Plans and IRAs Among Household Heads Aged 45 to 54
by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	2.5	0.1	0.1	-7
Second Quintile	17.0	0.5	1.5	-85
Middle Quintile	32.6	0.8	4.7	-218
Fourth Quintile	51.9	1.1	15.3	-509
Top Quintile	73.1	1.5	78.4	-1,970
All	43.5	1.3	100.0	-789
Addendum				
Top 10 Percent	75.6	1.5	57.8	-2,722
Top 5 Percent	74.4	1.3	36.6	-3,476
Top 1 Percent	65.8	0.6	8.3	-4,448
Top 0.5 Percent	63.5	0.5	4.6	-4,765
Top 0.1 Percent	61.8	0.2	0.9	-4,871

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

Table 12
Tax Benefits of Defined Contribution Plans and IRAs
by Economic Income Percentile, 2004

Economic Income Percentile[1]	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	3.6	0.2	0.5	-13
Second Quintile	15.9	0.8	4.3	-115
Middle Quintile	26.0	1.1	9.3	-246
Fourth Quintile	42.0	1.7	21.8	-574
Top Quintile	56.1	1.8	64.0	-1,689
All	28.7	1.5	100.0	-528
Addendum				
Top 10 Percent	57.9	1.6	41.9	-2,213
Top 5 Percent	55.7	1.3	25.3	-2,672
Top 1 Percent	46.0	0.6	6.2	-3,286
Top 0.5 Percent	43.2	0.4	3.2	-3,400
Top 0.1 Percent	43.2	0.1	0.7	-3,700

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.
(1) See http://www.taxpolicycenter.org/TaxModel/income.cfm for a description of economic income.

Table 13
Tax Benefits of Defined Contribution Plans and IRAs Using a 10% Tax Rate
by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	5.5	0.2	0.7	-13
Second Quintile	14.5	0.5	4.4	-81
Middle Quintile	25.3	0.6	9.9	-183
Fourth Quintile	43.2	0.8	20.2	-374
Top Quintile	61.0	0.9	64.7	-1,197
All	29.9	0.8	100.0	-370
Addendum				
Top 10 Percent	63.8	0.9	43.6	-1,614
Top 5 Percent	61.9	0.7	27.1	-2,004
Top 1 Percent	53.0	0.3	6.5	-2,403
Top 0.5 Percent	51.3	0.2	3.2	-2,377
Top 0.1 Percent	50.6	0.1	0.7	-2,534

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

Table 14
Tax Benefits of Defined Contribution Plans and IRAs Using a 9% Rate of Return
by Cash Income Percentile, 2004

Cash Income Percentile	Percent of Tax Units with Benefit	Benefit as Percent of After-Tax Income	Share of Total Benefits	Average Benefit ($)
Lowest Quintile	2.0	0.1	0.2	-7
Second Quintile	12.7	0.5	2.7	-93
Middle Quintile	25.0	0.9	7.7	-262
Fourth Quintile	43.0	1.4	19.7	-668
Top Quintile	61.0	1.8	69.7	-2,367
All	28.7	1.5	100.0	-679
Addendum				
Top 10 Percent	63.8	1.8	48.4	-3,289
Top 5 Percent	62.0	1.5	30.1	-4,092
Top 1 Percent	53.4	0.8	7.7	-5,244
Top 0.5 Percent	51.7	0.5	4.0	-5,454
Top 0.1 Percent	51.7	0.2	0.9	-5,986

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Table 1.

Appendix Table 1
Tax Benefits of Defined Contribution Plans and IRAs[1]
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)[2]	Tax Units[3]			Percent Change in After-Tax Income[4]	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	1.1	0.0	0.0	-2
10-20	26,467	18.4	8.7	0.3	1.6	-45
20-30	20,379	14.2	18.5	0.6	3.7	-137
30-40	15,377	10.7	27.0	0.7	4.6	-225
40-50	11,446	8.0	34.7	0.9	5.3	-353
50-75	20,054	14.0	46.0	1.1	14.9	-564
75-100	11,395	7.9	57.4	1.4	15.2	-1,009
100-200	13,281	9.3	65.0	1.9	34.8	-1,985
200-500	3,339	2.3	59.5	1.6	15.4	-3,495
500-1,000	527	0.4	52.2	0.8	2.9	-4,165
More than 1,000	257	0.2	50.7	0.2	1.5	-4,428
All	143,509	100.0	28.7	1.2	100.0	-528

Source: Urban-Brookings Tax Policy Center Microsimulation Model.
(1) Distribution of the present value of lifetime tax benefits for new contributions made in 2004.
(2) Tax units with negative cash income are excluded from the lowest income class but are included in the totals. For a description of cash income, see http://www.taxpolicycenter.org/TaxModel/income.cfm
(3) Includes both filing and non-filing units. Tax units that are dependents of other taxpayers are excluded from the analysis.
(4) After-tax income is cash income less individual income tax net of refundable credits, payroll and estate tax liability, and imputed burden from corporate taxes.

Appendix Table 2
Tax Benefits of Defined Contribution Plans[1]
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	1.0	0.0	0.0	-2
10-20	26,467	18.4	8.0	0.3	1.6	-41
20-30	20,379	14.2	16.6	0.5	3.5	-121
30-40	15,377	10.7	23.4	0.7	4.4	-197
40-50	11,446	8.0	29.7	0.8	5.2	-315
50-75	20,054	14.0	39.2	1.0	14.4	-500
75-100	11,395	7.9	49.6	1.3	15.0	-918
100-200	13,281	9.3	56.2	1.7	35.0	-1,839
200-500	3,339	2.3	53.4	1.5	16.3	-3,404
500-1,000	527	0.4	47.2	0.8	3.1	-4,083
More than 1,000	257	0.2	46.1	0.2	1.6	-4,365
All	143,509	100.0	25.0	1.1	100.0	-486

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

Appendix Table 3

Participation and Contributions to Defined Contribution Plans[1]

Married Filing Joint Returns by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units		Elective Deferral Head		Elective Deferral Spouse		Employer Contribution Head		Employer Contribution Spouse	
	Working Age Population (thousands)	Percent of Total	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]
Less than 10	2,590	5.6	2.8	791	2.5	386	3.3	612	2.3	285
10-20	3,419	7.4	8.3	1,156	6.3	682	8.4	906	6.5	547
20-30	3,257	7.1	12.8	1,628	10.7	1,075	13.4	1,257	11.1	769
30-40	3,206	7.0	18.4	2,208	16.4	1,333	20.1	1,707	16.1	1,075
40-50	3,469	7.5	22.8	2,663	19.4	1,689	23.7	1,992	19.6	1,319
50-75	9,598	20.9	28.4	3,543	26.0	2,300	28.7	2,604	26.8	1,910
75-100	7,463	16.2	36.4	4,827	34.2	3,174	35.8	3,319	34.0	2,522
100-200	9,788	21.3	44.6	7,471	37.4	4,572	42.9	5,085	35.7	3,673
200-500	2,417	5.3	46.4	12,157	32.8	6,746	47.2	11,422	29.2	5,666
500-1,000	366	0.8	42.3	12,929	24.8	8,909	47.1	21,208	20.8	9,185
More than 1,000	177	0.4	40.7	13,448	17.7	10,062	47.7	25,810	15.2	13,206
All	45,955	100.0	29.0	5,744	24.9	3,444	29.0	4,501	24.5	2,762

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

(1) Sample is limited to households where the head is between 18 and 64 years of age.

(2) Among those who contribute to a defined contribution plan.

Appendix Table 4

Participation and Contributions to Defined Contribution Plans[1]

Single and Head of Household Returns by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units		Elective Deferral		Employer Contribution	
	Working Age Population (thousands)	Percent of Total	Percent Participating	Average Contribution[2]	Percent Participating	Average Contribution[2]
Less than 10	13,923	20.4	4.0	590	3.9	519
10-20	15,901	23.3	12.4	1,083	12.2	926
20-30	12,301	18.0	19.0	1,659	18.5	1,399
30-40	8,841	12.9	24.6	2,256	23.8	1,816
40-50	5,889	8.6	30.1	2,905	28.2	2,293
50-75	6,879	10.1	38.0	3,939	35.4	2,986
75-100	2,135	3.1	40.4	5,595	37.8	4,136
100-200	1,670	2.4	41.1	8,256	40.6	6,241
200-500	360	0.5	39.1	12,119	38.6	13,315
500-1,000	58	0.1	34.1	12,685	33.7	21,440
More than 1,000	30	0.0	36.0	13,129	37.4	24,560
All	68,311	100.0	19.3	2,989	18.5	2,403

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

(1) Sample is limited to households where the head is between 18 and 64 years of age.

(2) Among those who contribute to a defined contribution plan.

Appendix Table 5
Tax Benefits of Roth and Traditional IRAs
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	0.1	0.0	0.0	0
10-20	26,467	18.4	0.8	0.0	1.8	-4
20-30	20,379	14.2	2.5	0.1	5.1	-15
30-40	15,377	10.7	4.4	0.1	6.6	-26
40-50	11,446	8.0	6.5	0.1	7.2	-37
50-75	20,054	14.0	9.1	0.1	21.2	-63
75-100	11,395	7.9	11.6	0.1	16.6	-87
100-200	13,281	9.3	15.5	0.2	35.2	-158
200-500	3,339	2.3	6.8	0.0	5.2	-93
500-1,000	527	0.4	6.1	0.0	0.7	-83
More than 1,000	257	0.2	5.5	0.0	0.4	-82
All	143,509	100.0	5.3	0.1	100.0	-42

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

Appendix Table 6
Participation and Contributions to Roth and Traditional IRAs
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units		Traditional IRA			Roth IRA		
	Number (thousands)	Percent of Total	Percent who Contribute	Average Contribution	Percent of Contributors at Limit	Percent who Contribute	Average Contribution	Percent of Contributors at Limit
Less than 10	20,428	14.2	0.2	1,631	27.4	0.3	2,210	27.0
10-20	26,467	18.4	0.6	2,213	50.4	0.6	2,852	47.2
20-30	20,379	14.2	1.7	2,578	56.8	1.1	2,956	39.8
30-40	15,377	10.7	3.2	2,584	49.4	1.5	2,904	37.7
40-50	11,446	8.0	4.0	2,284	32.0	2.8	2,731	32.3
50-75	20,054	14.0	4.8	3,092	39.3	4.4	3,206	38.6
75-100	11,395	7.9	4.7	3,078	34.2	7.0	3,320	36.0
100-200	13,281	9.3	5.5	3,638	43.1	10.0	3,632	39.0
200-500	3,339	2.3	5.6	4,680	70.1	1.4	4,613	61.4
500-1,000	527	0.4	4.5	5,040	79.3	1.7	5,704	95.1
More than 1,000	257	0.2	4.3	5,065	77.8	1.3	6,348	98.2
All	143,509	100.0	2.7	3,032	43.4	2.8	3,296	38.3

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.
(1) Among those who contribute to an IRA.

Appendix Table 7
Tax Benefits of the Savers' Credit
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	0.4	0.0	0.1	0
10-20	26,467	18.4	5.0	0.1	19.9	-16
20-30	20,379	14.2	10.1	0.1	24.5	-25
30-40	15,377	10.7	7.8	0.1	19.2	-26
40-50	11,446	8.0	11.6	0.1	16.0	-29
50-75	20,054	14.0	6.5	0.0	19.1	-20
75-100	11,395	7.9	0.2	0.0	0.5	-1
100-200	13,281	9.3	0.2	0.0	0.6	-1
200-500	3,339	2.3	0.0	0.0	0.0	0
500-1,000	527	0.4	0.0	0.0	0.0	0
More than 1,000	257	0.2	0.0	0.0	0.0	0
All	143,509	100.0	5.1	0.0	100.0	-14

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

Appendix Table 8
Tax Benefits of Makings the Savers' Credit Refundable[1]
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	3.8	0.2	8.4	-14
10-20	26,467	18.4	8.3	0.3	29.2	-36
20-30	20,379	14.2	8.0	0.2	30.1	-49
30-40	15,377	10.7	6.8	0.1	17.2	-37
40-50	11,446	8.0	4.7	0.1	6.7	-19
50-75	20,054	14.0	1.6	0.0	4.3	-7
75-100	11,395	7.9	0.3	0.0	1.0	-3
100-200	13,281	9.3	0.3	0.0	1.4	-3
200-500	3,339	2.3	0.2	0.0	0.2	-2
500-1,000	527	0.4	0.1	0.0	0.0	-1
More than 1,000	257	0.2	0.1	0.0	0.0	-2
All	143,509	100.0	4.6	0.1	100.0	-23

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.
(1) Baseline is current law.

Appendix Table 9
Tax Benefits of Accelerating DC and IRA Contribution Limit Increases[1]
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	0.0	0.0	0.0	0
10-20	26,467	18.4	0.3	0.0	0.8	-1
20-30	20,379	14.2	1.1	0.0	3.4	-5
30-40	15,377	10.7	1.9	0.0	4.6	-8
40-50	11,446	8.0	2.0	0.0	4.0	-10
50-75	20,054	14.0	3.6	0.0	15.6	-21
75-100	11,395	7.9	4.2	0.0	12.2	-29
100-200	13,281	9.3	8.0	0.1	31.4	-65
200-500	3,339	2.3	27.8	0.1	22.8	-188
500-1,000	527	0.4	35.5	0.0	3.8	-200
More than 1,000	257	0.2	37.2	0.0	1.5	-156
All	143,509	100.0	3.0	0.0	100.0	-19

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.
(1) Baseline is current law.

Appendix Table 10
Defined Contribution Plan and IRA Tax Benefits Among Houseold Heads Aged 45 to 54
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	2,373	9.9	1.3	0.0	0.0	-2
10-20	3,114	13.0	11.7	0.4	0.8	-51
20-30	2,350	9.8	25.1	0.7	1.9	-154
30-40	2,346	9.8	33.6	0.8	2.8	-224
40-50	1,953	8.2	42.2	0.9	3.6	-343
50-75	4,159	17.4	55.3	1.1	12.4	-562
75-100	2,688	11.2	70.1	1.4	14.0	-980
100-200	3,690	15.4	76.3	2.0	40.3	-2,059
200-500	956	4.0	71.0	1.7	19.3	-3,807
500-1,000	132	0.6	65.7	0.9	3.3	-4,663
More than 1,000	66	0.3	62.5	0.3	1.7	-4,910
All	23,920	100.0	43.5	1.3	100.0	-789

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

Appendix Table 11
Tax Benefits of Defined Contribution Plans and IRAs
by Economic Income Level, 2004

Economic Income Level (thousands of 2003 dollars)[2]	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	23,851	16.6	2.4	0.1	0.3	-8
10-20	29,715	20.7	15.1	0.7	4.0	-102
20-30	23,401	16.3	22.9	1.0	6.5	-209
30-40	18,325	12.8	34.0	1.3	8.8	-362
40-50	13,246	9.2	43.5	1.7	10.6	-606
50-75	17,593	12.3	52.7	2.3	24.1	-1,038
75-100	7,009	4.9	58.9	2.5	14.5	-1,567
100-200	6,822	4.8	59.8	2.3	20.2	-2,239
200-500	2,086	1.5	52.0	1.5	8.7	-3,176
500-1,000	347	0.2	42.4	0.7	1.5	-3,212
More than 1,000	177	0.1	42.7	0.2	0.9	-3,667
All	143,509	100.0	28.7	1.5	100.0	-528

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.
(1) For a description of economic income, see http://www.taxpolicycenter.org/TaxModel/income.cfm.

Appendix Table 12

Tax Benefits of Defined Contribution Plans and IRAs Using a 10% Tax Rate[1]

by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	4.3	0.1	0.3	-8
10-20	26,467	18.4	11.5	0.4	2.7	-54
20-30	20,379	14.2	19.1	0.6	5.0	-130
30-40	15,377	10.7	27.3	0.6	5.7	-196
40-50	11,446	8.0	35.0	0.7	5.9	-271
50-75	20,054	14.0	46.2	0.8	15.6	-412
75-100	11,395	7.9	57.6	1.0	15.6	-727
100-200	13,281	9.3	65.1	1.2	31.6	-1,264
200-500	3,339	2.3	59.4	1.0	14.1	-2,239
500-1,000	527	0.4	52.1	0.5	2.3	-2,360
More than 1,000	257	0.2	50.1	0.1	1.2	-2,435
All	143,509	100.0	29.9	0.8	100.0	-370

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

Appendix Table 13
Tax Benefits of Defined Contribution Plans and IRAs Using a 9% Rate of Return
by Cash Income Level, 2004

Cash Income Level (thousands of 2003 dollars)	Tax Units			Percent Change in After-Tax Income	Share of Total Benefit	Average Benefit ($)
	Number (thousands)	Percent of Total	Percent with Benefit			
Less than 10	20,428	14.2	1.1	0.0	0.0	-2
10-20	26,467	18.4	8.7	0.4	1.5	-54
20-30	20,379	14.2	18.5	0.7	3.5	-168
30-40	15,377	10.7	27.0	0.9	4.5	-286
40-50	11,446	8.0	34.7	1.2	5.3	-456
50-75	20,054	14.0	46.0	1.5	15.3	-742
75-100	11,395	7.9	57.4	1.9	15.4	-1,316
100-200	13,281	9.3	65.0	2.4	35.0	-2,566
200-500	3,339	2.3	59.6	2.0	15.1	-4,410
500-1,000	527	0.4	52.3	1.1	2.9	-5,329
More than 1,000	257	0.2	50.9	0.3	1.5	-5,697
All	143,509	100.0	28.7	1.5	100.0	-679

Source: Urban-Brookings Tax Policy Center Microsimulation Model. See notes to Appendix Table 1.

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