

# WHAT'S THE TAX ADVANTAGE OF 401(K)S?

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## Introduction

Tax reform is high on the nation's agenda. While Republicans and Democrats may disagree about the extent to which tax increases should be part of the deficit reduction effort, they generally agree that a broader base and lower rates for the federal income tax would promote fairness and boost economic growth. The base-broadening discussion inevitably raises the question of cutting back on some "tax expenditures." These expenditures are revenue losses attributable to provisions of the tax laws that are designed to support particular activities. Prime examples are the provisions designed to encourage retirement savings.

It seems like a good time to understand the nature of these expenditures, determine how the revenue losses are calculated, think about how tax reform could affect the value of these provisions, and speculate how changes might affect participation and contributions in tax-advantaged savings vehicles, particularly 401(k) plans.

The discussion proceeds as follows. The first section provides a brief overview of the role of taxes in the evolution of employer-sponsored retirement plans. The second section describes the tax advantage associated with 401(k) plans. The third section discusses the magnitude of the 401(k) tax expenditure. The fourth section highlights how the size of the tax

expenditure depends on the tax treatment of capital income outside of 401(k)s. The fifth section discusses the potential impact of proposals to cut back on the 401(k) tax expenditure. The final section concludes that while some reform proposals may make the 401(k) tax expenditure more equitable, policymakers should proceed with caution because the employer-based retirement system is the main savings vehicle for American workers.

## Pension History in a Nutshell

Tax benefits are clearly not the only reason employers sponsor retirement income plans. At the end of the nineteenth century, long before the enactment of the federal personal income tax in 1916, a handful of very large employers, such as governments, railroads, utilities, universities, and corporations, had put in place defined benefit pension plans. They did so because the pension was a valuable tool for managing their workforce. These plans provided benefits based on final pay and years on the job. As a result, the value of pension benefits increased rapidly as job tenure lengthened and motivated employees to stay with the firm. Defined benefit plans also encouraged employees to retire when their productivity began to decline.

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By the end of the 1920s, employer plans covered 15 percent of the U.S. private sector workforce. The railway industry had extended pension coverage to 80 percent of its workers. Most large banks, utility, mining, and petroleum companies, as well as a sprinkling of manufacturers, also had formal plans. While the income tax was then in effect and it exempted employer contributions to pension plans, less than 5 percent of Americans were subject to the federal personal levy. Defined benefit plans thus emerged as a way for firms to manage their workforce, not as a way to pay workers tax-advantaged compensation.

During and after the Second World War, the income tax was extended to a much larger share of the workforce. And postwar tax rates for the typical family were significantly higher than in the initial growth period of defined benefit pensions. So while a number of forces clearly contributed to the rapid expansion of employer plans in the postwar period, the increasing advantage of the favorable tax treatment was certainly important.<sup>1</sup>

With the transition from defined benefit to 401(k) plans, which began in the early 1980s, it is much harder to argue that employer-sponsored plans are a key personnel management tool to retain skilled workers and encourage the retirement of older employees whose productivity is less than their wage. Once vested, workers do not forego any benefits when they change employers. Nor do 401(k) plans contain the incentives to retire at specific ages that employers embed in defined benefit plans. Some economists contend that 401(k) plans help employers attract and retain high-quality workers – those who have low discount rates and value saving – rather than directly affect employee productivity.<sup>2</sup> As such, 401(k) benefits are more broadly shared among a company's workforce, as they go to short- as well as long-tenured workers. But, overall, the contribution of an employer plan to personnel management is somewhat less important today than it was in the past. The tax preferences afforded pensions, as a result, have become a more important aspect of employer-sponsored 401(k) plans.

## The Tax Advantage

Retirement saving conducted through 401(k) plans is tax advantaged because the government taxes neither the original contributions nor the investment returns on those contributions until they are withdrawn as benefits at retirement.<sup>3</sup> If the saving were done outside a plan, the individual would first be required to

pay tax on his earnings and then on the returns from the portion of those earnings invested.<sup>4</sup> The favorable treatment significantly reduces the lifetime income taxes of those employees who receive part of their compensation in contributions to a 401(k) compared to those who receive all their earnings in cash wages.

### *The Roth 401(k)*

Since 2006, employers have had the option of offering a Roth 401(k). Under this arrangement, initial contributions are not deductible. But investment earnings accrue tax free and no tax is paid when the money is withdrawn.<sup>5</sup> This arrangement is superior to saving outside a plan because no taxes are ever paid on the returns to investments.

### *Conventional and Roth 401(k)s Offer Equivalent Tax Benefits*

Although the conventional and Roth 401(k)s may sound quite different, in fact they offer equivalent tax benefits. Unfortunately, the easiest way to demonstrate this point is with equations. Assume that  $t$  is the individual's marginal tax rate and  $r$  is the annual return on the assets in the 401(k). If an individual contributes \$1,000 to a conventional 401(k), then after  $n$  years, the 401(k) would have grown to \$1,000  $(1+r)^n$ . When the individual withdraws the accumulated funds, both the original contribution and the accumulated earnings are taxable. Thus, the after-tax value of the 401(k) in retirement is \$1,000  $(1+r)^n (1-t)$ .

Now consider a Roth 401(k). The individual pays tax on the original contribution, so he puts  $(1-t)$  \$1000 into the account. (Note the original contribution in this example is smaller than for the conventional 401(k).) After  $n$  years, these after-tax proceeds would have grown to  $(1-t)$  \$1,000  $(1+r)^n$ . Since the proceeds are not subject to any further tax, the after-tax amounts under the Roth and conventional plans are identical.<sup>6</sup>

$$\begin{array}{cc} \text{Conventional} & \text{Roth} \\ \$1,000 (1+r)^n (1-t) & = (1-t) \$1,000 (1+r)^n \end{array}$$

Of course, the preceding exercise assumes that the tax rate that people face in retirement is the same as that when they are young. If their tax rates decline after retirement when they withdraw the funds, then they will pay less tax and have more after-tax income with the conventional 401(k) than with the Roth. If tax rates rise in the future to cover the deficits in

the budget forecasts, then today's workers will face higher taxes in retirement and will have more after-tax income with a Roth 401(k) plan than with a conventional one.<sup>7</sup> But for most people, changes in tax rates before and after retirement are not that significant, so the tax treatment of the two types of 401(k) plans can be viewed as equivalent.<sup>8</sup>

## How Much Does the Tax Advantage Cost the Treasury?

This favorable treatment accorded 401(k) plans costs the Treasury money. Precisely how much it costs has become a hotly debated topic given the enthusiasm, in the face of large and rising deficits, for increasing revenues by cutting tax expenditures. The government includes a list of tax expenditures, or revenue losses from specific provisions, in its budget each year.<sup>9</sup>

The value of the losses depends crucially on the baseline tax system against which a provision is measured. This issue is particularly important in the case of retirement saving. The current deferral of taxes is fully consistent with that accorded saving under a consumption tax. But the Treasury itself, with the concurrence of Congress, classifies the treatment of pensions as a deviation from the so-called "normal" structure and the so-called "reference law" baseline.<sup>10</sup>

The question then is how to calculate the revenue loss. Historically, the federal government estimated the tax expenditure on a cash basis. Under this concept, the loss is the net of two figures: 1) the revenue that would be gained from the current taxation of annual contributions and investment earnings in, say, 2010; and 2) the amount that would be lost in 2010 from not taxing benefits in retirement, as is done currently.

While the cash flow approach is meaningful for permanent deductions and exclusions, such as the exclusion of employer-provided health insurance, it does not properly account for tax deferrals. Consider the case where annual contributions to plans and investment earnings exactly equal withdrawals during that year. Under cash flow accounting, the revenue loss would equal zero. Yet, individuals covered by these plans enjoy the advantage of deferring taxes on contributions and investment earnings until after retirement. The problem is not that cash flow calculations

overstate or understate the revenue loss; the problem is that they do not measure the cost of deferral to the Treasury.

The correct way to estimate the true economic cost of the tax provisions associated with 401(k) plans is the present value of the revenue foregone, net of the present value of future tax payments, with respect to contributions made in a given year. Unfortunately, the present value estimates for 2010 range from \$134 billion in the *2012 Budget of the United States* to \$27 billion in a recent study by the American Society of Pension Professionals & Actuaries (ASPPA).

Why is the ASPPA number so low and the *2012 Budget* number so high? The ASPPA estimate is so low because the authors assume that contributions in 2010 amounted to \$110 billion. However, data for 2009 from the Department of Labor Form 5500 show employer contributions of \$110 billion and employee

contributions of \$172 billion for a total of \$283 billion. So the ASPPA estimate is based on less than 40 percent of the total contributions to

defined contribution plans.

The *2012 Budget* number is so high for two reasons.<sup>11</sup> (The *2013 Budget* released yesterday shows a significantly lower number).<sup>12</sup> First, it is based on IRS Statistics of Income data, which suggest that 401(k) contributions are 30 percent larger than the data in the Department of Labor Form 5500. Second, the *Budget* calculation assumes that all 401(k) money is invested in bonds. Therefore, if the money were not in a 401(k) account – the counterfactual – the income would be taxed annually at the full rate. In fact, two thirds of 401(k) assets are invested in equities where gains are taxed only when realized and both dividends and gains are taxed at a preferential rate of at most 15 percent.

To get a rough idea of the size of the tax expenditure requires only a few pieces of information: the amount contributed to 401(k)s, the rate of return earned on investments, the rate used to discount future values to the present, the length of time the money is held in the 401(k), and the average marginal tax rate before and after retirement.

Assume that the rate of return equals the discount rate and that, for the moment, all income is taxed at the same rate.<sup>13</sup> If contributions are \$280 billion, contributors are age 45, the money is withdrawn at 75, the nominal rate of return is 6 percent, and the average marginal tax rate is 25 percent, the tax expenditure for 2010 would be \$73 billion.

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*401(k)s cost the Treasury about  
\$50-70 billion per year.*

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This initial estimate is too high, because the cost of tax preferences for 401(k) plans also depends on the tax treatment of investments outside the 401(k) plan. As noted, the maximum rate on realized capital gains and dividends is 15 percent. The following exercise assumes that the one-third of 401(k) assets held in bonds is taxed at 25 percent and the majority of the two thirds held in equities is taxed annually at 15 percent (the remaining portion is taxed only once at age 75 at 15 percent).<sup>14</sup>

As shown in Table 1 below, the fact that realized capital gains and dividends are subject to lower rates reduces the cost of the tax expenditure. Assuming a 6-percent return and contributors are age 45, the tax expenditure falls to \$49 billion.

TABLE 1. TAX EXPENDITURES FOR 401(K) PLANS,\*  
ASSUMING THE SAME MARGINAL TAX RATE BEFORE  
AND AFTER RETIREMENT, IN BILLIONS

Rate of return and discount rate	Age of contributors			
	35	40	45	50
4%	\$45	\$41	\$36	\$31
6	60	55	49	43
8	72	66	59	52

\* Estimates also include other defined contribution plans.  
Source: Authors' calculations.

One more factor needs to be taken into account – namely, for a given tax structure, taxpayers may face a lower marginal rate in retirement than when working. A lower marginal rate raises the cost of the tax expenditure to the government. Assuming the average marginal rate for 401(k) participants drops from 25 percent to 20 percent, the tax expenditures for different contributor ages and rates of return are shown in Table 2.

TABLE 2. TAX EXPENDITURES FOR 401(K) PLANS,\*  
ASSUMING A LOWER MARGINAL TAX RATE AFTER  
RETIREMENT, IN BILLIONS

Rate of return and discount rate	Age of contributors			
	35	40	45	50
4%	\$58	\$54	\$49	\$44
6	73	67	62	55
8	85	79	72	64

\* Estimates also include other defined contribution plans.  
Source: Authors' calculations.

One could argue that tax rates are going to have to increase in the future so taxpayers may not see lower rates once they stop working; in this case, focusing simply on the value of deferral reported in Table 1 may be more reasonable. But if lower rates are included in the calculation, the tax expenditure in the case where contributors are age 45 and the rate of return and discount rate are 6 percent was about \$62 billion in 2010.

## The Importance of Tax Rates Outside 401(k) Plans

One of the major selling points for 401(k) plans has been their tax-preferred treatment under the federal personal income tax. But the value of the tax preference to individuals depends on the tax treatment of investments outside of 401(k)s.<sup>15</sup> And the taxation of capital gains and dividends has been reduced dramatically – particularly by President Bush's tax cuts – making saving outside of 401(k) plans relatively more attractive and lowering the value of the tax preference.

The intuition is clearest when comparing stock investments in a Roth 401(k) to a taxable account, as the amount initially saved is the same. (Remember the tax advantages to a conventional 401(k) and Roth are equivalent, assuming no change in tax rates before and after retirement.) Assume the tax rate on capital gains and dividends is set at zero. In both cases, the investor pays taxes on his earnings and puts after-tax money into an account. In the Roth 401(k) plan, he pays no taxes on capital gains and dividends as they accrue over time and takes his money out tax free at retirement. In the taxable account, he pays no tax on the dividends and capital gains as they accrue and takes the money out tax free at retirement. In short, the total tax paid under the Roth and the taxable account arrangement is identical.

How close is the assumption of a “zero” tax rate to the real world? Table 3 (on the next page) summarizes the maximum tax rates applied to capital gains and dividends since 1988. The 1986 tax reform legislation set the tax rate on realized capital gains equal to that on ordinary income. The capital gains tax rate became preferential in 1991-1996, not because it changed but because the rates of taxation of ordinary income increased. Subsequently, Congress explicitly reduced the tax rate on capital gains to 20 percent effective in 1997 and to 15 percent effective in 2003. Dividends traditionally were taxed at the rate of ordi-

TABLE 3. TOP TAX RATES ON ORDINARY INCOME, REALIZED CAPITAL GAINS, AND DIVIDENDS, 1988-PRESENT

Regime	Top tax rate		
	Ordinary income	Realized capital gains	Dividends
1988-1990*	28.0 %	28.0 %	28.0 %
1991-1992	31.0	28.0	31.0
1993-1996	39.6	28.0	39.6
1997-2000	39.6	20.0	39.6
2001	39.1	20.0	39.1
2002	38.6	20.0	38.6
2003 to present	35.0	15.0	15.0

\* In 1988-1990, the top rate on regular income over \$31,050 and under \$75,050 was 28 percent. Income over \$75,050 and under \$155,780 was taxed at 33 percent. And any income over \$155,780 was taxed at 28 percent. *Source:* Citizens for Tax Justice (2004).

nary income. That pattern was changed effective in 2003 when the rate on dividend taxation was reduced to 15 percent.

Table 4 shows how the difference in return between saving through a 401(k) plan and through a taxable account has narrowed over time.<sup>16</sup> The preferential tax treatment afforded 401(k)s in 1988 produced a difference in the after-tax annual rate of return of 1.4

TABLE 4. RETURNS FOR TAXPAYERS FACING MAXIMUM TAX RATE IN TAXABLE ACCOUNT AND 401(K) PLANS UNDER VARIOUS TAX LAWS

Regime	Annual rate of return		Difference (401(k) minus taxable account)
	Taxable account	401(k)	
1988-1990	3.4 %	4.8 %	1.4 %
1991-1992	3.2	4.7	1.5
1993-1996	2.6	4.2	1.7
1997-2000	2.8	4.2	1.4
2001	2.9	4.3	1.4
2002	2.9	4.3	1.4
2003 to present	3.7	4.5	0.7

Note: Returns assume appreciation of 6 percent per year, 2 percent from dividends and 4 percent from an increase in the price of the equities. Figures may not add to totals due to rounding.

*Source:* Authors' calculations based on rates in Table 3 and assumptions described in the text.

percent. This additional return may sound small, but over a thirty-year period it would result in 50 percent more retirement wealth. This difference in the after-tax rates of return did not change much until 2003, when it narrowed dramatically – to 0.7 percent – as Congress lowered the tax rate on both dividends and capital gains.

In short, the taxation of capital income outside has a major impact on the value of 401(k) tax preferences. Interestingly, many of the same people favor both tax preferences for 401(k) plans and favorable treatment for capital gains and dividends. The two goals are clearly inconsistent. The lower the tax rate on capital gains and dividends, the lower the tax preference for 401(k)s.

## The Implications of Reducing the Tax Expenditure for 401(k) Plans

Recent deficit reduction proposals would affect tax expenditures for 401(k)s. Both the National Commission on Fiscal Responsibility and Reform (co-chaired by Erskine Bowles and Senator Alan Simpson) and the Bipartisan Policy Center's Debt Reduction Task Force (co-chaired by Senator Pete Domenici and Alice Rivlin) recommended consolidating retirement accounts and capping tax-preferred contributions at the lower of \$20,000 or 20 percent of income. This change would limit the advantage of 401(k)s for higher earners. On the other hand, both commissions proposed taxing capital gains and dividends as ordinary income, which would increase the value of the favorable tax provisions. Others have proposed replacing the deduction for 401(k)s with a 30-percent government match on contributions up to \$20,000.<sup>17</sup>

The question is how such proposed changes would affect work-based savings plans, which currently are the only effective mechanism for retirement saving.

In all probability, employers would retain work-based saving plans even with smaller tax advantages. As noted, some economists have argued that employers view 401(k) plans as a useful mechanism for attracting a better class of worker. People who value 401(k)s are more careful with company equipment, take fewer sick days, and are generally more productive.<sup>18</sup> And employers could see such plans as a way to promote an orderly retirement process. Older

employees, whose productivity has declined, can stop working only if they have adequate resources. If employers see sufficient personnel management advantages, they will continue to sponsor these plans. After all, employer-based pensions – albeit the far more powerful management tool of the defined benefit plan – originated without any tax advantage.

On the other hand, people do not like locking their money up for long periods of time with limited access. Generally speaking, the money in 401(k) plans cannot be withdrawn until age 59½ without a 10-percent penalty. Borrowing is possible but only up to limited amounts. Thus, if owners, managers, and highly-compensated employees want equity investments and resist locking their money up without substantial tax advantages, 401(k) plans could be an endangered saving vehicle.

401(k) plans may not be perfect, but currently they are the only game in town. Virtually all saving by the working-age population currently takes place within employer-sponsored pension plans. Most individuals save virtually nothing on their own, other than through their home. Thus, a retrenchment of work-based pensions could lead to substantially less saving.

## Conclusion

The current tax treatment of 401(k) plans costs the Treasury revenue. This loss cannot be calculated simply by looking at the numbers on a cash basis, because the 401(k) tax advantage is a deferral, not a permanent exclusion. The correct approach is to calculate the present value of the revenue foregone, net of the present value of future tax payments, with respect to contributions made in a given year. Using this approach, tax expenditures for 401(k) plans amount to between \$50 and \$70 billion per year. The precise number depends importantly on the assumed rate of return and on whether workers face lower rates in retirement. The value of the tax expenditure is also sensitive to how capital income is taxed outside of 401(k)s. With realized capital gains and dividends taxed at a maximum of 15 percent, the relative advantage of 401(k)s has declined sharply.

Recent deficit reduction commissions have proposed capping the contribution eligible for favorable tax treatment at \$20,000 or 20 percent of income. Others have proposed replacing the deduction with a government match. Such changes would reduce the attractiveness of 401(k)s for high earners. On the other hand, the accompanying proposals to tax dividends and capital gains at the rates applied to ordinary income would enhance the value of the favorable tax provisions.

## Endnotes

1 Munnell (1982).

2 Ippolito (1997).

3 While the discussion focuses on 401(k)s, the analysis and the estimates of tax expenditures also apply to other qualified defined contribution plans, including money purchase, Keogh, 403(b), and SIMPLE.

4 Deferring taxes on the original contribution and on the investment earnings is equivalent to receiving an interest-free loan from the Treasury for the amount of taxes due, allowing the individual to accumulate returns on money that he would otherwise have paid to the government.

5 For withdrawals, the individual must be 59½ and the money must have been in the account for at least five years.

6 While the arithmetic says the tax treatment is the same, the two plans differ in terms of both perception and legalities. The most obvious issue of perception is that contributions to conventional 401(k)s produce an immediate tax cut. Roth 401(k)s do not provide tax relief today and therefore may not seem as appealing to the typical taxpayer. On the other hand, since no further taxes are required on a Roth 401(k), the individual knows that all the money in the account is available for support in retirement. Funds in a conventional account will be taxed upon withdrawal, so the amount available for support is always less than the account balance. In terms of legalities, the primary difference between the two types of 401(k)s is that the Roth 401(k) is more generous in terms of contribution amounts. This factor is not obvious given that individuals can contribute \$17,000 under either plan in 2012. But for the individual in, say, the 25-percent personal income tax bracket, a \$17,000 after-tax contribution is equivalent to \$22,667 before tax. Thus, in effect, the contribution limit is higher under the Roth 401(k). The Roth 401(k) also allows the individual to defer all distributions to after his death.

7 A Vanguard (2005) publication argues that because future rates are uncertain, employees ought to have both a conventional and a Roth 401(k).

8 See Tax Policy Center (2011).

9 The tax expenditure estimates do not necessarily indicate how much revenues would increase by eliminating the favorable provision because eliminating a tax expenditure may alter economic behavior or move individuals into another tax bracket.

10 U.S. Office of Management and Budget (2011). Some analysts who favor a consumption tax, such as Poterba (2011), do not characterize the tax treatment of pension saving as a tax expenditure.

11 The budget has details, but Lurie and Ramnath (2011) provide helpful background.

12 The 2013 *Budget* estimates the tax expenditure for 2011 at \$89 billion. This decrease from the 2012 *Budget* figure is probably the result of a lower assumed rate of return and lower initial contributions. One assumption that appears not to have changed is the way in which 401(k) money is invested. All the money is assumed to be invested in bonds; thus, if it were not in a 401(k), the income would be taxed annually at the full rate.

13 Using the same value for the discount rate and the rate of return avoids the possibility of tax arbitrage in which either the federal government or the taxpayer can earn greater returns by investing themselves. See Auerbach, Gale, and Orszag (2003) response to Boskin (2003).

14 The assumption is that the return to equities consists of a 2-percent dividend yield and a 4-percent capital gain. By law, dividends are taxed annually. The question is what to assume for the frequency of taxation of the capital gains. We assume that 50 percent of the capital gains are realized and taxed annually and 50 percent are held until age 75 and taxed at withdrawal.

15 This discussion focuses on higher earners, for whom alternative investments are a relevant consideration. But a similar phenomenon has occurred in the case of middle-income households. Through the growing use of tax credits, like the child credit, many middle-income households with children pay little or no federal income tax. For these households, the tax advantages offered by 401(k)s hold little attraction.

16 The returns are calculated net of taxes on wages, investment returns, and withdrawals, as appropriate, and are based on the following assumptions: 1) the worker earns \$1,000; 2) \$1,000, less any income taxes, is invested for 30 years in equities with a 6-percent return – 2 percent is paid out in dividends and 4 percent in the appreciation of the price of the stock; 3) the worker is in the maximum tax bracket; and 4) if the money is invested in a taxable account, 50 percent of the capital gains are realized and taxed annually and 50 percent are held until age 75 and taxed at withdrawal.

17 See Gale, Gruber, and Orszag (2006).

18 Ippolito (1997).



## References

- Auberbach, Alan J., William G. Gale, and Peter R. Orszag. 2003. "Reassessing the Fiscal Gap: The Role of Tax-Deferred Saving." *Tax Notes* 100 (July 28): 567-584.
- American Society of Pension Professionals & Actuaries. 2011. "Retirement Savings and Tax Expenditure Estimates." Arlington, VA.
- Bipartisan Policy Center Debt Reduction Task Force. 2010. "Restoring America's Future." Washington, DC: The Bipartisan Policy Center.
- Boskin, Michael J. 2003. "Deferred Taxes in the Public Finances." Working Paper. Stanford, CA: Hoover Institution.
- Citizens for Tax Justice. 2004. "Top Federal Income Tax Rates on Regular Income and Capital Gains Since 1916." Washington, DC.
- Gale, William G., Jonathan Gruber, and Peter R. Orszag. 2006. "Improving Opportunities and Incentives for Saving by Middle- and Low-Income Households." Discussion Paper 2006-02. Washington, DC: The Brookings Institution.
- Ippolito, Richard A. 1997. *Pension Plans and Employee Performance*. Chicago, IL: University of Chicago Press.
- Lurie, Ithai Z. and Shanthi P. Ramnath. 2011. "Long-run Changes in Tax Expenditures on 401(k)-type Retirement Plans." *National Tax Journal* 64(4): 1025-1038.
- Munnell, Alicia H. 1982. *The Economics of Private Pensions*. Washington, DC: The Brookings Institution.
- National Commission on Fiscal Responsibility and Reform. 2010. *The Moment of Truth*. Washington, DC.
- U.S. Department of Labor, Employee Benefits Security Administration. 2011. *Private Pension Plan Bulletin: Abstract of 2009 Form 5500 Annual Reports*. Washington, DC.
- U.S. Office of Management and Budget. 2011. "Tax Expenditures" in *Analytical Perspectives: Fiscal Year 2012 Budget of the U.S. Government*. Washington, DC.
- U.S. Office of Management and Budget. 2012. "Tax Expenditures" in *Analytical Perspectives: Fiscal Year 2013 Budget of the U.S. Government*. Washington, DC.
- Poterba, James M. 2011. "Introduction: Economic Analysis of Tax Expenditures." In *Economic Analysis of Tax Expenditures*, edited by James M. Poterba. *National Tax Journal* 64(2).
- Tax Policy Center. 2011. "Percent of Tax Filers by Marginal Tax Rate, Selected Years, 1985-2009." Washington, DC.
- Vanguard Center for Retirement Research. 2005. "Tax Diversification and the Roth 401(k)." Volume 18. Valley Forge, PA.

### About the Center

The Center for Retirement Research at Boston College was established in 1998 through a grant from the Social Security Administration. The Center's mission is to produce first-class research and educational tools and forge a strong link between the academic community and decision-makers in the public and private sectors around an issue of critical importance to the nation's future. To achieve this mission, the Center sponsors a wide variety of research projects, transmits new findings to a broad audience, trains new scholars, and broadens access to valuable data sources. Since its inception, the Center has established a reputation as an authoritative source of information on all major aspects of the retirement income debate.

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