DO TAX INCENTIVES INCREASE 401(K) RETIREMENT SAVING? EVIDENCE FROM THE ADOPTION OF CATCH-UP CONTRIBUTIONS

Matthew S. Rutledge, April Yanyuan Wu, Francis Vitagliano

BC13- Q20814F

Date Submitted: August 2014

Center for Retirement Research at Boston College
Hovey House
140 Commonwealth Ave
Chestnut Hill, MA 02467
Tel: 617-552-1762 Fax: 617-552-0191
http://crr.bc.edu

The research reported herein was pursuant to a grant from the U.S. Social Security Administration (SSA), funded as part of the Retirement Research Consortium (RRC). The findings and conclusions expressed are solely those of the authors and do not represent the views of SSA, any agency of the federal government, the RRC, or Boston College. The authors are indebted to the indispensable data analysis of Qi Guan, and would also like to thank Robin Jensen for excellent research assistance. The authors are grateful to Kelly Trageser, Gary Benedetto, and Martha Stinson for helping us access the SIPP synthetic data and re-running our code on the actual data.

DO TAX INCENTIVES INCREASE 401(K) RETIREMENT SAVING? EVIDENCE FROM THE ADOPTION OF CATCH-UP CONTRIBUTIONS

Matthew S. Rutledge, April Yanyuan Wu, Francis Vitagliano

Abstract

The U.S. government subsidizes retirement saving through 401(k) plans with $61.4 billion in tax expenditures annually, but the question of whether these tax incentives are effective in increasing saving remains unanswered. Using longitudinal U.S. Social Security Administration data on tax-deferred earnings linked to the *Survey of Income and Program Participation*, the project examines whether the "catch-up provision," which was enacted in 2001 and allows workers over age 50 to contribute more to their 401(k) plans, has been effective in increasing earnings deferrals. The study finds that contributions increased by $540 more among age-50-plus individuals constrained by the 401(k) tax-deferral limits relative to similar workers just under age 50, suggesting that the older individuals respond to the expanded tax incentives. For this group, the elasticity of retirement savings to the tax incentive is quite high: a one-dollar increase in the tax-deferred limit leads to an immediate 49-cent increase in 401(k) contributions.

Introduction

The Joint Committee on Taxation (2013) estimates that the tax-deferred treatment of defined contribution (DC) plans like 401(k)s will cost the U.S. federal government $61.4 billion in lost revenue in 2014. But researchers have not come to a consensus on whether this tax expenditure induces additional retirement saving (see Bernheim 2002 for a review). Indeed, whether retirement savings respond to *any* tax incentive is an open question. Chetty et al. (2014), using Danish data, find that 85 percent of savers are "passive": their saving rate increases only when it is done automatically. Ramnath (2013) finds no evidence that low-income Americans' retirement saving increases in response to the Saver's Tax Credit.[1]

The increase in the maximum tax-deferred 401(k) contribution for participants age 50 and older provides a natural experiment in whether savers respond to a change in the tax incentives. The Economic Growth and Tax Relief Reconciliation Act of 2001 for the first time allowed individuals age 50 and over to make "catch-up contributions" that extend the incentives for older workers. In 2014, the contribution limit is $17,500, but older workers can contribute an extra $5,500 per year.[2] The higher limit provides an incentive for workers previously constrained by the maximum to increase their tax-deferred savings, but does not change the incentives to save for workers unconstrained by the limit.

Evaluating the effect of the catch-up provision on 401(k) saving requires accounting for three factors: the fundamental differences between maximum contributors (who faced a change in incentives) and participants contributing a lower amount (who faced no change), the growth in 401(k) contributions over time, and the potential increase in saving with age. This study adopts a triple-differences framework, comparing the change in 401(k) contributions for maximum contributors just after age 50 to similar participants just under age 50, within a tight window around the policy change. The identification assumption is that maximum contributors at ages 50-53 are (conditionally) identical to maximum contributors at ages 46-49, except that the older

[1] Much of the literature focuses on whether the deferred taxes in defined contribution plans increase total retirement saving. Poterba, Venti, and Wise (1995) find that 401(k) saving is not offset by decreases in other financial assets. In contrast, Engen, Gale, and Scholz (1994) argue that most of the investment in IRA or 401(k) accounts reflects asset shifting, not new net capital accumulation.

[2] This study uses "401(k)" as shorthand for all defined contribution (DC) plans involving a salary deferral; the U.S. Department of Labor often summarizes these plans as "401(k)-type" plans. Similar catch-up allowances are in place for 403(b) and 457 plans, but these allowances were adopted earlier than for 401(k) plans. The tax records do not distinguish between 401(k), 403(b), and 457 plans, but 401(k) plans make up as much as 87 percent of DC plan enrollment (U.S. Department of Labor 2013). Similarly, "contributions" and "deferrals" are used interchangeably, because all deferrals become contributions.

group faces a higher deferral limit.[3] In that event, the differential increase in contributions for this older group from just before 2002 to just after is due to the adoption of the catch-up provision.

The existing literature documents the two non-policy factors that complicate the analysis. First, contributions have increased over time as workers have lost access to defined benefit pensions and have come to rely on 401(k)s as the sole source of employer-sponsored retirement saving (Poterba, Venti, and Wise 2008). Second, contributions may rise at age 50 not due solely to tax policy. The life cycle model predicts an increase in retirement saving around age 50, due to a combination of factors, e.g., children graduating from college (Gokhale, Kotlikoff, and Warshawsky 2002). Empirical evidence suggests that saving rates increased around age 50 between 0.5 and 1.2 percentage points, even before the adoption of catch-up contributions (Holden and VanDerHei 2001; Poterba, Venti, and Wise 2008; Joulfaian and Richardson 2001).[4]

This study estimates the triple-differences model using demographic and economic characteristics from the *Survey of Income and Program Participation* (SIPP) linked to administrative data on tax-deferred earnings from the U.S. Social Security Administration (SSA). We find that workers respond to the tax incentives in the catch-up contribution provision. After adoption of the catch-up contribution in 2002, workers age 50 and over constrained by the maximum deferral level increase their contributions by $540-1,020 more than the increase by similar workers under 50. This increase is between 3.5 percent and 6.5 percent of the maximum deferral level – about $13,000 – over this period. Adjusting for inflation, the deferral limit increased by 11.7 percent per year for participants age 50 and over, or 6.8 percentage points faster than the simultaneous increase in the limit for participants under age 50 (4.9 percent). The 3.5-6.5 percent increase in contributions represents 49-96 percent of the 6.8-percentage-point rise in the limit for the 50+ group; that is, the elasticity of retirement savings to the tax incentive is in the range of 0.49-0.96, depending on the model specification. Deferrals among maximum contributors just under age 50 – who faced smaller increases in the maximum deferral – also

[3] Another challenge is that maximum contributors just under age 50 also faced increasing deferral limits between 2002 and 2005. But because participants age 50 and over faced these same increases – and catch-up contributions on top of them – the triple-differences framework should difference out this increase.

[4] Other research finds that saving accelerates at younger ages, in one's mid-to-late 30s (Love 2007) or mid-40s (Cagetti 2003). Other studies find later acceleration; King and Dicks-Mireaux (1982) and Hubbard (1986) find that the ratio of net worth to permanent income increases into one's 60s, though these studies pre-date defined contribution plans. On the other hand, saving rates may never accelerate; Munnell and Sundén (2004) find a relatively constant 401(k) contribution rate after age 30.

increased by a large and statistically significant amount. These results suggest that contributors near the maximum have excess capacity for further tax-deferred saving and are quite sensitive to changes in the statutory limit.

The paper proceeds as follows. Section 2 discusses the institutional background behind 401(k) plans and the adoption of the catch-up contribution provision. Section 3 describes the SIPP *Completed Data File* and outlines the difference-in-differences and triple-differences methodology used in the regression models. Section 4 describes the results, and Section 5 concludes that the catch-up provision increased 401(k) deferrals among maximum contributors, demonstrating the sensitivity of their retirement saving to tax incentives.

Background: 401(k) Pensions and the Catch-Up Contribution

Though deferred compensation plans had existed for several decades, the Employee Retirement Income Security Act (ERISA) of 1974 set in motion the creation of the 401(k) pension plan, named after Section 401(k) of the IRS Code, which sanctions the use of salary reductions as a source of plan contributions. The law went into effect on January 1, 1980.

The Tax Reform Act of 1986 added a separate limit (IRS Code 402(g)) for salary deferral contributions into 401(k) plans. Previously the only limit on salary deferral contributions was the *total* defined contribution limit of $30,000 (in 1986) set by IRS Code 415. The 402(g) deferral limit was originally set at $7,000 and indexed to inflation thereafter.

The Economic Growth and Tax Relief Reconciliation Act in 2001 increased potential contributions in two ways. First, starting in 2002, the participant salary deferral limit was increased by $1,000 per year until reaching $15,000 in 2006; this increase exceeded the inflation adjustments previously in place. After 2006 the limit was indexed to inflation. Second, to further encourage retirement savings by older workers, added catch-up contributions to 401(k) plans, allowing participants age 50 or older to make additional salary deferral contributions into their 401(k) accounts. The limit on catch-up contributions into 401(k)s was $1,000 in 2002 and increased $1,000 per year until reaching $5,000 in 2006.[5]

Table 1 reports the 401(k) contribution limits for 1999-2005 in nominal and real (2005) dollars by age, demonstrating how catch-up contributions allowed the maximum deferral to

[5] It is important to note that the catch-up contribution amounts (IRS Code 414(v)) are not subject to non-discrimination tests. This allows for the age-eligible highly compensated participants to take full advantage of the catch-up contributions, notwithstanding any plan constraints due to the non-discrimination testing and limits.

increase rapidly for participants approaching retirement. Adjusting for inflation, the deferral limit increased by 11.7 percent per year from 2002-2005 for participants age 50 and over, 4.9 percentage points of which is due to speeding up the increase in the limit for all ages. The catch-up provision increased the real limit by the remaining 6.8 percentage points.

In 2014, the maximum 402(g) elective deferral amount is $17,500. The maximum 414(v) catch-up amount is $5,500. The total employer and employee contributions permitted in a DC plan (415 limits) for any participant is $52,000. Thus an age-eligible participant might be able to contribute a total of $23,000 in salary deferrals into his 401(k) account and receive an additional $29,000 of employer contributions and/or match contributions.

Contributions under the tax-deferred limit lower the worker's tax liability in the year in which they are contributed. When the funds are distributed after age 55 (assuming the worker is no longer employed at the firm that sponsored the 401(k) plan, in which case the penalty-free age is 59½), the participant is responsible for paying taxes on both the original contribution and the return it has earned. The working-age participant benefits from this arrangement in several ways. First, the increase in the tax burden is in the uncertain and heavily-discounted future, while the reduction in the tax burden is in the present. Second, the government essentially gives the participant an interest-free loan for the tax burden, which the participant can re-invest to build up a larger 401(k) balance (Gokhale, Kotlikoff, and Warshawsky 2002). Third, the participant benefits if his future tax burden is calculated from a lower marginal tax rate when the funds are withdrawn than when they are earned.[6]

A few existing studies have evaluated the catch-up provision but fail to reach a consensus on whether this provision induces additional retirement saving. Orszag (2004) reports that only 5 percent of individuals in the 2001 Survey of Consumer Finance contributed the maximum. Similarly, Kawachi, Smith, and Toder (2005) find that only 7.5 percent of participants contributed the IRS maximum in 2001, with that proportion actually decreasing in 2002 and 2003 as some older households chose not to take advantage of the catch-up provision. In contrast, Holden et al. (2005) suggest that after the catch-up provision was adopted for Individual

[6] This study focuses on traditional 401(k) plans, as the data is limited to tax-deferred contributions. In recent years workers have had access to Roth 401(k) plans, where contributions are post-tax, but withdrawals are never again taxed – effectively making earnings on those plans tax-free. Munnell, Quinby, and Webb (2012) emphasize that, if the participant faces the same marginal tax rate pre- and post-retirement and the discount rate equals the market rate of return, traditional and Roth 401(k) plans yield the same after-tax value. The comparison to taxable accounts discussed above holds for either 401(k) type, but the data limits our analysis to traditional plans.

Retirement Accounts (at the same time as 401(k) plans), one-third of previously constrained older households took advantage of the higher limits, and each of those households in their sample contributed precisely the maximum. These analyses of retirement saving around the time that catch-up provisions were adopted are largely descriptive and do not attempt to measure the causal increase in contributions among contributors near the maximum.

This study is, to our knowledge, the first to examine the change in 401(k) saving induced by the change in tax incentives from the adoption of catch-up contributions. It uses administrative data that should be a more accurate measure of deferred earnings than would be available in a household survey alone, while connecting this administrative data to detailed information on demographics and economic circumstances not available in administrative data alone. Making use of a natural experiment allows us to explore how retirement saving responds to tax incentives. The results of this study add to our understanding of the effects of tax incentives on saving.

Data and Methodology

This study uses the SIPP Synthetic Beta (SSB), a data product that allows users to link the SIPP household survey to administrative earnings records without requiring access to the restricted data (Abowd, Stinson, and Benedetto 2006).

In the public-use SIPP, each individual in a household is interviewed every three months over the two to five years in their panel about a wide range of topics, including labor market outcomes, public program participation, demographics and family structure, and health insurance coverage. A subset of essential SIPP variables is then linked, via Social Security Number, to an SSA-produced extract from tax records, including an individual's total annual tax-deferred earnings for each year from 1978-2006; this study examines a smaller window of tax records: three years before the adoption of the catch-up provision (1999-2001), the year of its adoption (2002), and three years after its implementation (2003-2005).[7]

The SSB alleviates privacy disclosure concerns by allowing researchers to first run their analysis on synthesized data and then re-run the analysis on actual data. The synthesis first

[7] The SSA Detailed Earnings Record file separately records FICA-taxable and non-FICA earnings. This study uses the total deferred earnings, i.e. the sum of the FICA and non-FICA deferred earnings variables. The Summary Earnings Record, also available via the SSB, contains earnings up to the FICA taxable maximum dating back as far as 1951. A new version of the SSB due to be released this summer will include earnings up to 2011, but these more recent years of earnings are not necessary for this project.

involves imputing missing values for a subset of essential SIPP variables to create four implicates called the SIPP *Completed Data Files*, each the result of separate imputations. Finally, each variable in each implicate – with the exception of gender, spouse's identifier, and type of Social Security benefit – is synthesized four times to create a total of 16 SSB implicates. The synthetic data aim only to match unconditional means of the public-use SIPP variables, so conditional analysis for selected subsamples is not meaningful. With this consideration, the results reported in this paper are the average of the estimates produced from the four implicates of the *Completed Data Files*; other than imputed values, therefore, the analysis uses actual, rather than synthetic, data.[8]

The sample includes any individual matched to the SSA earnings records who was age 46-53 at some point between 1999 and 2005, even if that individual were sampled by the SIPP outside of that window (Table 2).[9] The primary sample excludes individuals who failed to accumulate enough earnings to qualify for four credits toward SSA "insured status" in every year in which they were age 46-53 between 1999-2005.[10] This restriction eliminates many workers with low or inconsistent earnings who are less likely to be offered a 401(k), less likely to be eligible to participate, or less likely to contribute even if they were eligible (Wu and Rutledge 2014).[11] The sample further excludes anyone reporting the inability to work due to a health condition while they were sampled by the SIPP, as individuals with work-preventing health conditions may save more to make up for the risk of an earlier retirement, or are less able to save due to diminished earning capacity.[12]

The dependent variables (y) in the regressions are, separately, individual i's annual total tax-deferred earnings in 2005 dollars (adjusted by the Consumer Price Index for all urban consumers), or the contribution rate, i.e., the ratio of total deferred earnings to total earnings in

[8] SSB results are available upon request.
[9] Most of the control variables in the regression model are time-invariant for middle-aged individuals, including education, marital status, and children's ages. Other variables, including net worth quartiles, pension coverage, and blue collar status, are from the specific SIPP interview and should be interpreted with caution; e.g., the coefficient on blue collar should be interpreted as "those who reported working blue collar at one time."
[10] Workers earn as many as four "quarters of coverage" or "credits" per year for every multiple of a specific threshold of FICA-taxable earnings. That threshold is adjusted annually to account for wage inflation. In 1999 (2005), a worker earned one credit for every multiple of $740 ($920) of earnings, up to the maximum of four credits. Our employment variable marks someone as a non-worker even if they earned as much as $2960-3680 (nominal) in a year, but anyone earning less than this level is very unlikely to be eligible for, or take up, a pension plan.
[11] The results are robust to the inclusion of any individual earning at least four credits in the given year.
[12] All analyses are unweighted, as the SIPP Synthetic and Completed Files do not include weights that account for the possibly-unrepresentative match to the SSA data.

year *t*. The regression is a linear difference-in-differences (DID) model, where the more basic specification is of the form:

$$y_{it} = \alpha_0 + \alpha_1 CUC_t + \beta_1 Age50_{it} + \delta_1 CUC_t Age50_{it} + \gamma' X_{it} + \tau_t + \nu_{it}, \qquad (1)$$

CUC_t is an indicator variable equal to one if the catch-up contribution has been adopted (i.e., $t \geq 2002$). $Age50_{it}$ is an indicator variable equal to one if *i* is age 50 or older in year *t*, and hence eligible for catch-up contributions if the provision is in place. The DID coefficient of interest is δ_1, the interaction effect of CUC_t and $Age50_{it}$. A positive and significant interaction coefficient indicates that the step-up in 401(k) contributions at age 50 and older is greater for individuals after the adoption of catch-up contributions compared to the control group, participants who are not yet 50.

Those individuals most likely to respond to the legal change should be those who are at or near the limit before 2002. In the preferred specification, we include an indicator variable (Max_{it}) equal to one if the individual has any years in which he contributed within 10 percent of the maximum at any previous age, and interact that variable with CUC_t, the age indicators, and the interaction of age with CUC_t:

$$y_{it} = \alpha_0 + \alpha_1 CUC_t + \alpha_2 Age50_{it} + \alpha_3 Max_{it} + \alpha_{12} CUC_t Age50_{it} + \qquad (2)$$
$$\alpha_{13} CUC_t Max_{it} + \alpha_{23} Age50_{it} Max_{it} + \alpha_{123} CUC_t Age50_{it} Max_{it} + \gamma' X_{it} +$$
$$\tau_t + \nu_{it},$$

A positive and statistically significant coefficient on the triple interaction (α_{123}) indicates that previously constrained participants increase their contributions at age 50 by more than maximum-contributors under 50 after the adoption of the catch-up provision.[13]

In both specifications, τ is a series of year dummies. *X* is a vector of personal characteristics including gender, race, Hispanic origin, educational attainment, being foreign

[13] The coefficient on the interaction of age 50+ and post-2002 (α_{13}) may be of interest on its own; this coefficient would indicate whether those who have *not* been constrained by the legal deferral limit increase their contributions at age 50 by more after the catch-up provision, perhaps because of increased outreach efforts from their 401(k) providers or employers anticipating increases in funds cycling through the pension system.

born, marital status, having a working spouse, earnings terciles, net worth quintiles, homeownership, working in a blue-collar occupation, Census geographic region, and calendar year. Because parents may reduce their 401(k) contributions while their children are in college, *X* includes an indicator for the presence of children between the ages of 18 and 24, as well as an indicator for having children under 18, which either reduces the ability to save relative to non-parents or parents of kids above 24 or increases the incentive to save in anticipation that the parents will miss contributions during the college years. Finally, *X* includes indicators representing whether the individual reports having a defined benefit (DB) pension or defined contribution (DC) pension at their current job during his SIPP sampling window. Because the timing of the information on pension type does not necessarily correspond to the 1999-2005 window for deferred earnings, these variables should be interpreted as "ever having a DB" or "ever having a DC."[14]

We also estimate a more flexible functional form with respect to age:

$$y_{it} = \alpha_0 + \alpha_1 CUC_t + \sum_{a=47}^{53}(\beta_a D_{iat} + \delta_a D_{iat} CUC_t) + \gamma' X_{it} + \tau_t + \nu_{it}, \qquad (3)$$

D_{iat} is equal to one if the individual *i* is age *a* in year *t*; the omitted age is 46. The DID coefficients of interest in this specification are δ_a's. We test whether each individual δ_a is statistically distinct from zero, and whether the sum of $\delta_{50} + \delta_{51} + \delta_{52} + \delta_{53}$ is statistically distinct from the sum of $\delta_{47} + \delta_{48} + \delta_{49}$, which indicates that 401(k) contributions increased differentially for catch-up eligible individuals after the adoption of the catch-up provision. The omitted category is age 46. A triple-differences version of this equation is also estimated.

We also take advantage of the longitudinal nature of the data to estimate fixed effects versions of equations (1) and (2). Finally, we estimate the preferred specification, equation (2), within relevant subsamples, to determine whether the sensitivity to tax incentives varies by gender, education, the age of the individual's children, and net worth.

[14] Unfortunately. the SSB does not include an indicator for whether the individual has had a DB pension from a previous job. Individuals who can count on significant DB pension income will be less inclined to contribute to 401(k) plans in their later-career jobs. Limiting our sample to workers age 46-53 likely eliminates many early retirees and individuals who switch to "bridge jobs" because they no longer need to accrue DB pension benefits, and most workers who have had a DB pension only through jobs they held before age 50 will not have accumulated a significant DB pension, and so 401(k) contributions are still attractive.

Results

Figure 1 displays average, real 401(k) contributions over time for workers age 46-53. Deferred earnings trend upward over this period as DC pension plans continued the gradual replacement of DB plans, though the upward movement was halted in 2001 by the onset of the recession. The contribution level exhibits only a small jump of 2.2 percent between 2001 and 2002 when the catch-up provision was adopted. By 2004, however, real contributions have increased by nearly 10 percent, and are ultimately 11 percent above their 2001 level by the end of the sample period in 2005. The end of the "jobless recovery" from the 2001 recession complicates the analysis, but the delay in the increase in contributions is also consistent with workers taking time to learn about, and adjust to, the higher deferral limit.

Of course, fewer than 10 percent of the sample is constrained by the legal maximum deferral either before or after age 50, making their impact hard to detect at the macro level. To account for the shift from DB to DC pensions and the few 401(k) participants constrained by legal maximums, Figures 2 and 3 decompose the sample by pension type (having only a DC plan or having both DB and DC plans during the SIPP window) and whether the worker was at or near the maximum deferral at any point between ages 46 and 53.[15,16] Among those who never contributed at the maximum, contributions increased in real terms in nearly every period for each age group and pension type (Figure 2). Even though all participants in this figure are unconstrained by the maximum, contributions increased the most for DC-only and DB-and-DC participants at ages 50-53 – by 7.0 and 6.7 percent per year, respectively, over the 2001-2005 period.

Among maximum contributors, each of the four age-pension type groups in Figure 3 increased their contributions between 2001 and 2005. This increase tells us very little, since the limit increased 4.8 percent, from $10,500 to $11,000, before accounting for the catch-up provision. Once we account for the catch-up provision, not surprisingly, the over-50 participants increased their contributions more than the younger group; between 2001 and 2005, contributions increased by an average of about 14 percent per year for participants age 50-53, compared to 7 percent per year for participants age 46-49.

[15] This criterion differs from the indicator from the regression analysis, which is equal to one if the individual was at or near the maximum at any earlier age.

[16] Appendix Table A1 indicates that 91 percent of individuals are never at the maximum between ages 46-53, and those participants who do rarely stay there for long: just less than a quarter of those who ever contribute within 10 percent of the legal maximum defer at level in all years in the sample.

Interestingly, in all three figures, the initial response to the catch-up provision is small and often contrary to theory. In the first year of the provision, for example, maximum contributors under age 50 increased their contributions by more (about 6 percent) than maximum contributors age 50 and over (about 5 percent). By 2005, however, the theoretical prediction rings true in each case. This finding suggests that participants may have been slow to learn about the availability of catch-up contributions, and slow to adjust their deferrals to take advantage of the tax incentive.

Table 3 reports summary statistics by age and year. Consistent with Figures 1 through 3, deferred earnings have increased for all ages over time, but fewer individuals are reaching the maximum contribution, in part because it is increasing throughout this time. The 2002-2005 period includes most of the recession and "jobless recovery," so earnings and total net worth are lower, but both variables increase with age by similar amounts between 1999-2001 and 2002-2005. Most other variables are similar between the two periods and between age groups within a period.[17] Surprisingly, individuals in the later period are less likely than in the earlier period to be work-limited and slightly less likely to have bachelor's and graduate degrees, but most other trends over time and by age – more racial and ethnic minorities, more foreign born, and more spouses employed in younger groups and in the later period – fit broader patterns in the population. Because of the large sample size, nearly all of the differences are statistically significant, but none of them are substantively large.[18]

The analysis of interest, however, is the triple-differences framework, which further differentiates near-maximum contributors from those who have never previously approached the deferral maximum. Maximum contributors, of course, are quite different from participants who never approach the maximum (Table 4). They earn approximately $163,000 and have net worth of $440,000, compared to $57,000 and $200,000 in the sample overall. They are more likely to be male, married, white, and have at least a college degree, and are less likely to have children under 24 or a work-limiting health condition. The differences between pre- and post-adoption of

[17] The relative consistency in DB and DC coverage rates between the two periods seems, at first glance, inconsistent with trends away from DB plans and toward DCs. But the DB and DC coverage indicators derive from the SIPP; because respondents could be sampled by SIPP at any time, the time periods matching these pension coverage indicators do not necessarily correspond to the 1999-2001 and 2002-2005 in the column heading.

[18] Similarly, a Heckman and Hotz (1989) regression of an indicator for inclusion in the treatment group (being observed at 50-53) on the characteristics of individuals before age 50 also finds that nearly every coefficient is statistically significant, but the magnitudes are small, so treatment and control groups should be sufficiently similar for the difference-in-differences analysis to be valid.

the catch-up provision by age are similar to the differences in the overall sample: earnings and net worth fell between periods but increases with age, and changes between periods in demographics and family structure are consistent with overall trends.

The linear regression model formalizes the comparison of deferred contributions over time by age. Table 5 reports the results from the simpler specification (equations 1 and 2). The sample is limited to individuals who earn four credits in each of the years between 1999 and 2005 in which they were ages 46-53. The first two columns report the results from the model where the dependent variable is the real annual 401(k) contribution level, without and with the triple-interaction with contributing at the maximum deferral level at some point at ages 46-49. The latter two columns report estimates where the dependent variable is the 401(k) contribution rate (i.e., the ratio of deferred earnings to total earnings).

The results without the triple-interaction (columns 1 and 3) indicate that contributions increase over time but are not statistically greater after age 50. Among individuals who have not yet reached age 50, deferrals are a statistically significant $597 higher after 2002, the equivalent of 22 percent of the average deferral of $2,706. Among all workers, contributions do not increase by more for age-50-plus workers relative to workers under age 50 after the adoption of the catch-up provision. The deferral rate is 0.26 percentage points (or 6 percent of the mean) higher for those who are over 50, and the rate increases after 2002 by 0.52 percentage point (13 percent of the mean), but the ratio does not increase for age 50-plus participants after the catch-up provision's adoption.

The triple-differences model finds a statistically significant increase in contributions among workers 50 and older after the adoption of the catch-up provision relative to workers just under 50. Workers younger than 50 who have been near the maximum contribute a statistically significant $917 more after 2002, likely due to the higher maximum for all ages. The large and statistically significant triple interaction indicates that the group that *is* eligible for catch-up contributions, on the other hand, increases contributions by an additional $543 per year, in response to the change in the deferral limit. This increase is 20 percent of the mean, and 3.5 percent of the average maximum deferral level. Over the 2002-2005 period, the real increase in the maximum contribution for workers age 50 and over was 11.7 percent, or 6.8 percentage points larger than the increase in the maximum for workers under age 50 (Table 1). Therefore, the elasticity of savings with respect to the change in the maximum deferral is 3.5/6.8, or 0.51.

These results suggest that those contributors near the maximum are quite sensitive to the change in tax incentives.

The other interactions emphasize that only workers affected by the adoption of the catch-up provision increase their contributions. The interaction between the indicators for age-50-plus and 2002-and-later is statistically insignificant, small, and negative, suggesting that workers over 50 in the latter period contribute no more than under-50 workers in that period. The interaction between the indicators for age-50-plus and being at the maximum is actually negative and statistically significant, suggesting that, before 2002, participants who had ever contributed near the maximum deferred somewhat more before age 50 than at 50 and older.

The triple-interaction coefficient when the outcome is the deferral rate is also statistically significant and of almost exactly the same magnitude relative to the mean (21.5 percent). Other coefficients are similar to the deferral estimates; notably, contributions also increase by a statistically significant amount for workers age 46-49 after 2002.

Other estimates in Table 5 are largely consistent with predictions. The highest earners and workers with high wealth contribute more, as do married workers. Having children is associated with lower contributions not just when the child is college-aged, but during their pre-college years. Rather than being lower because 401(k) wealth is less necessary for people with a DB pension, their contributions and the deferral rate are actually statistically significantly higher, suggesting either that these workers may select into jobs with generous pension benefits or that DB pension holders earn higher wages (though the regression model includes the earnings tercile). In results that are suppressed for space, contributions and deferral rates are larger with more education and are lower for blacks, though Hispanic origin, being born abroad, and the region in which the individual currently resides are not statistically significantly correlated with deferred earnings or rates.

The results in Table 6 allow for separate estimates of 401(k) contributions at each age between 47 and 53, relative to contribution levels or rates at age 46 (the omitted condition). For brevity, we report just the coefficients for age and its interactions, but other variables have coefficients that are similar to the results in Table 5. As in Table 5, contributions are larger in 2002-2005 than in 1999-2001, and the difference-in-differences estimates indicate that the deferral rate is higher for workers 50 and over than for 46-year-olds, though only before 2002

(column 3). But the interaction coefficients in the difference-in-differences models are all statistically insignificant (columns 1 and 3).

The triple-difference model, on the other hand, tells a story that is very consistent with Table 5 and with predictions. Individuals who have never been near the maximum deferral level contribute no more after 2002 than they did before 2002. Workers who have been at the maximum, on the other hand, contribute differentially more after 2002 when they are 50 and over, as we would expect if they were reacting to the implementation of the catch-up provision. The age-50-plus triple-interaction coefficients are each statistically significantly different from the omitted condition – 2002-and-later contributions made by 46-year-olds who have been near the maximum – and the 50-plus coefficients are collectively statistically significantly greater than the sum of the triple-interaction coefficient at ages 47, 48, and 49. Furthermore, the coefficients are large: these workers defer $869-$1,129 more after catch-up contributions become available than similar individuals defer before 2002, or 6.4 percent of the average real maximum deferral level over 2002-2005. At the same time, the triple interactions for ages 47 through 49 represent a 1.8 percent increase over the mean, relative to age 46. This 4.6-percentage-point difference represents 68 percent of the 6.8 percentage point increase in the maximum deferral level, implying an elasticity of 401(k) contributions with respect to the deferral limit of 0.68. This estimated elasticity is similar to the 0.51 implied by the results in Table 5, which is to be expected given that the qualitative conclusions from the two tables are similar.

The longitudinal nature of the deferred earnings data allows for the estimation of a fixed-effects regression, where the individual's contribution in any given year – in particular, after catch-up contributions become available – is compared to his average contributions over the sample window. The triple-differences coefficient in Table 7 is nearly twice as large as in Table 5 and is strongly statistically significant. The $1,020 increase in contributions in 2002 and later for workers age 50-53 relative to workers who are just under 50 is 6.5 percent of the maximum deferral, implying an elasticity of 0.96 – that is, nearly a one-for-one increase in contributions with the increase in the maximum. Other estimates are similar, except that the interaction of the ever-at-maximum and post-2002 indicators is small and statistically insignificant, implying that workers age 46-49 have no discernible increase in their contributions after the adoption of catch-up contributions.

The above results include some workers who do not have access to DC pensions during the period of interest (because this information is only known during the SIPP window). Though the information may not overlap with the 1999-2005 period, the first and third columns of Table 8 limit the sample to individuals who report having a DC pension in the SIPP. The triple-difference coefficient is somewhat larger, but the standard errors increase by more, resulting in estimates that just miss statistical significance at the 90 percent level. The larger standard errors are not surprising, considering that the period in which DC pension participation is measured does not necessarily match up with the period in which we measure deferred earnings. The results in columns 2 and 4 of Table 8 – which limit the sample to individuals with positive deferrals, thereby using information from the same period as the outcome of interest – are more consistent with the earlier results, with similar levels of significance despite the smaller sample size.

Table 9 tests the robustness of the triple-difference results on selected sub-samples: by gender, educational attainment, the age of the workers' children, and net worth. The smaller samples make most of the triple-difference coefficients fall just short of statistical significance, but the magnitudes are on the same scale. Women and the wealthy appear to be the most sensitive to the tax incentives to contribute to 401(k)s, with statistically significant triple-difference coefficients that are larger than the main result in Table 5. More striking is the consistency with which workers of any age who have been max contributors in the past defer more after 2002 – nearly every coefficient in the first column is statistically significant and substantively large. Though attributing this increase to tax incentive sensitivity is difficult, the deferral limit did increase for all ages during this period.

Conclusions

This paper examines whether the catch-up provision, which allows workers over 50 to contribute more to their 401(k) plans, has been effective in increasing 401(k) saving. Our results suggest that workers over age 50 constrained by the maximum deferral level increase their contributions by about $540-1,020 more than the increase by similar workers under 50 (who also contribute more in response to higher deferral limits). The older group is quite sensitive to the change in tax incentives: the elasticity of retirement savings with respect to the tax deferral limit for this group ranges from 0.51 to 0.96, depending on the comparison group. This high elasticity

among maximum contributors, who tend to be higher earners, is consistent with Bernheim and Scholz (1993), who find that higher-income individuals are more responsive to the after-tax rate of return on savings than lower-income individuals.

Further work is needed to fully understand the implications of this increase in 401(k) contributions induced by the catch-up provision among previously constrained older workers. Researchers have reported conflicting evidence on the extent to which saving through private-sector DB and DC plans crowds out private saving. Poterba, Venti, and Wise (1995), on the one hand, argue that 401(k) plans generate an increase in net retirement saving, while Engen, Gale, and Scholz (1994) find that savers only shift assets. Chetty et al. (2014) suggest that tax expenditures do not increase total saving. Even active savers who respond to tax subsidies only shift assets across savings without increasing the total amount they save. While this study finds that contributors near the maximum are quite sensitive to the maximum deferral, whether the increase in 401(k) contributions is a substitution from other accounts or an increase in total saving remains unclear.

The findings of this study also contribute toward the literature evaluating the trade-off between further tax expenditures and increased retirement saving. The increase in 401(k) contributions for the 10 percent who are previously constrained may or may not have resulted in an increase in retirement saving on net. If it did, further research would be needed to understand whether this increase is sufficient to counteract the additional deadweight loss from the increase in the 401(k) tax expenditure.

References

Abowd, John M., Martha Stinson, and Gary Benedetto. 2006. *Final Report to the Social Security Administration on the SIPP/SSA/IRS Public Use File Project*. Available at http://www2.vrdc.cornell.edu/news/wp-content/uploads/2007/11/ssafinal.pdf

Bernheim, B. Douglas. 2002. "Taxation and Savings," in *Handbook of Public Economics* Volume 3, Alan J. Auerbach and Martin Feldstein, eds. Amsterdam: North-Holland.

Bernheim, B. Douglas, and John Karl Scholz. 1993. "Private saving and public policy." In *Tax Policy and the Economy, Volume 7*, edited by James Poterba. Cambridge, MA: MIT Press.

Cagetti, Marco. 2003. "Wealth Accumulation over the Life Cycle and Precautionary Savings." *Journal of Business & Economic Statistics* 21(3): 339-353.

Chetty, Raj, John N. Friedman, Soren Leth-Petersen, Torben Nielsen, and Tore Olsen. 2014. "Active vs. Passive Decisions and Crowdout in Retirement Savings Accounts: Evidence from Denmark." Working Paper 18565. Cambridge, MA: National Bureau of Economic Research.

Engen, Eric, William Gale, and John Karl Scholz. 1994. "Do Savings Incentives Work?" *Brookings Papers on Economic Activity* 1994(1): 85-180.

Gokhale, Jagadeesh, Laurence J. Kotlikoff, and Mark Warshawsky. 2004. "Life-Cycle Saving, Limits on Contributions to DC plans, and Lifetime Tax Benefits." In *Private Pensions and Public Policies*, edited by William G. Gale, John B. Shoven, and Mark J. Warshawsky, 146-188. Washington, DC: Brookings Institution Press.

Heckman, James and Joseph V. Hotz. 1989. "Choosing among Alternative Nonexperimental Methods for Estimating the Impact of Social Programs: The Case of Manpower Training." *Journal of the American Statistical Association* 84(408): 862-74.

Holden, Sarah and Jack VanDerhei. 2001. "Contribution Behavior of 401(k) Plan Participants." *Investment Company Institute Perspective* 7(4): 1-20.

Holden, Sarah, Kathy Ireland, Vicky Leonard-Chambers, and Michael Bogdan. 2005. "The Individual Retirement Account at Age 30: A Retrospective." *Investment Company Institute Perspective* 11(1): 1-24.

Hubbard, R. Glenn. 1986. "Pension Wealth and Individual Saving: Some New Evidence." *Journal of Money, Credit, and Banking* 18(2): 167-178.

Joint Committee on Taxation. 2013. *Estimates of Federal Tax Expenditures for Fiscal Years 2012-2017*. Washington, DC: U.S. Government Printing Office.

Joulfaian, David and David P. Richardson. 2001. "Who Takes Advantage of Tax-Deferred Saving Programs? Evidence from Federal Income Tax Data." *National Tax Journal* 54(3): 669-688.

Kawachi, Janette, Karen E. Smith, and Eric J. Toder. 2005. "Making Maximum Use of Tax-Deferred Retirement Accounts." Working Paper 2005-19. Chestnut Hill, MA: Center for Retirement Research at Boston College.

King, Mervyn A. and L-D. L. Dicks-Mireaux. 1982. "Asset Holdings and the Life-Cycle." *Economic Journal* 92(366): 247-267.

Love, David A. 2007. "What Can the Life-Cycle Model Tell Us About 401(k) Contributions and Participation?" *Journal of Pension Economics and Finance* 6(2): 147-185.

Munnell, Alicia H., Laura Quinby, and Anthony Webb. 2012. "What's the Tax Advantage of 401(k)s?" Issues in Brief 12-4. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Munnell, Alicia H. and Annika Sundén. 2004. *Coming Up Short: The Challenge of 401(k) Plans*. Washington, DC: Brookings Institution Press.

Orszag, Peter R. 2004. *Progressivity and Saving: Fixing the Nation's Upside-Down Incentives for Saving.* Testimony before the House Committee on Education and the Workforce, February 25, 2004.

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

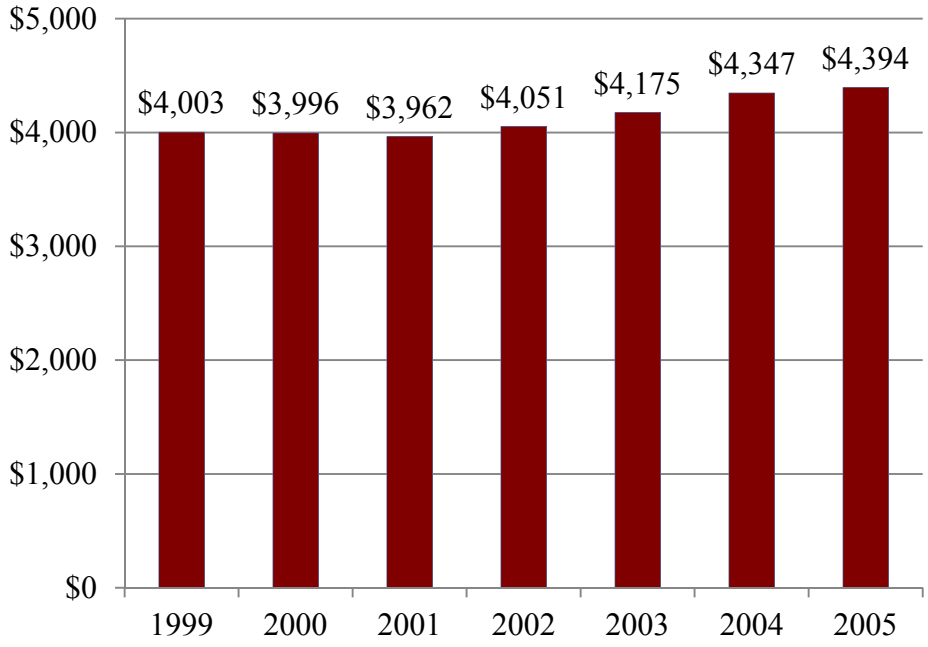
Poterba, James M., Steven F. Venti, and David A. Wise. 2008. "New Estimates of the Future Path of 401(k) Assets." In *Tax Policy and the Economy, Volume 22*, edited by James M. Poterba. Chicago, IL: University of Chicago Press.

Ramnath, Shanthi. 2013. "Taxpayers' Responses to Tax-Based Incentives for Retirement Savings: Evidence from the Saver's Credit Notch." *Journal of Public Economics* 101: 77-93.

U.S. Department of Labor. 2013. *Private Pension Plan Bulletin: Abstract of 2011 Form 5500 Annual Reports*. Washington, DC: U.S. Department of Labor Employee Benefits Security Administration.

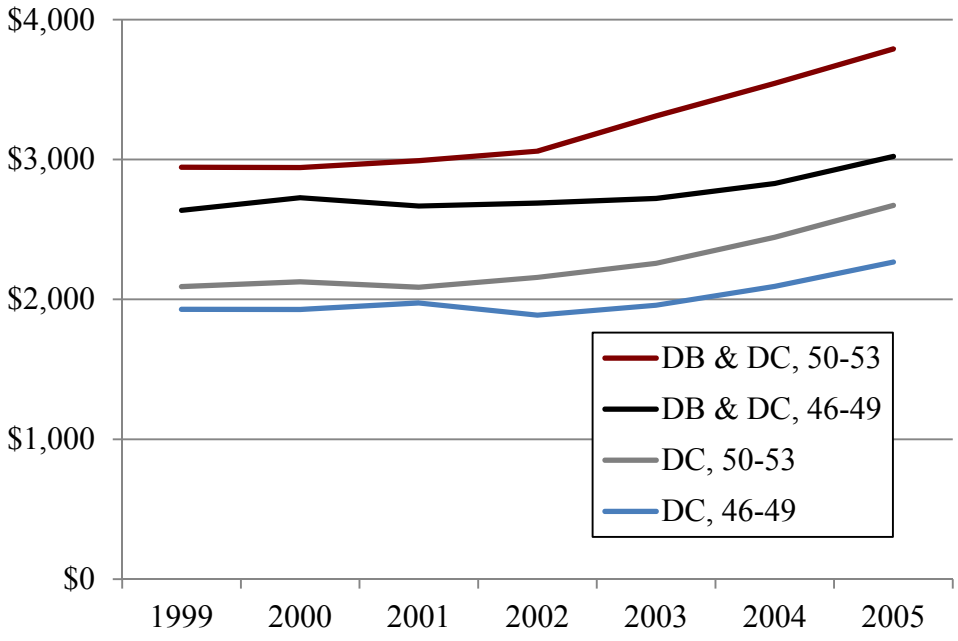
Wu, April Yanyuan and Matthew S. Rutledge. 2014. "Lower-income Individuals Without Pension: Who Misses Out and Why?" Working paper 2014-2. Chestnut Hill, MA: Center for Retirement Research at Boston College.

Figure 1. *Average Deferred Earnings over Time*



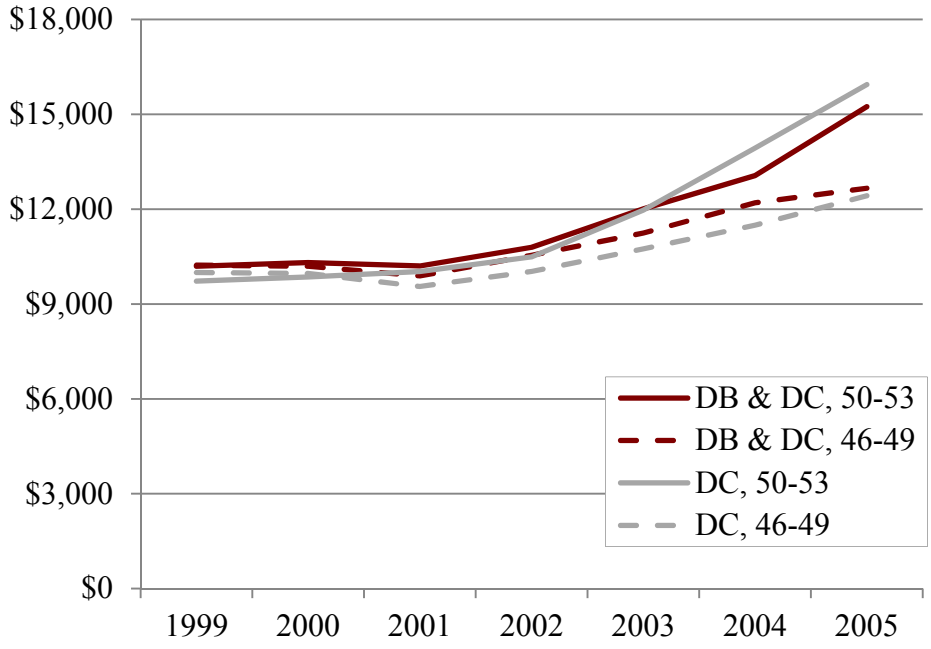
Source: Authors' calculations from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Figure 2. *Average Deferred Earnings by Age and Pension Type: Workers Who Are Never Near the Tax-Deferred Maximum*



Source: Authors' calculations from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Figure 3. *Average Deferred Earnings by Age and Pension Type: Workers who Are Ever Near the Tax-Deferred Maximum*



Source: Authors' calculations from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Table 1. *401(k) Deferral Limits by Age*

Year	Nominal limit	Catch-up limit	Real (2005$) limit		Real YoY increase	
			Age < 50	Age ≥ 50	Age < 50	Age ≥ 50
1999	$10,000	$0	$11,723	$11,723	-2.2 %	-2.2 %
2000	10,500	0	11,909	11,909	1.6	1.6
2001	10,500	0	11,579	11,579	-2.8	-2.8
2002	11,000	1,000	11,942	13,027	3.1	12.5
2003	12,000	2,000	12,737	14,860	6.7	14.1
2004	13,000	3,000	13,440	16,542	5.5	11.3
2005	14,000	4,000	14,000	18,000	4.2	8.8
’02-05 avg	12,500	2,500	13,030	15,607	4.9	11.7
Difference, 50+ vs. <50				2,578		6.8
2014	17,500	5,500	14,417	18,947	-1.7	-1.7

Note: Real amounts adjusted for the annual average Consumer Price Index for All Urban Consumers. Dollar values are rounded to the nearest dollar.
Source: Authors’ calculations from the Internal Revenue Service.

Table 2. *Sample Refinement*

Criterion	Unique persons remaining
Full SIPP Completed Data Files sample	436,295
Ever between ages 40-65 in 1999-2005	224,593
Valid match to SSA data	174,370
Between ages 46-53 at some point in 1999-2005	89,501
Earned four Social Security credits in each year at ages 46-53	55,753
No work-preventing health condition, and did not die at ages 46-53	38,651

Source: Authors’ calculations from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Table 3. *Summary Statistics by Year and Age*

	1999-2001			2002-2005		
	All ages	46-49	50-53	All ages	46-49	50-53
Deferred earnings	2,205	2,116	2,313	2,387	2,246	2,549
Ever contribute max	8.5	8.4	8.8	7.5	6.6	8.5
Total earnings	57,675	56,395	59,235	56,860	56,423	57,359
DB pension in SIPP	49.5	48.4	50.8	46.8	45.1	48.8
DC pension in SIPP	38.6	39.1	38.1	39.2	39.3	38.9
DB & DC pension in SIPP	10.4	10.4	10.5	10.0	9.6	10.4
No pension in SIPP	19.4	19.8	19.0	20.5	21.2	19.6
Total net worth	234,391	202,836	272,870	176,946	161,676	194,477
Homeowner	82.3	81.0	83.9	79.4	77.6	81.4
Blue collar	30.1	30.0	30.3	30.7	31.3	30.1
Work limited	5.5	5.1	6.0	4.9	4.7	5.2
Male	52.7	52.5	52.9	52.5	52.6	52.4
Married	73.7	73.2	74.2	72.4	71.8	73.1
Ever had children	82.0	80.8	83.4	79.7	78.6	81.1
Children ages 0-17	41.2	46.2	35.2	39.6	43.6	35.0
Children ages 18-24	24.7	25.7	23.6	24.4	24.4	24.4
Spouse ever employed	88.7	89.4	87.8	89.6	89.8	89.3
White	86.9	86.6	87.3	86.2	85.8	86.6
Black	8.8	9.2	8.3	9.5	9.8	9.1
Other race	4.3	4.3	4.4	4.3	4.4	4.3
Hispanic	5.7	6.0	5.5	6.3	6.7	5.9
Foreign born	8.2	8.2	8.1	8.4	8.5	8.2
Less than HS	5.7	5.5	5.9	6.0	6.3	5.6
HS degree only	26.6	27.6	25.4	28.6	29.9	27.2
Some college	33.2	33.5	32.7	33.7	33.9	33.5
College graduate	20.4	19.9	20.9	19.6	19.2	20.1
Graduate degree	14.2	13.4	15.1	12.1	10.7	13.7
Sample size	61,607	33,830	27,777	94,816	50,654	44,163

Source: Authors' calculations from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Table 4. *Summary Statistics for Contributors Ever Within 10 Percent of Annual Maximum Deferral*

	1999-2001			2002-2005		
	All ages	46-49	50-53	All ages	46-49	50-53
Deferred earnings	9,039	8,922	9,173	10,867	10,957	10,786
Contribution/maximum	0.77	0.76	0.78	0.76	0.84	0.70
Total earnings	165,505	157,771	174,509	160,341	169,632	152,052
DB pension in SIPP	56.5	55.2	58.0	52.4	48.7	55.7
DC pension in SIPP	53.9	55.1	52.5	55.9	57.5	54.4
DB & DC pension in SIPP	20.4	20.6	20.2	19.7	18.9	20.5
No pension in SIPP	12.0	12.3	11.7	13.1	14.0	12.3
Total net worth	523,685	406,605	659,820	376,404	373,010	379,679
Homeowner	92.4	91.6	93.4	90.9	89.9	91.7
Blue collar	34.6	33.8	35.6	35.0	35.9	34.1
Work limited	3.0	2.8	3.1	2.3	1.6	2.8
Male	70.3	70.4	70.2	70.1	70.3	70.0
Married	82.9	82.5	83.5	81.3	80.0	82.4
Ever had children	76.4	74.4	78.7	72.5	70.1	74.6
Children ages 0-17	33.5	39.3	26.8	31.5	35.1	28.3
Children ages 18-24	20.7	19.7	21.9	20.4	15.7	24.6
Spouse ever employed	85.3	85.7	84.9	83.6	80.7	86.0
White	91.0	89.8	92.4	90.2	90.6	89.9
Black	2.9	3.6	2.1	3.4	3.2	3.5
Other race	6.1	6.6	5.5	6.4	6.2	6.6
Hispanic	2.5	3.0	1.9	2.6	2.5	2.7
Foreign born	9.6	9.7	9.4	9.7	9.6	9.8
Less than HS	0.6	0.4	0.8	0.6	0.7	0.4
HS degree only	8.0	8.2	7.6	8.0	7.8	8.1
Some college	19.5	19.2	19.9	19.3	19.3	19.2
College graduate	33.2	34.6	31.6	35.5	37.1	34.2
Graduate degree	38.7	37.5	40.0	36.6	35.1	38.0
Sample size	5,260	2,827	2,433	7,146	3,368	3,778

Source: Authors' calculations from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Table 5. *Difference-in-Differences Regression Results*

Dependent variable	Deferred amount		Deferred percentage	
	(1)	(2)	(3)	(4)
Mean of the dependent variable	2705.9	2705.9	0.042	0.042
Year ≥ 2002	597.0***	248.5***	0.0052***	0.0030***
	(52.5)	(43.1)	(0.0007)	(0.0007)
Age 50+	47.9	95.9*	0.0026***	0.0029***
	(52.9)	(51.5)	(0.0008)	(0.0008)
Ever previously at 401(k) limit		5604.6***		0.0352***
		(164.4)		(0.0022)
(Age 50+) × (Year ≥ 2002)	65.7	-11.4	0.0003	-0.0008
	(76.3)	(66.8)	(0.0011)	(0.0012)
(Age 50+) × (At limit)		-460.5*		-0.0034
		(237.7)		(0.0035)
(At limit) × (Year ≥ 2002)		917.1***		0.0054*
		(189.0)		(0.0028)
(Age 50+) × (Year ≥ 2002) × (At limit)		543.3*		0.0090*
		(312.8)		(0.0053)
DB pension in SIPP window	252.5***	274.1***	0.0053***	0.0054***
	(56.6)	(47.9)	(0.0009)	(0.0009)
Lowest earnings tercile	-3403.0***	-2779.3***	-0.0300***	-0.0259***
	(81.0)	(71.2)	(0.0010)	(0.0009)
Middle earnings tercile	-2589.5***	-1857.0***	-0.0128***	-0.0081***
	(64.5)	(51.0)	(0.0008)	(0.0008)
Bottom wealth quartile	-1280.1***	-748.7***	-0.0152***	-0.0118***
	(84.1)	(69.3)	(0.0013)	(0.0013)
2nd wealth quartile	-1084.1***	-566.1***	-0.0104***	-0.0071***
	(86.8)	(71.9)	(0.0012)	(0.0012)
3rd wealth quartile	-720.8***	-345.1***	-0.0060***	-0.0036***
	(84.5)	(55.6)	(0.0011)	(0.0011)
Married	306.2**	188.8*	0.0046**	0.0038**
	(142.5)	(104.5)	(0.0019)	(0.0017)
Children ages 0-17	-177.2***	-147.4***	-0.0037***	-0.0035***
	(56.1)	(43.3)	(0.0010)	(0.0009)
Children ages 18-24	-137.0***	-70.6*	-0.0015**	-0.0011
	(42.3)	(38.2)	(0.0007)	(0.0007)
Sample size	86,830	86,830	86,830	86,830
R^2	0.304	0.490	0.125	0.169

Note: Models also include race and education categories; indicators for sex, Hispanic origin, foreign born, homeownership, and blue collar occupation; Census region and year dummies; and a constant.
Source: Authors' estimates from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Table 6. *Regression Results with Separate Age Estimates*

Dependent variable	Deferred amount		Deferred percentage	
	(1)	(2)	(3)	(4)
Mean of the dependent variable	2705.9	2705.9	0.042	0.042
Year ≥ 2002	581.5***	282.8***	0.0056***	0.0041***
	(74.5)	(60.8)	(0.0009)	(0.0009)
Age 47	20.9	40.2	0.0011*	0.0014**
	(40.7)	(39.0)	(0.0006)	(0.0007)
Age 48	-24.5	6.8	0.0013	0.0014
	(61.6)	(56.2)	(0.0010)	(0.0010)
Age 49	6.3	24.2	0.0017	0.0018
	(71.0)	(62.2)	(0.0012)	(0.0011)
Age 50	7.7	20.4	0.0019	0.0018
	(79.4)	(60.8)	(0.0013)	(0.0012)
Age 51	-4.4	41.9	0.0030***	0.0031***
	(69.4)	(58.4)	(0.0012)	(0.0011)
Age 52	59.1	90.8	0.0039***	0.0040***
	(72.9)	(64.7)	(0.0011)	(0.0011)
Age 53	104.6	221.0***	0.0044***	0.0055***
	(70.3)	(61.3)	(0.0011)	(0.0011)
Ever previously at 401(k) limit		5978.0***		0.0372***
		(245.8)		(0.0034)
(Age 47) × (Year ≥ 2002)	-13.5	-57.5	-0.0010	-0.0017*
	(59.1)	(51.0)	(0.0009)	(0.0009)
(Age 48) × (Year ≥ 2002)	22.9	-24.4	-0.0008	-0.0014
	(88.7)	(77.7)	(0.0014)	(0.0013)
(Age 49) × (Year ≥ 2002)	-34.1	-69.5	-0.0010	-0.0017
	(95.5)	(77.7)	(0.0015)	(0.0014)
(Age 50) × (Year ≥ 2002)	98.6	-33.7	0.0007	-0.0007
	(109.6)	(84.8)	(0.0017)	(0.0016)
(Age 51) × (Year ≥ 2002)	104.3	-31.4	-0.0001	-0.0015
	(95.6)	(85.5)	(0.0014)	(0.0014)
(Age 52) × (Year ≥ 2002)	46.3	-53.0	-0.0005	-0.0021
	(97.5)	(86.2)	(0.0014)	(0.0014)
(Age 53) × (Year ≥ 2002)	86.4	-63.9	0.0004	-0.0019
	(93.9)	(78.6)	(0.0014)	(0.0014)
(Age 47) × (Year ≥ 2002) × (At limit)		189.3		0.0070
		(323.8)		(0.0046)
(Age 48) × (Year ≥ 2002) × (At limit)		341.1		0.0055
		(378.7)		(0.0056)
(Age 49) × (Year ≥ 2002) × (At limit)		386.8		0.0075
		(445.1)		(0.0062)
(Age 50) × (Year ≥ 2002) × (At limit)		1099.6**		0.0135**
		(443.7)		(0.0069)

Table 6. *Regression Results with Separate Age Estimates* (cont'd)

Dependent variable	Deferred amount		Deferred percentage	
	(1)	(2)	(3)	(4)
(Age 51) × (Year ≥ 2002) × (At limit)		1128.7**		0.0126*
		(459.2)		(0.0073)
(Age 52) × (Year ≥ 2002) × (At limit)		868.9*		0.0154**
		(471.3)		(0.0078)
(Age 53) × (Year ≥ 2002) × (At limit)		898.0*		0.0202**
		(508.2)		(0.0079)
Sample size	86,830	86,830	86,830	86,830
R^2	0.305	0.490	0.125	0.169

Note: Models also include race and education categories; indicators for sex, Hispanic origin, foreign born, homeownership, and blue collar occupation; Census region and year dummies; and a constant.
Source: Authors' estimates from the *Survey of Income and Program Participation Completed Data Files,* 1999-2005.

Table 7. *Difference-in-Differences Fixed Effects Regression Results*

Dependent variable	Deferred amount		Deferred percentage	
	(1)	(2)	(3)	(4)
Mean of the dependent variable	2315.1	2315.1	0.037	0.037
Year ≥ 2002	603.1***	555.8***	0.0080***	0.0078***
	(36.8)	(33.8)	(0.0005)	(0.0004)
Age 50+	13.0	45.9**	0.0004	0.0010***
	(21.6)	(20.0)	(0.0003)	(0.0003)
Ever previously at 401(k) limit		1141.0***		0.0097***
		(192.0)		(0.0021)
(Age 50+) × (Year ≥ 2002)	57.5**	-17.7	0.0002	-0.0005
	(24.2)	(22.5)	(0.0004)	(0.0004)
(Age 50+) × (At limit)		-495.9***		-0.0088***
		(161.4)		(0.0017)
(At limit) × (Year ≥ 2002)		-49.8		-0.0021*
		(128.6)		(0.0013)
(Age 50+) × (Year ≥ 2002) × (At limit)		1020.1***		0.0100***
		(176.5)		(0.0020)
Sample size	160,203	160,203	160,203	160,203
R^2	0.042	0.051	0.020	0.022

Note: Models also include year dummies.
Source: Authors' estimates from the *Survey of Income and Program Participation* Completed Data Files, 1999-2005.

Table 8. *Difference-in-Differences Regression Results for DC Participants and Workers with Positive Deferrals*

Dependent variable	Deferred amount		Deferred percentage	
	DC participants	Positive deferrals	DC participants	Positive deferrals
	(1)	(2)	(3)	(4)
Mean of the dependent variable	4286.8	3383.1	0.057	0.052
Year ≥ 2002	297.0**	310.0***	0.0019	0.0039***
	(122.9)	(51.4)	(0.0021)	(0.0009)
Age 50+	207.3	160.1***	0.0047**	0.0042***
	(136.8)	(59.1)	(0.0021)	(0.0009)
Ever previously at 401(k) limit	5339.4***	5053.5***	0.0311***	0.0287***
	(304.7)	(165.6)	(0.0041)	(0.0022)
(Age 50+) × (Year ≥ 2002)	33.3	-17.8	0.0011	-0.0010
	(179.9)	(83.6)	(0.0030)	(0.0014)
(Age 50+) × (At limit)	-373.3	-527.4**	-0.0031	-0.0049
	(426.1)	(246.9)	(0.0066)	(0.0036)
(At limit) × (Year ≥ 2002)	527.9*	917.6***	-0.0015	0.0053*
	(295.5)	(191.6)	(0.0045)	(0.0029)
(Age 50+) × (Year ≥ 2002) × (At limit)	739.4	546.9*	0.0129	0.0091
	(488.5)	(323.8)	(0.0082)	(0.0056)
Sample size	12,373	69,660	12,373	69,660
R2	0.499	0.488	0.153	0.132

Note: Models include same controls as the models in Table 5.
Source: Authors' estimates from the *Survey of Income and Program Participation* Completed Data Files, 1999-2005.

Table 9. *Difference-in-Differences Regression Results, Selected Sub-Samples*

Dependent variable	Deferred amount		Deferred percentage		
Coefficient	(At limit) × (Year ≥ 2002)	(Age 50+) × (Year ≥ 2002) × (At limit)	(At limit) × (Year ≥ 2002)	(Age 50+) × (Year ≥ 2002) × (At limit)	Sample size
Men	979.1***	390.0	0.0083***	0.0036	48,056
	(213.4)	(356.4)	(0.0030)	(0.0057)	
Women	712.3**	961.4*	-0.0067	0.0246**	38,774
	(336.2)	(576.8)	(0.0060)	(0.0111)	
Any college	968.4***	473.4	0.0048	0.0095*	58,563
	(213.6)	(338.4)	(0.0030)	(0.0057)	
No college	129.5	1417.9	0.0051	0.0066	28,267
	(779.1)	(1153.9)	(0.0095)	(0.0154)	
No Kids	1006.8**	305.6	0.0048	0.0129	11,217
	(406.7)	(897.4)	(0.0077)	(0.0133)	
Children 0-17	936.3***	552.3	0.0057**	0.0101*	64,674
	(209.1)	(350.4)	(0.0029)	(0.0055)	
Children 18-24	817.3***	662.6	0.0046	0.0103	57,307
	(266.0)	(404.0)	(0.0035)	(0.0063)	
Grown Kids	847.5***	589.6	0.0046	0.0091	25,446
	(279.8)	(559.4)	(0.0046)	(0.0088)	
Below median wealth	797.4*	106.3	0.0035	0.0035	41,118
	(432.3)	(763.8)	(0.0075)	(0.0143)	
Above median wealth	903.5***	654.8*	0.0037	0.0111**	45,712
	(232.5)	(344.8)	(0.0027)	(0.0053)	

Note: Models include same controls as the models in Table 5.
Source: Authors' estimates from the *Survey of Income and Program Participation* Completed Data Files, 1999-2005.

Table A1. *Frequency Contributing Near the Maximum 401(k) Contribution*

Years at Ages 46-53 in 1990-2005	Number	Percent	Percent Ever at Max
Never	205,920	91.1%	
1-3	10,614	4.7	53.0%
4-7	4,789	2.1	23.9
All (maximum of 8)	4,621	2.0	23.1

Note: Participants are "near" the maximum if their deferred earnings are within 10 percent of that year's tax-deferred limit.
Source: Authors' calculations from the *Survey of Income and Program Participation Completed Data Files,* 1990-2005.