

401(k) Participant Behavior in a Volatile Economy

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Abstract

The booms and busts of the late 1990s and 2000s have taken 401(k) plan participants on a rollercoaster ride. Using data from administrative tax records and household surveys, this paper examines how participants responded to these periods of economic expansions and contractions by documenting changes in 401(k) participation, contributions, and investment allocation from 1990 through 2010. Controlling for earnings, job changes, and other household factors, we show that 401(k) participation and contributions decline during recessions. The Great Recession could lower the 401(k) assets of the typical 30-year-old by as much as 9 percent at age 62.

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Executive Summary

The booms and busts of the late 1990s and 2000s have taken 401(k) plan participants on a rollercoaster ride of ups and downs. Yet, it isn't clear how participants respond to periods of economic expansions and contractions. Do they stop contributing or reduce their 401(k) contributions during economic downturns? Do participants react similarly to all recessions or do certain economic downturns—because of their severity, for example—induce different or more dramatic behavioral responses? What are 401(k) participants' responses to booms compared with busts? Are retirement account portfolios more heavily invested in stocks when the economy is booming and less invested in stocks when the economy is failing?

This paper documents changes in DC plan participation, contributions, investment allocation, and risk tolerance between the late 1990s and late 2000s and examines how they correspond to changes in the economy. It uses data from the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP) pooled together and linked to administrative data on earnings and contributions for 1990 through 2010 from the Social Security Administration's (SSA) Detailed Earnings Record (DER). A major advantage of these data is that they are not subject to the same measurement error as workers' self-reported information because they come from actual tax records. They also provide 21-year longitudinal measures of participation and contributions independent of workers' employers.

We find strong evidence that 401(k) participant behavior is influenced by the economy, and that retirement account holders responded to the Great Recession more drastically than to previous recessions. Some key findings include:

Participation Rates

- Participation rates among wage and salary workers increased dramatically from 22.5 to 40.2 percent between 1990 and 2001, after which they declined steadily to 39.1 percent in 2003. Between 2003 and 2008, they increased again, but much more gradually, to peak at 42.7 percent in 2008. After 2008, participation rates fell in 2009 and 2010 to 41.4 percent. Participation rates dipped during both the 2001 and 2008 recessions, especially for younger workers.

Contribution Amounts

- Changes in the median DC contribution amounts mirrored changes in the Gross Domestic Product (GDP) between 1990 and 2010—particularly starting in 2002. For example, amid booming economies, real median DC contributions increased 19.1 percent between 1992 and 1999 (about 2.5 percent per year) and 3.7 percent between 2002 and 2004 (about 1.8 percent per year). They declined 4.6 percent between 2004 and 2007 as the booming housing market began to reverse and another 4.9 percent between 2007 and 2009 (-2.5 percent per year) with the Great Recession. They remained unchanged between 2009 and 2010.
- Workers ages 50 to 64 were the hardest hit. Between 2007 and 2009, median contributions declined 9.3 percent for those ages 50 to 59 and 8.7 percent for those ages 60 to 64. Contributions of workers ages 65 to 69 declined the least over this time period—only 3.6 percent.
- In 2010, contributions rebounded for workers ages 50 to 64, but continued to fall for workers ages 20 to 29, those ages 40 to 49, and those ages 65 to 69. Still, contribution levels in 2010 were lower than they were in 2007 for all age groups.

Contribution Rates

- Median contribution rates (contribution amount divided by total earnings) among participants declined 2.2 percent between 2007 and 2009. They declined for all age groups and for most earnings groups. The largest decline was for workers ages 60 to 64 whose median contribution rates fell 7.8 percent from 6.7 to 6.2 percent. The second largest decline was for workers ages 65 to 69 whose median contribution rates fell 7.1 percent from 7.0 to 6.5 percent.
- Contribution rates declined further in 2010 for workers ages 20 to 29 and those ages 65 to 69. By 2010, their median contribution rates were 4.3 and 8.4 percent lower, respectively, than in 2007. In contrast, contribution rates increased slightly for workers ages 50 to 59 and those ages 60 to 64. Still, their median contribution rates in 2010 were 2.8 and 5.1 percent lower, respectively, than in 2007.

Investments

- Workers do vary their retirement account investment allocations with changes in economic conditions. The percentage of workers investing their 401(k) contributions in bonds increased with both the 2001 and 2008 recessions and decreased with market recoveries. The share with current contributions invested in bonds increased dramatically with the Great Recession from 38.0 percent in 2006 to 54.8 percent in 2009. Similarly, those investing in mixed stocks and bonds increased from 36.8 to 52.8 percent.
- Among all adults with retirement accounts, the share with stocks declined between 2006 and 2009 from 83.1 to 75.4 percent, and the share with certificates of deposit, money market accounts, or government securities increased from 31.3 to 40.6 percent.

Multivariate Analyses

- Multivariate analyses of workers, controlling for age, earnings, and employment history, find significant declines in both the probability of contributing to DC plans and contribution amounts for both the 2001 and 2008 recessions.

The Great Recession, more than each of the previous two recessions, had a large negative impact on 401(k) participants' behavior. Participation dropped off slightly, while contribution amounts and contribution rates declined dramatically—even after controlling for other factors.

Furthermore, those with retirement accounts were much more likely to invest in bonds after the recession than they were before the recession.

Although the typical worker reduced his contributions only \$130 as a result of the Great Recession, this represented a decline of 4.9 percent. This is especially troubling when one considers that the median contribution amount before the recent recession began was only about \$2,600—far less than the 2007 legislated contribution limits of \$15,500 for workers under age 50 and \$20,500 for those ages 50 and older. Workers are already contributing to their retirement savings far less than they are legally permitted, and now they are contributing even less.

If the typical worker had done nothing in 2007 and kept his contributions in 2008 and 2009 at the 2007 level, instead of reducing them, his account balances would have been at least \$210 higher at the end of 2009. The long-run impacts are even greater, especially when compounded over many years.

The typical 30-year-old worker reduced his contributions by \$138 or 6 percent between 2007 and 2010. His retirement account balance at age 62 is projected to be just under \$134,000 (assuming contributions begin increasing 1 percent per year after 2010 and that accumulated balances earn a 3 percent annual rate of return). If instead of reducing his contributions starting in 2007, he increased them just 1 percent each year, his account balance at age 62 would be \$145,572—a difference of \$11,907 or 8.9 percent. The further individuals were from retirement when the recession occurred and the higher their contributions before the recession, the larger the potential negative impact on their retirement savings. Of course, workers can recoup some or all of their investment losses by increasing their future contributions. For example, our hypothetical worker could recoup all of his losses from the recession by increasing his baseline contribution \$232 plus making a one-time catch-up contribution of \$520 all in 2011, and then continuing future contributions at the higher level under the alternative scenario. Our regression results show that participation is lower immediately following a spell of unemployment, suggesting it is difficult to get back on track after losing a job. But for workers who do contribute after an unemployment spell, they tend to contribute higher amounts on average in an attempt to catch up. For those who don't catch up, the recession will amount to a real loss in retirement savings.

Introduction

Over the past 25 years, employment-based pensions have been shifting from traditional defined benefit (DB) plans in which employers bear most investment risks to defined contribution (DC) plans that place the investment responsibility on workers. Consequently, the number of households with retirement account assets has soared along with the number of households owning stocks inside those accounts— increasing from 12 percent in 1989 to 31 percent in 2008 (Investment Company Institute [ICI] and the Securities Industry and Financial Markets Association [SIFMA] 2008). About two-thirds of participants' assets in 401(k) plans—the most widely used type of employer-sponsored DC plan—were invested in equities in 2007 (ICI 2008).

As 401(k) plans were becoming increasingly popular, the economy experienced significant booms and busts. Between March 1991 and March 2001, the economy prospered for an unprecedented 10 years (NBER 2011). Then in 2000, the dot-com bubble burst and stock prices fell by double digits for three straight years. This triggered a relatively short recession in March 2001. The economy bounced back and expanded again for more than six years. Retirement account balances (defined contribution plans and IRAs) peaked at \$8.7 trillion in the third quarter of 2007 before plummeting \$2.7 trillion (31 percent) through the first quarter of 2009 as the stock market crashed (Butrica and Issa 2011). Although retirement account balances have now recovered much of their value, they would have been significantly higher had the market not crashed and instead continued on its pre-crash path. The 2008 stock market crash coincided with the Great Recession, the longest of any recession since World War II (NBER 2011), with the highest unemployment rates in nearly three decades and record-long unemployment spells.

While it's clear that the economy has taken investors on a rollercoaster ride of ups and downs during the past two decades, it is not clear how they have responded. Smith, Johnson, and Muller (2004) suggest that many plan participants adjust their contributions in response to life events, contrary to the popular perception that 401(k) contributions do not change much over time. Although the authors did not consider the effects of economic expansions and contractions, participants might increase their contributions and shift their investments into equities when the economy is expanding and the stock market booming, and decrease their contributions and shift away from equities when the economy is contracting and the market is falling. The state of the economy is also likely to influence 401(k) participation. Unemployed workers cannot participate, and financial pressures may lead some workers whose spouses lost their jobs to reduce 401(k) contributions even if they remain employed themselves. Indeed, Malmendier and Nagel (2007) find that individual experience with stock market returns and inflation influence investment behaviors with cohorts that experienced high inflation less willing to invest in long-term bonds and cohorts that experienced high stock market returns more willing to invest in equities.

This paper uses data from the Survey of Income and Program Participation linked to Social Security administrative data on earnings and contributions for 1990 through 2010. A major advantage of these data is that they are not subject to the same measurement error as workers' self-reported information because they come from actual tax records (Dushi, Iams, and Tamborini 2011). They also provide 21-year longitudinal measures of participation and contributions independent of workers' employers. We use these data to document changes in DC plan participation, contributions, and investment allocation between the late 1990s and late 2000s and examine how they correspond to changes in the economy. Do 401(k) participants stop contributing or reduce their contributions during economic downturns? Do participants react

similarly to all economic downturns or do certain downturns, because of their severity, induce different or more dramatic behavioral responses? Do 401(k) participants respond more to busts than booms? Are retirement account portfolios more heavily invested in stocks when the economy is booming and less invested in stocks when the economy is failing? Although the analysis will not directly measure the impact of booms and busts on retirement account assets, the results will enable us to infer likely implications for account balances.

Background

Many Americans choose not to save for retirement and the reason may be related to the changing pension landscape. The percentage of workers covered by a traditional defined benefit pension plan that pays a lifetime annuity, often based on years of service and final salary, has been steadily declining over the past 25 years. Between 1989 and 2012, the proportion of private industry full-time workers participating in DB pension plans declined from 42 to 20 percent, while the share participating in defined contribution plans—investment accounts established and often subsidized by employers, but owned and controlled by employees—increased from 40 to 51 percent (Wiatrowski 2011; U.S. Bureau of Labor Statistics 2012).

Because DB pensions are tied to employers, workers do not have to think about retirement savings. They are automatically enrolled, contributions are automatically deducted, and benefits are automatically paid when workers retire. With DB pensions, employers bear the responsibility for ensuring that employees receive pension benefits. In contrast, DC retirement accounts are owned by employees. Workers have to actively decide to participate in the plan, how much to contribute, which investments to put their money in, and whether to take benefits as an annuity or lump sum payment at retirement. With DC retirement accounts, workers bear the

responsibility for their own financial security. This requires that individuals make informed and forward-looking decisions at every step of the way. Moreover, in recent decades both the array of financial instruments and their complexity have increased—obligating investors to evaluate and understand many new and more sophisticated financial products. How well-equipped individuals are at making their savings decisions determines, at least in part, the amount of income in retirement they get to enjoy. But recent studies have revealed less than encouraging information about retirees' ability to adequately plan for retirement. While DC plans have the potential to provide retirees with substantial retirement wealth, a typical household approaching retirement had 401(k)/IRA balances of only \$42,000 in 2010 (Munnell 2012).

Moreover, differences in pension wealth across gender and racial groups are substantial (Butrica and Johnson 2010). While some of the differential is driven by factors beyond the individual's control, others such as participation, contribution level, and portfolio allocation are usually the result of the individual's decisions. If offered a plan, blacks and Hispanics are less likely to participate as compared to whites, they also tend to contribute a lower share of their earnings to the plan and are more likely to withdraw funds from their accounts or borrow from them. In addition, some evidence suggests that blacks, Hispanics, and women are often conservative investors and less willing to take on financial risk. However, it's not clear whether these conservative investment tendencies reflect innate preferences or merely blacks' and women's relatively limited wealth holdings (Bajtelsmit and Bernasek 2001; Schubert et al. 1999). Blacks and women are also less likely than others to invest their 401(k) funds in equities, which historically have had higher rates of return than other investment types (Ariel Investments and Hewitt Associates 2009).

With all this in mind, it is not particularly surprising that participation rates among private wage and salary workers in 2012 who were offered an employer retirement plan were 89 percent in DB pensions but only 70 percent in DC plans (U.S. Bureau of Labor Statistics 2012). Even among full-time workers—whose participation rates are typically higher—participation rates were 91 percent in DB pensions but only 74 percent in DC plans (U.S. Bureau of Labor Statistics 2012). Do workers not participate because of inertia—which automatic enrollment can fix? Or do they not participate because they are scared off by the financial decisions and responsibilities that go hand-in-hand with DC plans?

If the policy goal is to help retirees be financially independent and minimize poverty at older ages, it is important to understand how individuals think about retirement planning and how they make their financial decision every step of the way. Are individuals well equipped to make their own sound financial decisions in an environment where the responsibility of retirement saving is increasingly shifting from employers to workers and financial products are becoming ever more complex? Assuming they are, how are their decisions influenced by lifecycle events or the economy?

A number of studies have examined the impact of stock market crashes and economic downturns on older workers' retirement decisions (Coile and Levine 2011; Coile and Levine 2006; Goda, Shoven, and Slavov 2010). Other studies have analyzed the impact of stock market and labor market conditions on retirement income and assets (Brady 2009; Burtless 2009; Coile and Levine 2010; Engen, Gale, and Uccello 2004; Gustman, Steinmeier, and Tabatabai 2009). Butrica, Smith, and Toder (2010) considered the impact of the 2008 stock market crash and alternative recovery scenarios on future retirement savings. The authors assumed that 401(k) participants would continue making the same total contributions to retirement accounts and

would rebalance their portfolios to maintain the target allocation for their age. Their assumptions about how participants would behave in response to a stock market crash were necessary to isolate the effects of the stock market crash itself on retirement savings.

The current paper recognizes that retirement account assets depend not only on market performance, but also on individuals' behavior—whether individuals contribute, how much they contribute, and how they allocate their investment portfolio. It builds upon prior research by Smith, Johnson, and Muller (2004), which found that key lifecourse events, such as the birth of a child and the purchase of a home, influence contributions in defined contribution plans. It also builds upon research by Muller and Turner (2011), which used survey data and found that 401(k) participation is influenced by the performance of the stock market. Utkus and Young (2009), using Vanguard DC plan data, found that 16 percent of plan participants changed their asset allocation during 2008 (only slightly higher than the trading rates in the prior two years), but 4 percent of assets were shifted from equities to fixed income investments (the largest net shift in over 10 years).

However, the recent rise in automatic enrollment and diversified investment options including target date funds may dampen expected changes in worker contribution behavior surrounding the recessions and market fluctuations (BLS 2011b). Among workers participating in their employer's DC plans, the share with plans that included automatic enrollment increased from 5 percent in 2003 to 21 percent in 2010 (Costo 2006; Bureau of Labor Statistics 2011c). Many of these workers will be assigned a default contribution rate and default investment fund because they did not make their own elections. Given these trends, it is not surprising that a 2012 Morningstar industry survey found a fivefold increase in target date fund assets in the last six years, increasing from \$71 billion in 2005 to \$378 billion in 2011 (Charlson and Lutton 2012).

This analysis extends previous studies by using more recent data and focusing on the extent to which workers adjust their participation, contributions, and asset portfolios during economic booms and busts.

Methodology

We examine contributions to employer–sponsored retirement plans over time and how they interact with key lifecourse events for a large sample of workers. The data come from the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (SIPP) pooled together and linked to administrative data from the Social Security Administration’s (SSA) Detailed Earnings Record (DER) and Summary Earnings Record (SER).

The SIPP provides basic demographic data, including age, race, gender, marital status, and education, as well as information about employment status, income, and earnings. Special topical modules provide additional information on marital histories, fertility histories, employment histories, disability, asset holdings, and employer–sponsored pension participation. In particular, the survey asked respondents with work limitations about when their health problems started, and asked homeowners about when they purchased their homes. Thus, the data allow us to identify the timing of key lifecourse events, including marriages, divorces, widowhood, the birth of a child, the onset of health problems that limit the ability to work, and the purchase of a home. Because the survey interviewed all adult members of the household, it also provides information about key transitions in the spouse’s life.

The DER contains information collected from the Internal Revenue Service’s Form W–2, which employers must file to report salaries and benefits they pay to their employees, as well as self-employment income from Schedule SE (Olsen and Hudson 2009). The DER provides annual

information on total earnings, earnings covered by Social Security and Medicare, taxable earnings from 1978 to 2010, and worker contributions to employer–sponsored retirement accounts from 1990 to 2010.¹ The DER file also includes employer identification codes that enable users to calculate job tenure and identify respondents who change jobs over time.

The SIPP topical modules provide contemporaneous information, as well as retrospective data for marriage histories, fertility histories, and disability histories. The DER match provides both retrospective and prospective earnings and DC contributions relative to the SIPP interview period. Our analyses use two samples: one that includes both retrospective and prospective DER earnings and contributions, and one that includes only retrospective DER data. The former sample allows us to examine DC participation and contribution patterns over the 21-year period from 1990 to 2010 and relate them to non-changing demographic characteristics observed on the SIPP (for example, sex, birth year, race, and educational attainment). The latter sample allows us to examine DC participation and contribution patterns from 1990 to the SIPP interview year and relate them to characteristics known from the SIPP retrospective data (for example, marital status, number of dependents, disability and health status, homeownership, and pension characteristics).

We restrict the sample to wage and salary workers ages 20 to 69 who report positive earnings in the given year.² We exclude workers younger than 20 because many employers do

¹Administrative match rates vary by SIPP panel. The match rate was 79 percent for the 1996 SIPP, 47 percent for the 2001 SIPP, 73 percent for the 2004 SIPP, and 80 percent for the 2008 SIPP. Czajka, Mabli, and Cody (2008) examined attrition and match bias in the SIPP data. They found that the nonmatched cases in the 2001 panel appeared fairly similar to matched cases on a number of important dimensions, and that nonmatch bias did not appear to differ greatly from that present for the 1996 SIPP.

²The DER provides annual wage reports for all employers in each calendar year. For workers with multiple employers, we do not know if the jobs were held sequentially or concurrently. We pool earnings from all jobs in each calendar year.

not allow them to participate in retirement plans, and we exclude workers older than 69 because people must begin withdrawing funds from defined contribution plans at age 70 ½. Our sample includes 902,344 person-year observations between 1990 and 2010 for over 168,000 individuals. We express all dollar amounts in constant 2011 dollars (indexed to changes in the Consumer Price Index).

We define wage and salary workers as individuals with positive earnings from any job in a calendar year and with at least half of their total annual earnings from wage and salary employment.³ Workers are offered DC plans if: 1) they report on the SIPP pension topical module that their employer offered a DC plan and that they were eligible to participate in the plan; or 2) they made a DC contribution in any year while on the pension job up to and including the SIPP pension topical module year.⁴ Workers participate in DC plans if they make a contribution to any DC plan, excluding employer-only contributions, personal IRA contributions, or self-employed Keogh contributions. We sum all worker contributions (as reported in Box 12 of workers' W-2 forms) from all jobs in a calendar year to create our measure of total annual contributions, and we divide this amount by total annual earnings to create our measure of contribution rates.⁵

We begin our analyses by showing how DC offer rates have changed over time. We then show participation rates, contribution levels, and contribution rates by year, age, and earnings

³ The DER separately reports self-employment and wage and salary earnings.

⁴ For 1996 SIPP respondents, we look at DC contributions for all years on the pension job (identified by the employer identification number) from 1990 to 1998 (the year of the pension topical module). For 2001 SIPP respondents, we look at DC contributions on the pension job through 2003. For 2004 SIPP respondents, we look at DC contributions on the pension job through 2006. For 2008 SIPP respondents, we look at DC contributions on the pension job through 2009.

⁵ Total earnings are the sum of wage and salary earnings, including the deferred earnings, and self-employment earnings.

level. We then estimate logit models of the participation decision and linear regression models of the level of contributions for workers contributing to their retirement plans. Predictors in the models include age and its square (to capture nonlinear effects of age), age splines with kinks at age 30, 40, 50, and 60, marital status, log of own earnings, number of work years since age 20, unemployment (measured as a full calendar year with no earnings), the number of children under age 18, the presence of a work limitation, the presence of a working spouse, and indicators (during the current year) of the onset of work limitations, the purchase of a home, the birth of a child, the death of a spouse, the dissolution of a marriage through divorce, and a job change.⁶ We also experiment with lagging these indicators, to explore whether the impact on retirement contributions persists a few years after the event. We also include SIPP panel dummies and year dummies to capture changes in 401(k) behavior over time. We are particularly interested in the sign and magnitude of the year dummies and their relationship to macro-economic conditions including the unemployment rate and gross domestic product (GDP).

We also examine retirement asset allocation using self-reported data from the SIPP pension and asset topical modules and measure how asset allocation has changed over time.⁷ This data is limited to the SIPP interview years. The pension module collects information about the flows into retirement accounts among workers contributing to DC pensions. The asset module collects information about the stock of retirement account assets among individuals with

⁶ A job change is a worker working for an employer in year t who was not working for that employer in year $t-1$ identified by the employer identification numbers on the DER. Number of work years includes all years with positive earnings from the DER or SER starting at age 20. The SER includes annual Social Security covered earnings from 1951 to 2010.

⁷ The 1996 SIPP panel asks the pension module in wave 7 (1998) and wealth module in waves 3, 6, 9, and 12. The 2001 SIPP panel asks the pension module in wave 7 (2003) and wealth modules in wave 3, 6, and 9. The 2004 SIPP panel asks the pension module in wave 7 (2006) and the wealth modules in waves 3, and 6. The 2008 SIPP panel asks the pension module in wave 3 (2009) and the wealth modules in waves 4 and 7. We examine the wealth module asked nearest to the pension module (waves 6 and 7 for the 1996, 2001, and 2004 panels and waves 3 and 4 for the 2008 panel).

retirement accounts. Unfortunately, neither the pension nor the asset topical module provides information on the share of investments by investment type. Instead, they provide only indicators of the type of investments owned. We exploit these indicators to examine people's willingness to invest in equities and whether this has changed over time given the dual 2001 and 2008 stock market crashes.

For workers contributing to their DC pensions, the SIPP asks if workers invest assets in company stocks, stock funds, corporate bonds or bond funds, long term interest bearing securities, diversified stock and bond funds, government securities, money market funds, or other investments. The 2008 SIPP panel added "evenly split between types" to their list of DC investment types. These workers are then asked "of the types of investments just mentioned, which type is where the largest share of current contributions are being invested?" While we know the majority investment type, we do not know the specific share of each investment type.

For individuals reporting retirement account assets in IRA, Keoghs, and DC plans (401(k), 403(b), or thrift plans), the SIPP asks how these accounts are allocated. Respondents can choose certificate of deposit or other saving certificates, money market funds, U.S. government securities, municipal or corporate bonds, stock or mutual fund shares, or other assets. The SIPP collects up to four investment types for IRA, Keogh, and DC balances (12 possible reports). While we can measure the share of account holders with retirement account balances invested in different types of investments, we do not know the amount invested in each type. Unlike the pension topical module that asks about the majority investment type, this is not asked about account balances. This limited information, however, does allow us to measure workers willingness to invest in stocks and other asset types and how this has changed over time.

Results

DC Offer Rates

The share of wage and salary workers offered DC plans has increased over time, rising from 54 percent in 1998 to 63 percent in 2009 (figure 1). This trend reflects the increase in employers offering DC pensions—either replacing or in addition to their DB pensions, as well as the increase in finance and service jobs that typically offer DC plans and decline in manufacturing jobs that typically offered DB pensions. Although DC offer rates increased for all age groups, prime age workers, those ages 30 to 59, are more likely to work in jobs that offer DC pensions than are younger or older workers.

Participation

Among wage and salary workers ages 20 to 69, the share contributing to employer-sponsored retirement accounts increased sharply between 1990 and 2001 as employers increasingly offered workers DC plans (rising from 22.5 to 40.2 percent) (figure 2). Participation then dipped slightly between 2001 and 2003 (falling from 40.2 to 39.1 percent) with the 2001 recession, dot.com stock market crash, and high unemployment period from 2002 to 2004.⁸ After 2003, participation rates increased again, but much more gradually to peak at 42.7 percent in 2008. Coinciding with the Great Recession, participation rates fell in 2009 and 2010 to 41.1 percent.

As DC plans became more common, participation rates at all ages increased between 1990 and 2001 (figure 3). Since 2001, participation rates leveled off for workers under age 50 but continued to rise for workers over age 50. Note, however, that participation rates have

⁸ The national unemployment rate increased from 4 percent in January 2000 to 6.3 percent in June 2003. It then fell to 4.4 percent in May 2007 before rising to 10 percent in October 2009. Unemployment remained above 9 percent for all of 2010 (BLS 2011a).

distinct recession dips between 2001 and 2003 and between 2008 and 2010. The recession dips are bigger for younger workers than for older workers, but participation rates declined for all workers under age 60 during both recessions. Although participation rates for each cohort are higher at every age than for the preceding cohort at the same age; participation rates at ages 40 to 49 appear to have plateaued for cohorts born after 1946 (figure 4). Furthermore, participation rates are lower for workers after age 59. Because these workers had DC offers and participated at younger ages, their lower participation at older ages is not solely due to lack of offers.

Much of the observed changes in historic DC participation rates reflect changes in employer offer rates. Only workers offered a DC plan can participate and offer rates have increased over time as employers increasingly offer these types of plans. Unfortunately, we do not know historic offer rates from the administrative data. The SIPP pension topical module asks workers if their employer offers a DC-type pension plan, but this is only known at the SIPP interview. About 40 percent of wage and salary workers in 2006 did not participate in a DC plan because their employer did not offer a plan (figure 5). Around a third of workers ages 30 to 59 did not participate because their employer did not offer a plan in 2006, compared with 61 percent of workers ages 20 to 29 and 50 percent of workers ages 65 to 69.

Participation rates among workers offered a DC plan are higher than participation rates among all workers. About 69 percent of workers offered a DC plan in 2006 made contributions to their plan (figure 6). Participation rates rise among those offered a plan with age until age 59 and decline at older ages. Younger and older workers are both less likely to be offered a DC plan and less likely to participate when they are offered a plan compared with workers in their 50s.

Conditional on having a DC plan offer, we still see a significant drop in DC participation between 2006 (based on the 2004 SIPP panel) and 2009 (based on the 2008 SIPP panel) in response to the Great Recession. Among all workers offered a DC plan, participation fell from 69.1 percent in 2006 to 66.3 percent in 2009. While participation rates are highest among 40-49 year-olds and 50-59 year-olds, these groups also experienced the largest drops in participation between 2006 and 2009.

Contribution Levels and Rates

Changes in the median DC contribution amounts mirrored changes in the GDP between 1990 and 2010—particularly starting in 2002 (figure 7). For example, amid booming economies median DC contributions increased 19.1 percent between 1992 and 1999 (about 2.5 percent per year) and 3.7 percent between 2002 and 2004 (about 1.8 percent per year) (table 1). They declined 4.6 percent between 2004 and 2007 as the booming housing market began to reverse and another 4.9 percent between 2007 and 2009 (-2.5 percent per year) with the stock market crash and Great Recession. They remained relatively unchanged between 2009 and 2010.

Workers ages 50 to 64 were the hardest hit by the recent economic downturn (figure 8, table 1, and table 2). Between 2007 and 2009, median contributions declined 9.3 percent from \$3,530 to \$3,203 for those ages 50 to 59 and 8.7 percent from \$3,529 to \$3,224 for those ages 60 to 64. Contributions of workers ages 65 to 69 declined the least over this time period—only 3.6 percent from \$2,983 in 2007 to \$2,877 in 2009. In 2010, contributions rebounded for workers ages 50 to 64, but continued to fall for workers ages 20 to 29, those ages 40 to 49, and those ages 65 to 69 (figure 9). Still, contribution levels in 2010 were lower than they were in 2007—for all age groups.

The lowest and highest earners experienced the largest decline in contributions levels as a result of the recession (figure 10, table 3, and table 4). Compared with their DC contributions in 2007, workers making under \$10,000 contributed 11.4 percent less in 2009 and 12.1 percent less in 2010. Those earning \$10,000 to \$15,000 contributed 5.0 percent less in 2009, but 1.9 percent more in 2010. At the other end of the earnings distribution, workers making \$80,000 to \$100,000 contributed 5.8 percent less in 2009 and 4.8 percent less in 2010. And workers making more than \$100,000 contributed 7.2 percent less in 2009 and 4.9 percent less in 2010. Since median contribution amounts are well below the statutory maximum contribution limits, reductions in contribution amounts are not due to changes in contribution limits, which increased over this period.

Contributions can increase even if workers don't change their contribution rates. All else equal, contributions will increase if earnings increase. However, we also find that contribution rates (contribution amount divided by total earnings) declined with the Great Recession (figure 11 and table 5). For the typical DC participant, contribution rates declined 2.2 percent between 2007 and 2009, from 5.1 to 5.0 percent. The largest changes occurred among the oldest workers. Between 2007 and 2009, median contribution rates declined 7.8 percent for workers ages 60 to 64 and 7.1 percent for those ages 65 to 69. In contrast, they declined only 2.1 percent for workers ages 20 to 29. Contribution rates declined further in 2010 for workers ages 20 to 29 and those ages 65 to 69 (figure 12). By 2010, their median contribution rates were 4.3 and 8.4 percent lower, respectively, than in 2007. In contrast, contribution rates increased slightly for workers ages 50 to 59 and those ages 60 to 64. Still, their median contribution rates in 2010 were 2.8 and 5.1 percent lower, respectively, than in 2007.

Among participants, median contribution rates for the lowest earners declined 15.8 percent between 2007 and 2009 from 4.0 to 3.4 percent (figure 13 and table 6). They declined 6.9 percent for workers earning \$40,000 to \$50,000 from 4.9 to 4.6 percent. Median contribution rates also declined 3.7 percent from 6.3 to 6.0 percent for workers making \$80,000 to \$100,000.

Multivariate Analysis of Participation

Table 7 reports logistic regression coefficients of DC participation among workers from 1991 to 2010. Models 1 and 2 vary only in the age specification: model 1 includes age and age squared and model 2 includes age splines. Both models show that workers' probability of participating increased with earnings, more work years, and age (but at a decreasing rate). Workers who changed jobs or returned to work after a spell of unemployment were less likely to participate in a DC plan surrounding their job change. This may reflect waiting periods for new workers or failure to initially enroll in offered plans with new employers. Our key variables of interest here are the year dummies. The probability that a worker contributed to a DC plan increased every year between 1991 and 2001, but then declined between 2001 and 2003 as the recession progressed and unemployment rates increased. Participation probabilities increased again between 2004 and 2008 and then declined after 2008 as the recession progressed and unemployment rates increased. The impact of the 2001 and 2008 recessions on participation probabilities continued past the official end of both recessions.

We see similar declines in DC participation associated with the 2001 and 2008 recessions using the retrospective sample that is limited to wage and salary workers offered a DC plan (table 8). We expand the set of explanatory variables to include characteristics known from the SIPP retrospective data including spouses' earnings and DC contributions, health, and pension characteristics. We also limit the sample to include only years the worker was with the employer

that offered the DC plan in the SIPP pension topical module. The models in table 8 control for many of the same variables as in Smith, Johnson, and Muller (2004), but also include year dummies.⁹ Models 1 and 2 vary only in the age specification: model 1 includes age and age squared and model 2 includes age splines. Again, we see a decline in participation following the 2001 and 2008 recessions. Figure 14 graphically compares the unadjusted logistic parameter estimates for the year dummies using both the sample of all workers and the sample of workers offered a plan (omitted year is 1991). The coefficients in the model of all workers represent a 1.9 percentage point reduction between 2001 and 2003 and a 1.7 percentage point reduction between 2008 and 2010 due to the recessions.¹⁰

Multivariate Analysis of Contribution Amount

Table 9 reports the results from our OLS regression of 401(k) retirement contributions for participating workers. Holding other factors constant, contributions increased from 1995 through 1998, declined until 2000, and then increased until 2006 where they leveled off until 2007. After 2007, contributions declined until 2009 and leveled off until 2010. Models 1 and 2 are identical except for the age specification, and both models find nearly identical contribution patterns by year.

Table 10 reports the results from a similar regression based on the retrospective sample (1990 to SIPP interview period only). This sample allows us to add additional explanatory variables available from the SIPP data but not known after the SIPP panel. This model controls for many of the same variables as in Smith, Johnson, and Muller (2004) and also includes year dummies. Despite these differences, many of the relationships shown in this table are similar to

⁹ Because the models include lagged terms, we exclude 1990 from the sample and omit 1991 from the models.

¹⁰ For workers offered a DC plan, the recessions lowered their probability of participating 1.2 percentage points between 2001 and 2003 and 1.7 percentage points between 2008 and 2009.

those in the original study. Although the coefficients on the year dummies are lower in this model than in the model reported in table 9, the pattern of contributions over time is identical (shown graphically in figure 15).

Unfortunately, our data do not include information about automatic enrollment. They also do not include information about changes in employer contributions in years other than the SIPP pension topical module year. Participation and contribution behaviors are likely affected by these and other factors we cannot control for. Despite these limitations, our results strongly suggest that economic forces, beyond just their effects on earnings and employment, influence workers' retirement saving behavior.

Workers, concerned about a future job loss, may stop contributing to their DC plan to not tie up saving in DC accounts that face tax penalties for withdrawals before age 59 ½. To test this hypothesis, we included forward-looking unemployment dummies in the participation and contribution functions for those under age 59 who face penalties and those over age 59 who do not face penalties. Results (not shown) find no significant effect of future unemployment on younger worker's participation, but a positive and significant effect for older workers where unemployment (no earnings in the next calendar year) include both retirement and full-year unemployment. Future unemployment increased contributions modestly for both younger and older participants. In all cases, including forward-looking indicators did not change our measured recession effects, nor did adding controls for whether the DC plan was a 401(k), 403(b), or other type DC plan.¹¹

¹¹ Beginning in 2004, the DER reports the DC plan type for DC contributions.

Investments

This section first examines how wage and salary workers allocate their DC contributions—that is the flows into retirement accounts. It then examines how individuals with retirement accounts have invested those assets—that is the stock of assets. This analysis is based on self-reported SIPP data and is limited to the pension and asset topical module years.

The percentage of workers investing their DC contributions in bonds increased dramatically with the recession from 38.0 percent in 2006 to 54.8 percent in 2009 (figure 16). Similarly, those investing in mixed stocks and bonds increased from 36.8 to 52.8 percent.¹²

Between 1998 and 2009, workers shifted their primary 401(k) investment type away from money markets accounts to diversified stock and bond investments (figure 17). Participant's primary DC investment type shifted away from stock funds with both the 2001-2003 and 2008-2009 stock market crashes. Despite the volatile stock market fluctuations over this period, DC participants have not abandoned equities but have shifted assets into more diversified investments. In 2006, 34.1 percent of DC participants invested primarily in employer stock or stock funds and 22.7 percent invested primarily in diversified stock bonds. In 2009, only 24.1 percent primarily invested their DC contributions in employer stock or stock funds, but 38.0 percent invested primarily in diversified stock bonds. The share investing their DC contributions primarily in money market accounts declined from 23.8 percent in 1998 to only 12.0 percent in 2009.

¹² Workers are invested in stocks if they report contributions to company stocks, stock funds, or diversified stock and bond funds. They are invested in bonds if they report contributions to bond funds or diversified stock and bond funds, and they are invested in fixed income accounts if they invest in long-term interest securities, government securities, money market, or other investments.

Next we use multivariate analysis to consider the probability that workers invest their DC contributions in stocks and how that has changed over time (table 11). Workers whose employers contribute to the plan are 55 percent more likely to invest in stocks than those whose employers do not contribute. In addition, having a plan that permits borrowing increases the likelihood of investing in stocks by 56 percent. However, we find no evidence that the likelihood of investing 401(k) contributions in stocks has changed between 2001, 2003, 2006, and 2009.

Among all adults with retirement accounts, the share with stocks or mutual funds declined between 2006 and 2009 from 83.1 to 75.4 percent, and the share with certificates of deposit, money market accounts, or government securities increased from 31.3 to 40.6 percent (figure 18).

Table 12 reports the results from a multivariate analysis that considers the probability that retirement account owners invest their balances in stocks and how that has changed over time. In addition to those variables reported in table 11 to be correlated with investing in stocks, homeownership, earnings, and work experience are all correlated all increase the likelihood that retirement account balances are invested in stocks. We also find that the probability of holding retirement account assets in stocks has changed over time. Compared with 1998, retirement account owners were 58.7 percent more likely to invest in stocks in 2003 and 63.7 percent more likely to invest in stocks 2006. However, they were only 52.9 percent more likely to invest in stocks in 2009 (a 10.8 percentage point decline relative to 2006).

Some of the changes in investment allocations over time reflect employers' adoption of target date funds as their default investment type, but the fluctuation in and out of stock funds around the stock market crashes suggests that some workers do adjust their investment portfolio

in response to how the market performs. However, the observed behavior is contrary to wise investment advice. Instead of buying equities when the price is low and selling equities when the price is high, some investors appear to do the opposite. The correlation between the DC investment behavior reported in the SIPP pension topical module and the retirement account allocation reported in the SIPP wealth topical module is poor.

Discussion

If the typical worker had done nothing in 2007 and kept his contributions in 2008 and 2009 at the 2007 level, instead of reducing them, his account balances would have been at least \$210 higher at the end of 2009 (table 13). If he had increased his contributions just 1 percent each year after 2007, his account balances would have been at least \$289 higher at the end of 2009. The long-run impacts are even greater, especially when compounded over many years.

The typical 30-year-old worker reduced his contributions by \$138 or 6 percent between 2007 and 2010 (see figure 9). His retirement account balance at age 62 is projected to be just under \$134,000 (table 14). (This assumes contributions begin increasing 1 percent per year after 2010 and that accumulated balances earn a 3 percent annual rate of return). If instead of reducing his contributions starting in 2007, he increased them just 1 percent each year, his account balance at age 62 would be \$145,572—a difference of \$11,907 or 8.9 percent. The further individuals were from retirement when the recession occurred and the higher their contributions before the recession, the larger the potential negative impact on their retirement savings. Of course, workers can recoup some or all of their investment losses by increasing their future contributions. For example, our hypothetical worker could recoup all of his losses from the recession by increasing his baseline contribution \$232 plus making a one-time catch-up contribution of \$520 all in 2011,

and then continuing future contributions at the higher level under the alternative scenario. The regression results in table 8 show that participation is lower immediately following a spell of unemployment, suggesting it is difficult to get back on track after losing a job. But for workers who do contribute after an unemployment spell (see table 10), they tend to contribute higher amounts on average in an attempt to catch up. For those who don't catch up, the recession will amount to a real loss in retirement savings.

Conclusions

With the erosion of DB pensions and the growth in DC plans, sound retirement planning increasingly depends on the commitment of individuals to invest in retirement accounts throughout their work lives. A better understanding of the factors influencing workers' 401(k) behavior could help policymakers design policies that encourage higher participation and contribution levels throughout workers' careers, thus enhancing private retirement savings so that retirees may rely less on Social Security benefits.

We find that the Great Recession, more than each of the previous two recessions, had a large negative impact on DC participants' behavior. Participation dropped off slightly, while contribution amounts and contribution rates declined dramatically—even after controlling for other factors. The decline in worker participation after the 2001 and 2008 recessions occurred despite the increased adoption of automatic enrollment. The decline in participation is especially sharp for younger workers who were more likely to be new employees and automatically enrolled in their employers' retirement plans. This suggests that economic forces outweigh inertia in participation decisions.

Furthermore, those with retirement accounts were much more likely to invest in bonds after the recession than they were before the recession. The increased prevalence of target date funds can help unsophisticated investors make better investment choices, but this only works if the default investments are good choices. While automatic enrollment and target date funds were established largely to help fight inertia, there is rising concern that defaults may lower retirement savings (Turgesen 2011).

Although the typical worker reduced his contributions only \$130 as a result of the Great Recession, this represented a decline of 4.9 percent. This is especially troubling when one considers that the median contribution amount before the recent recession began was only about \$2,600—far less than the 2007 legislated contribution limits of \$15,500 for workers under age 50 and \$20,500 for those ages 50 and older. Workers were already contributing to their retirement savings far less than permitted, and now they are contributing even less.

Finally, our results suggest that workers' participation and contribution decisions are not always made simultaneously, at least with regard to their response to recessions. As the economy falters, workers first lower their contribution amounts and later change their decision to participate. Lower contributions precede recessions, while lower participation follows recessions.

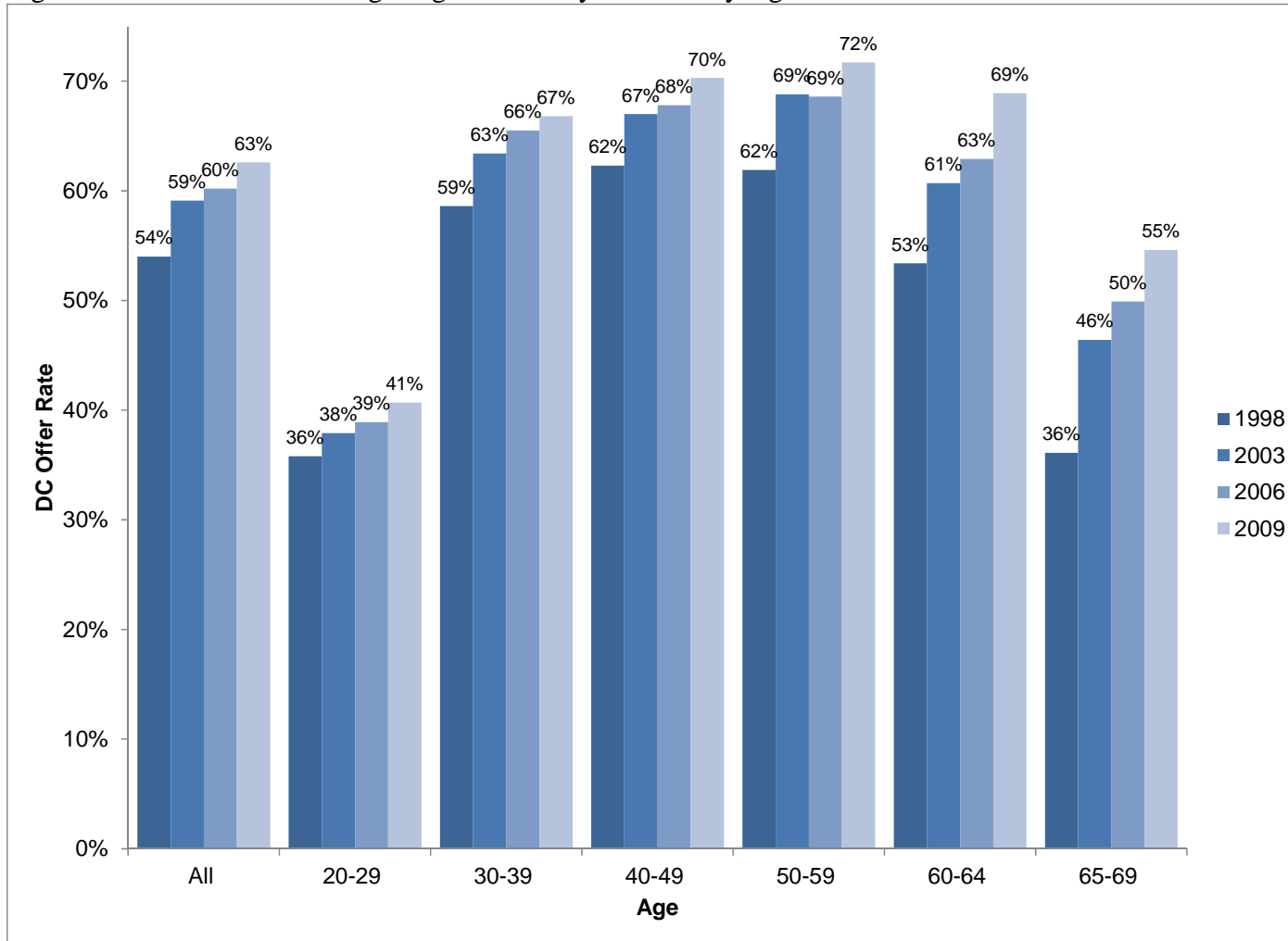
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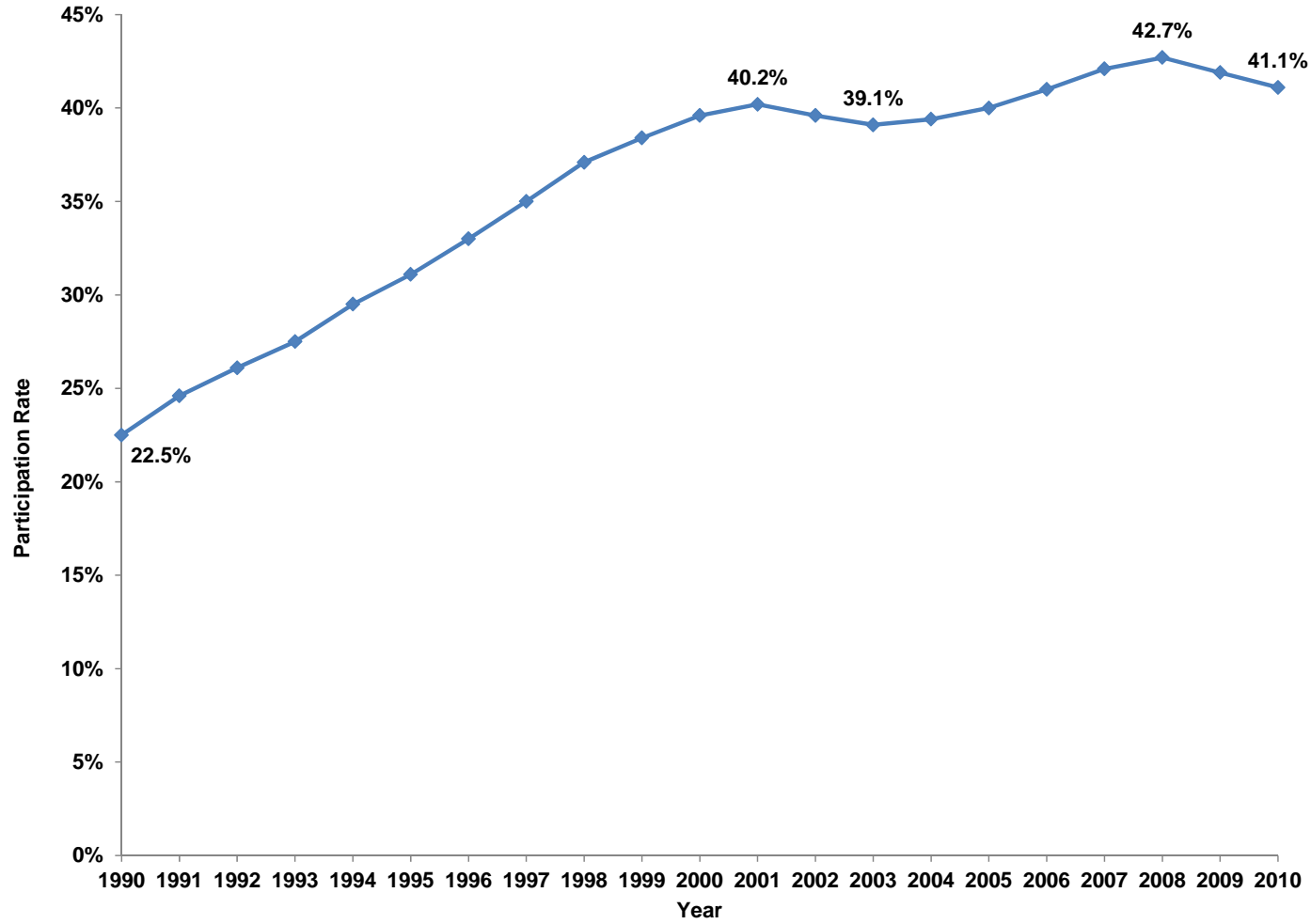
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Figure 1. DC Offer Rate among Wage and Salary Workers by Age and Year



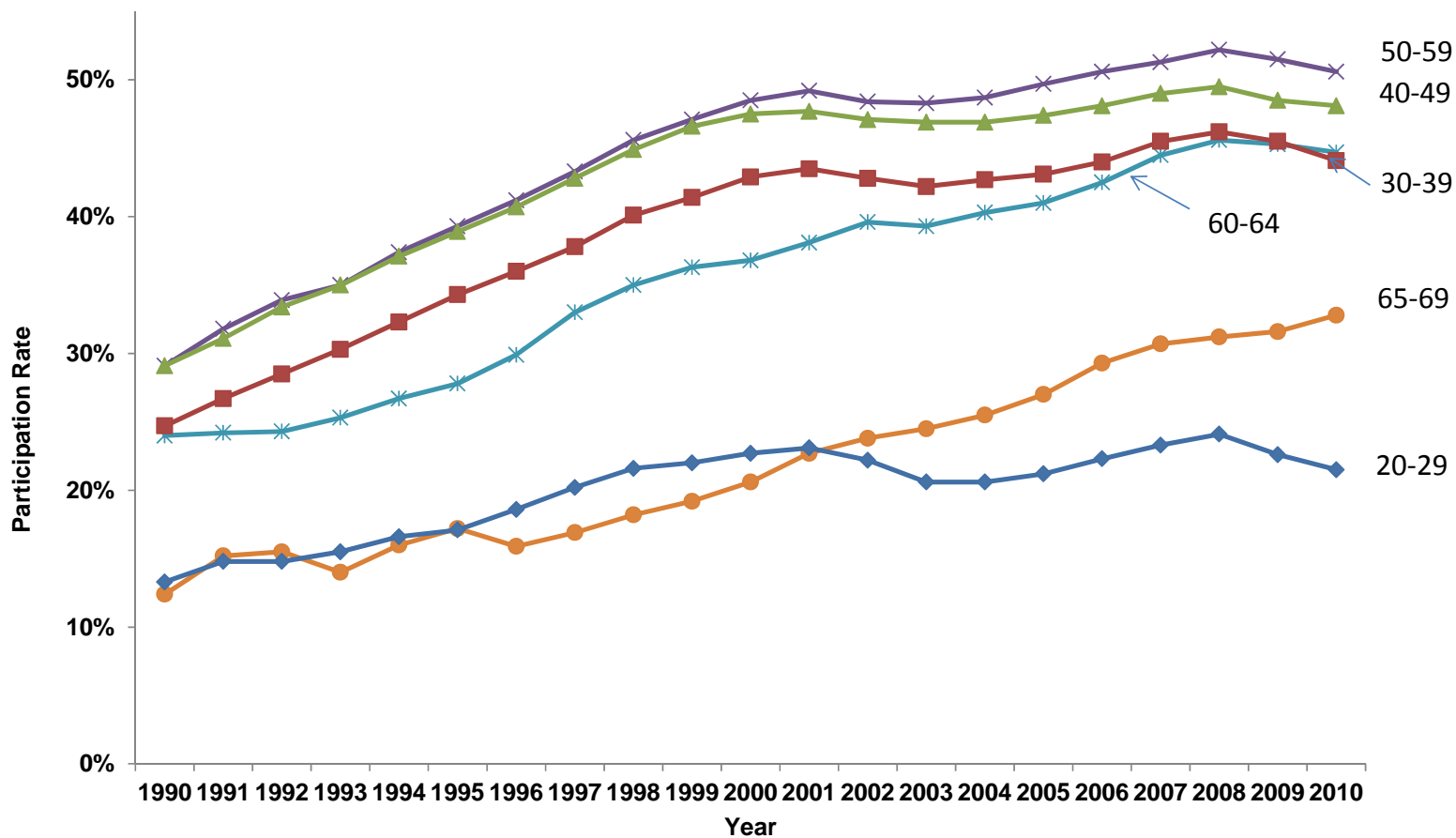
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP pension topical modules matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 2. Participation Rate among Wage and Salary Workers Ages 20 to 69, by Year



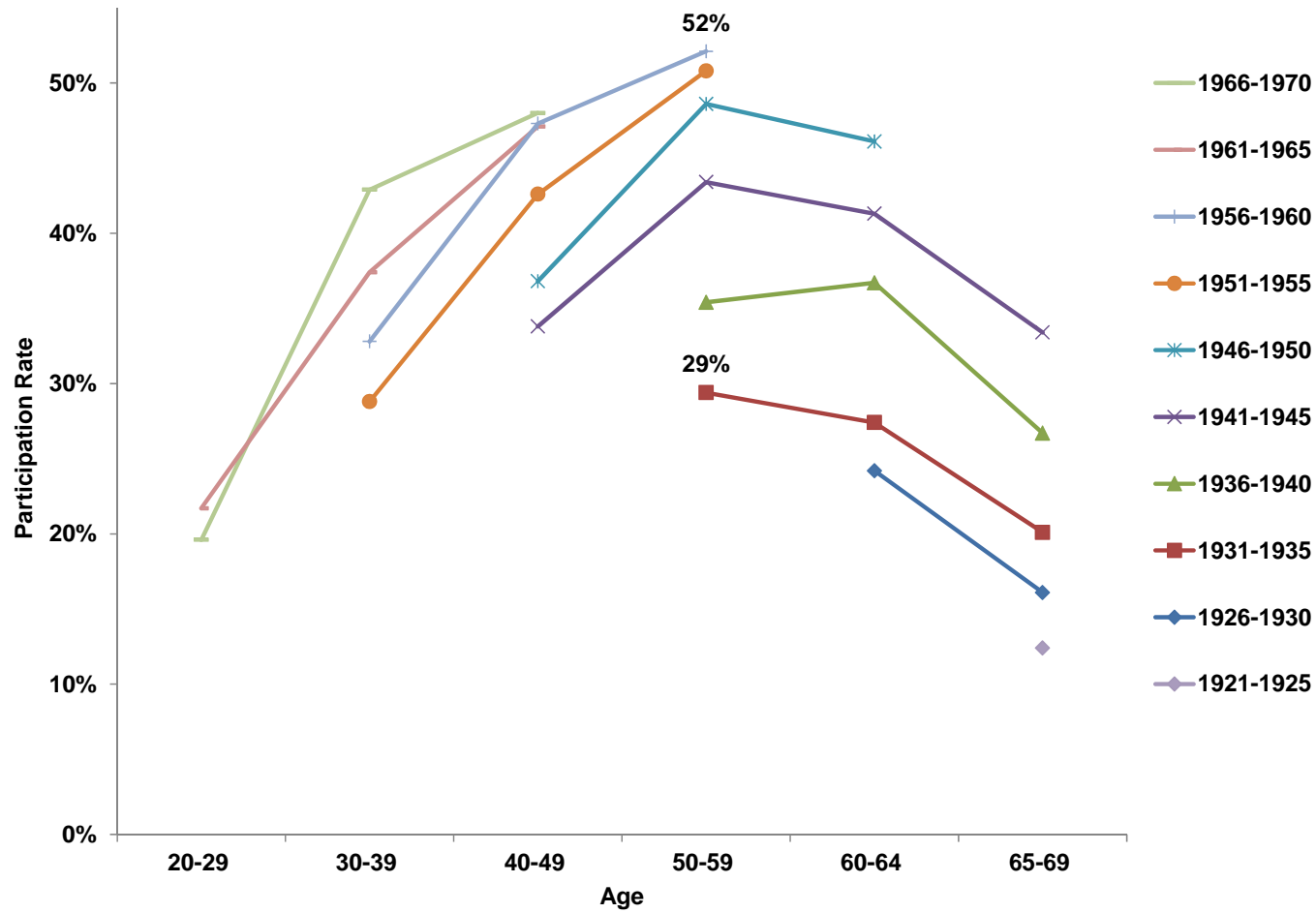
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 3. Participation Rate among Wage and Salary Workers by Age and Year



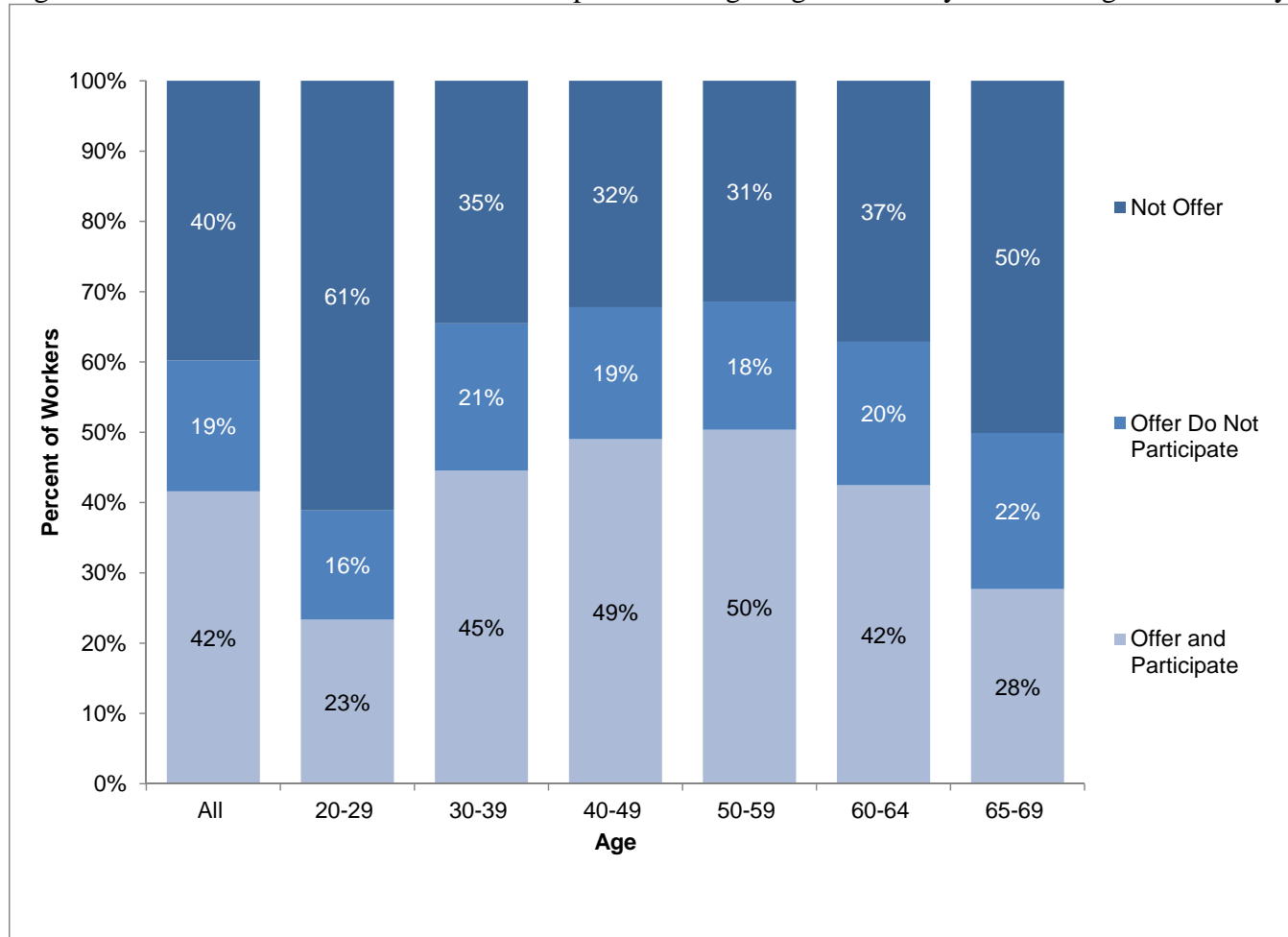
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 4. Participation Rate among Wage and Salary Workers by Age and Cohort



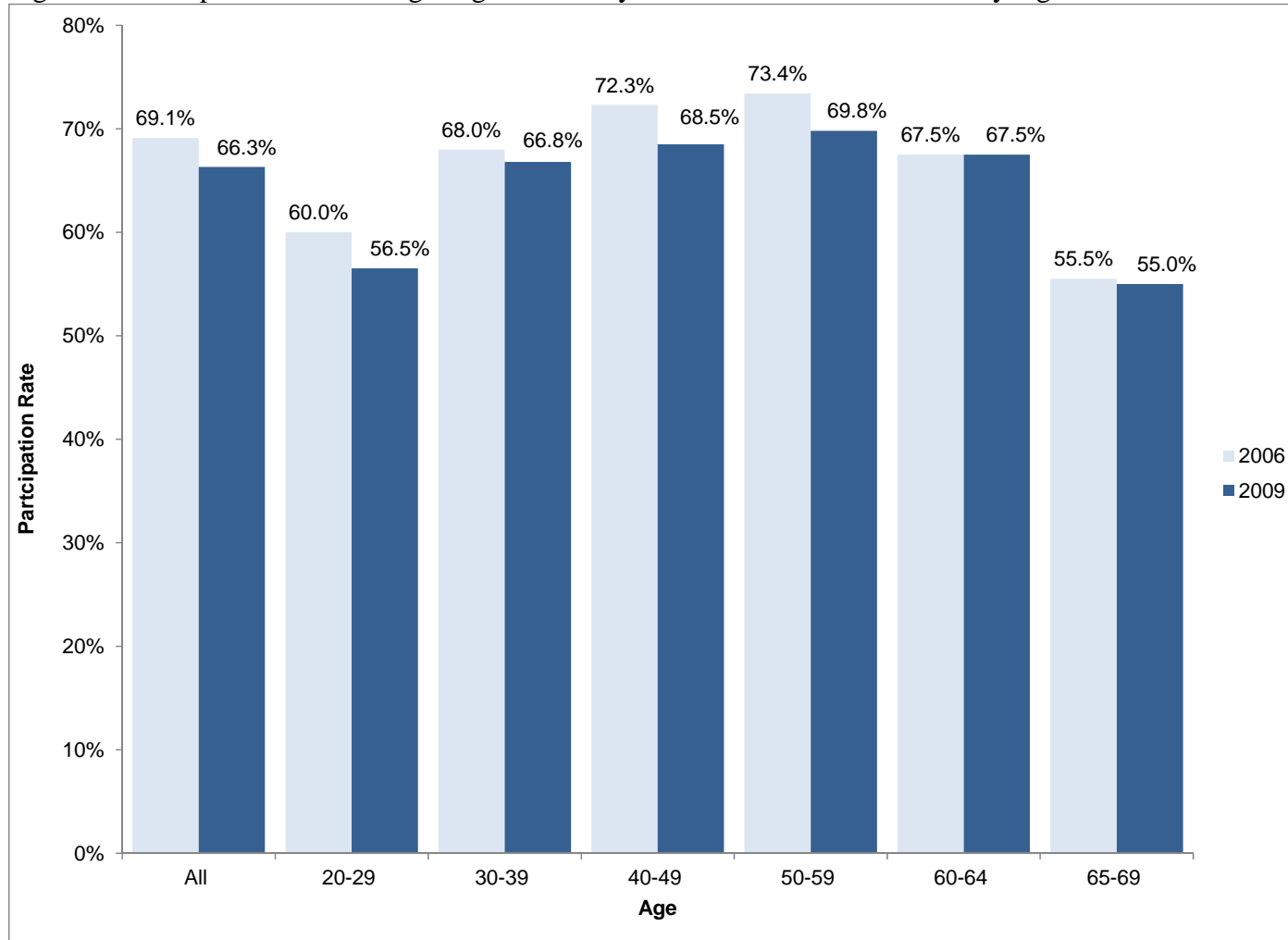
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 5. Distribution of DC Offer and Participation among Wage and Salary Workers Ages 20 to 69 by Age in 2006



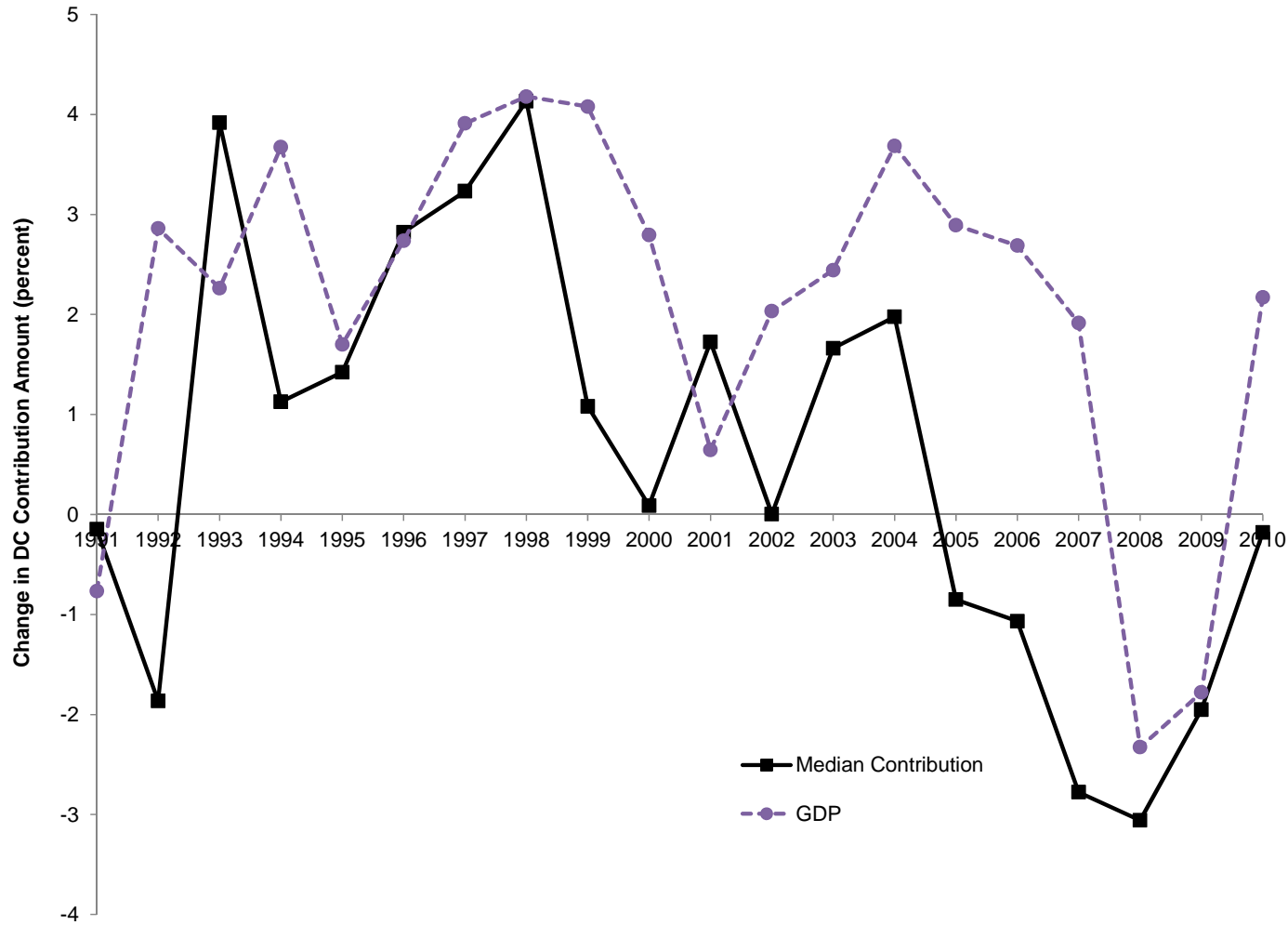
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Figure 6. Participation Rate among Wage and Salary Workers Offered a DC Plan by Age and Year



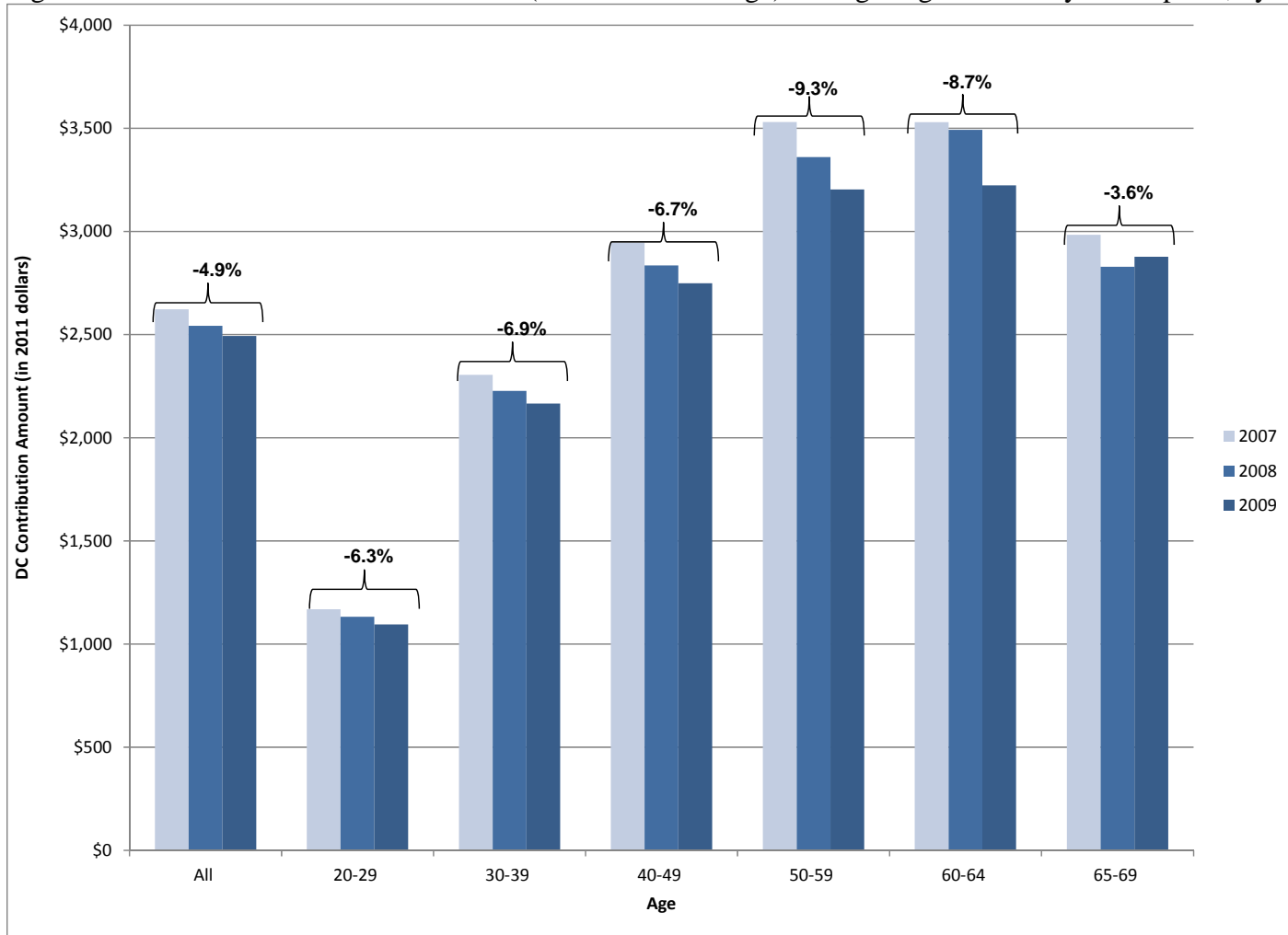
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 7. Percent Change in DC Contribution Amount among Wage and Salary Participants Ages 20 to 69, by Year



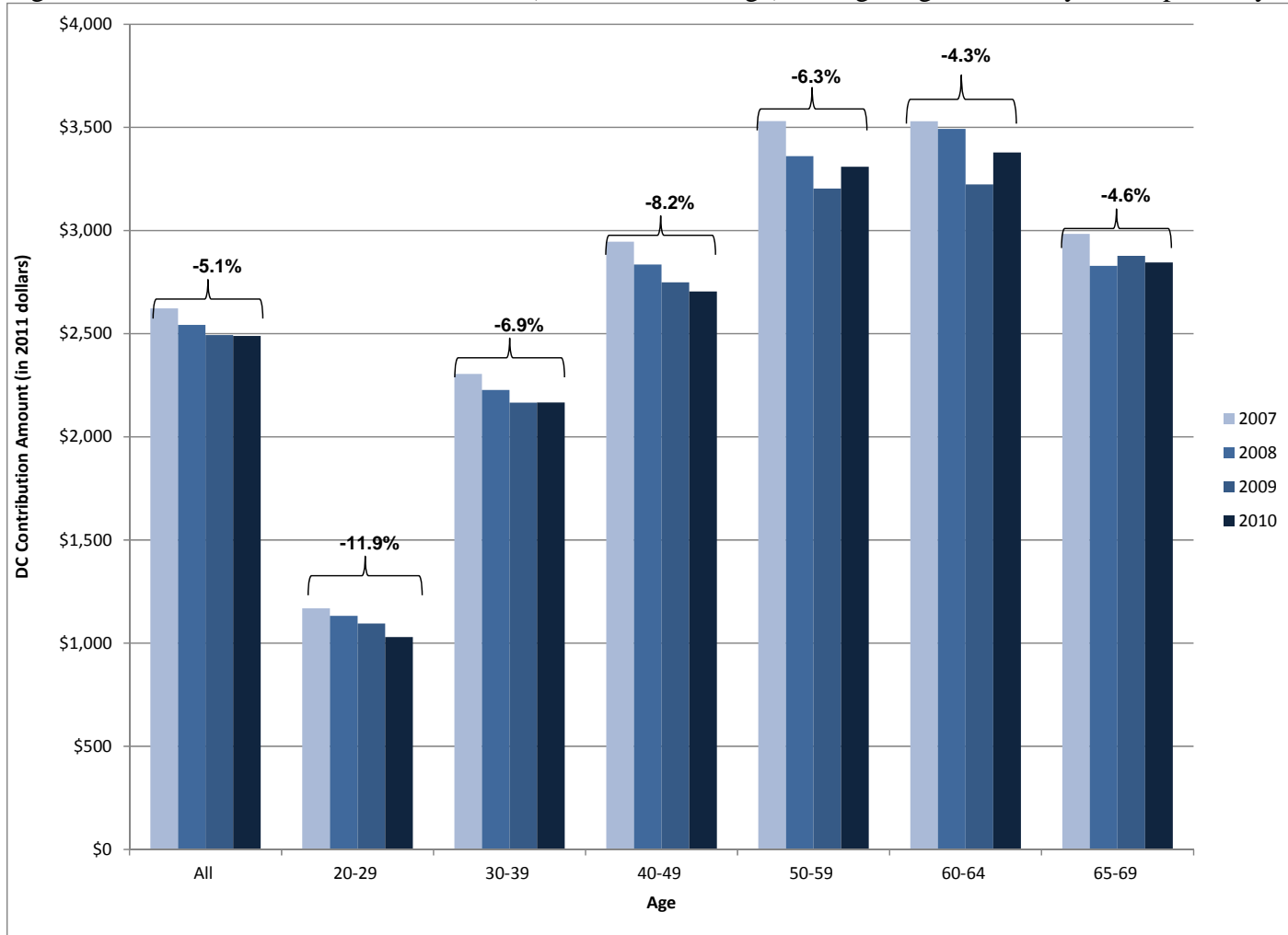
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 8. Median DC Contribution Amount (and Percent Change) among Wage and Salary Participants, by Age and Year



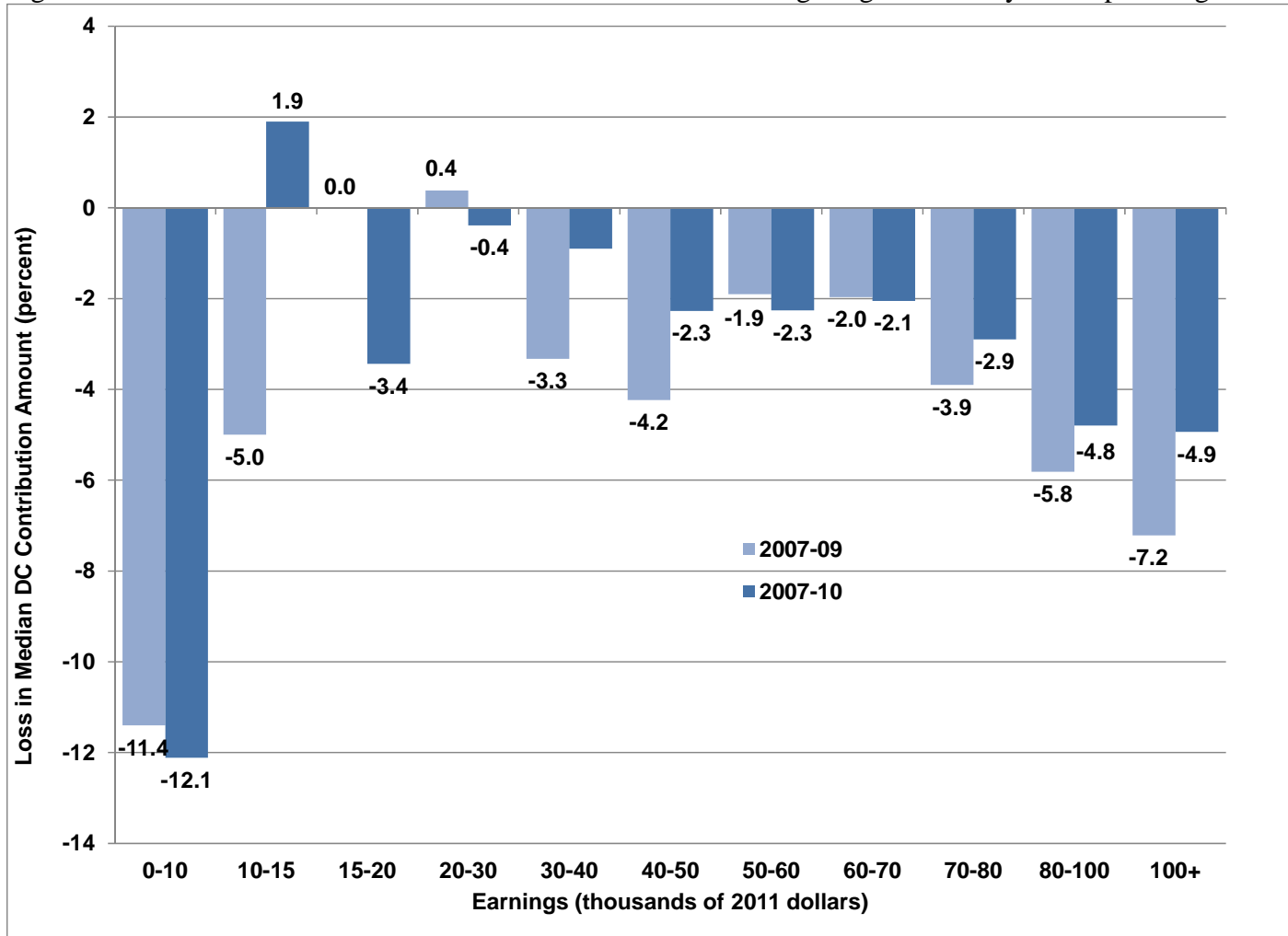
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 9. Median DC Contribution Amount (and Percent Change) among Wage and Salary Participants, by Age and Year



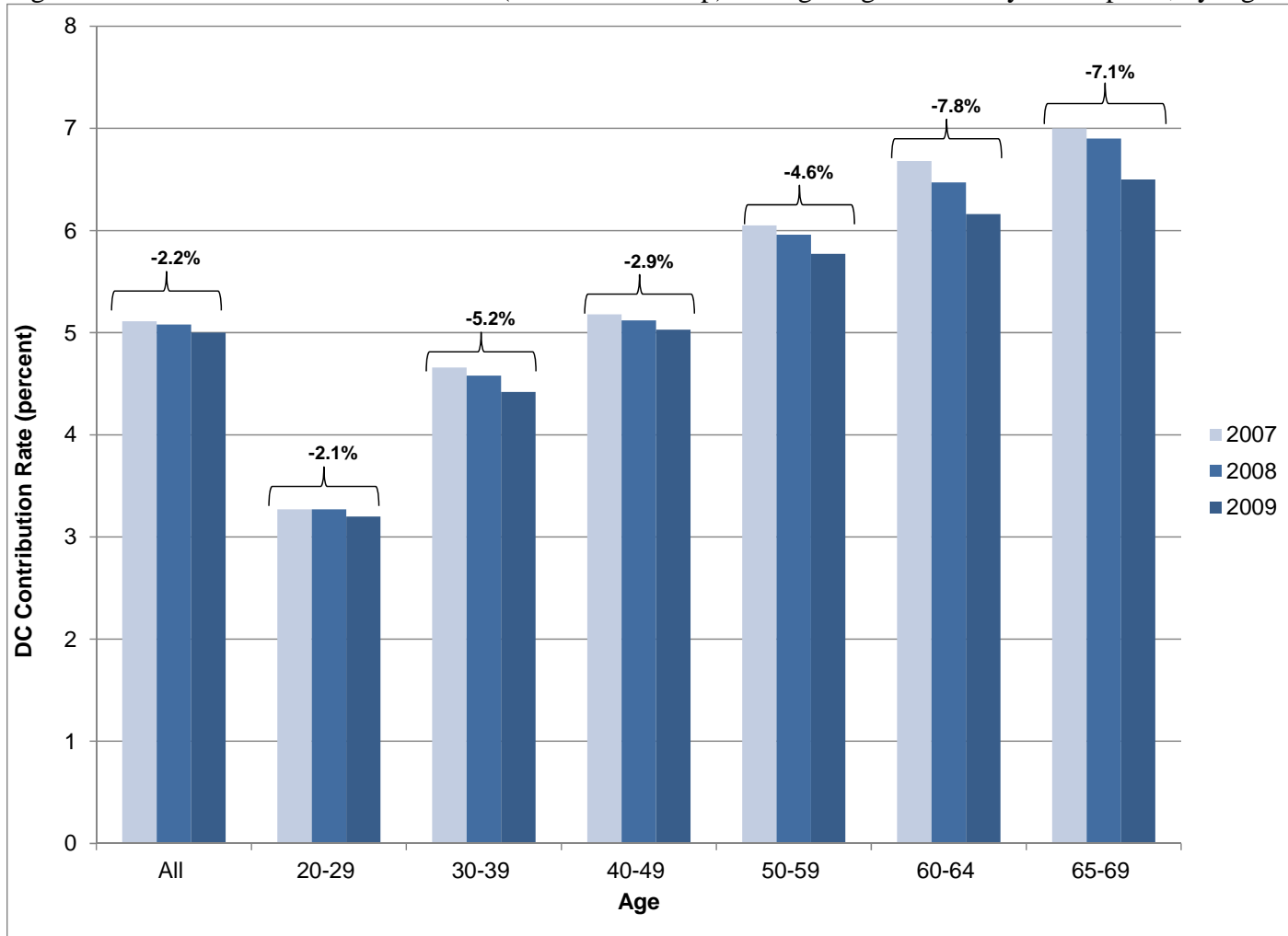
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 10. Percent Loss in Median DC Contribution Amount among Wage and Salary Participants Ages 20 to 69, by Earnings



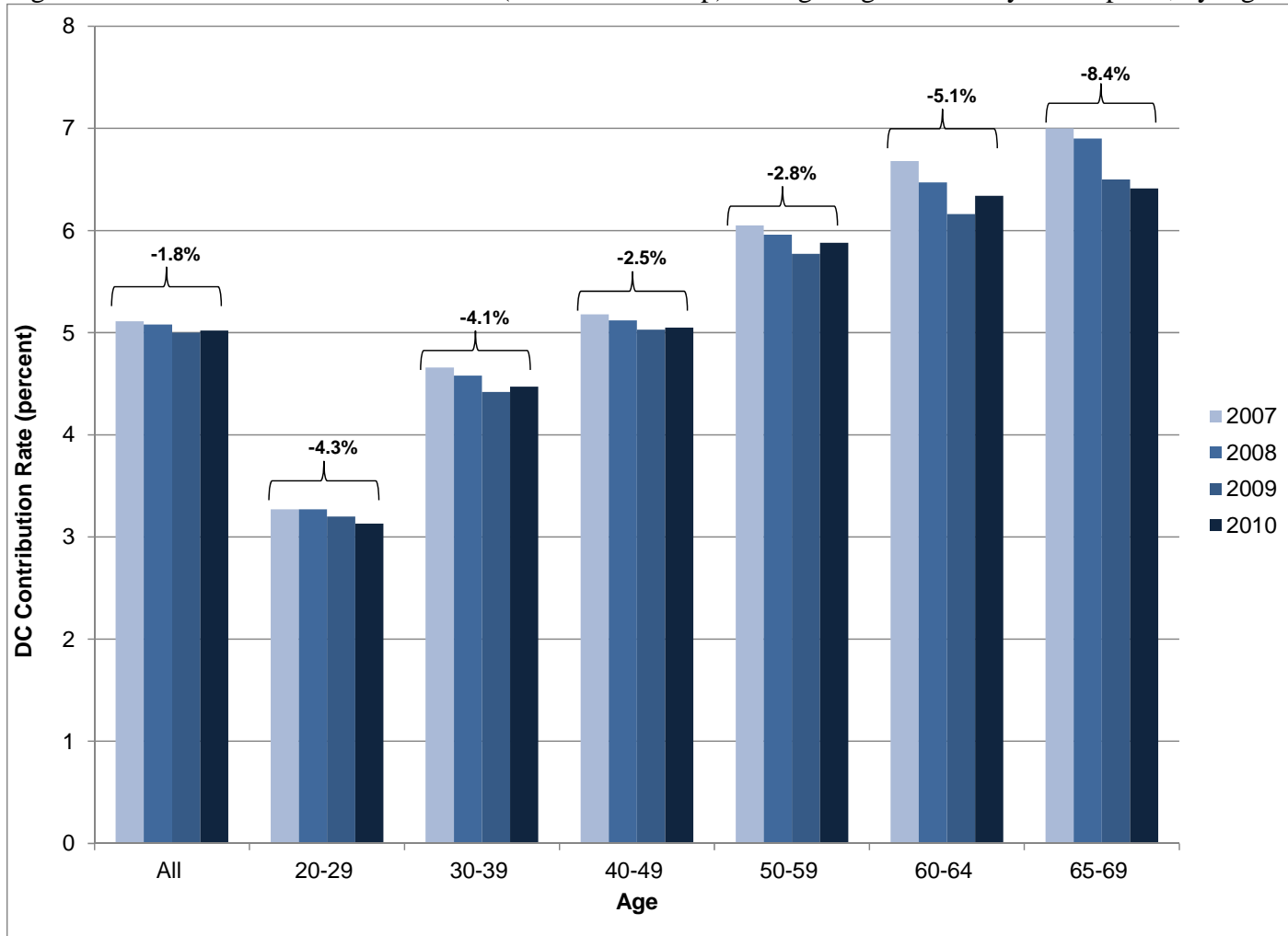
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 11. Median DC Contribution Rate (and Percent Drop) among Wage and Salary Participants, by Age and Year



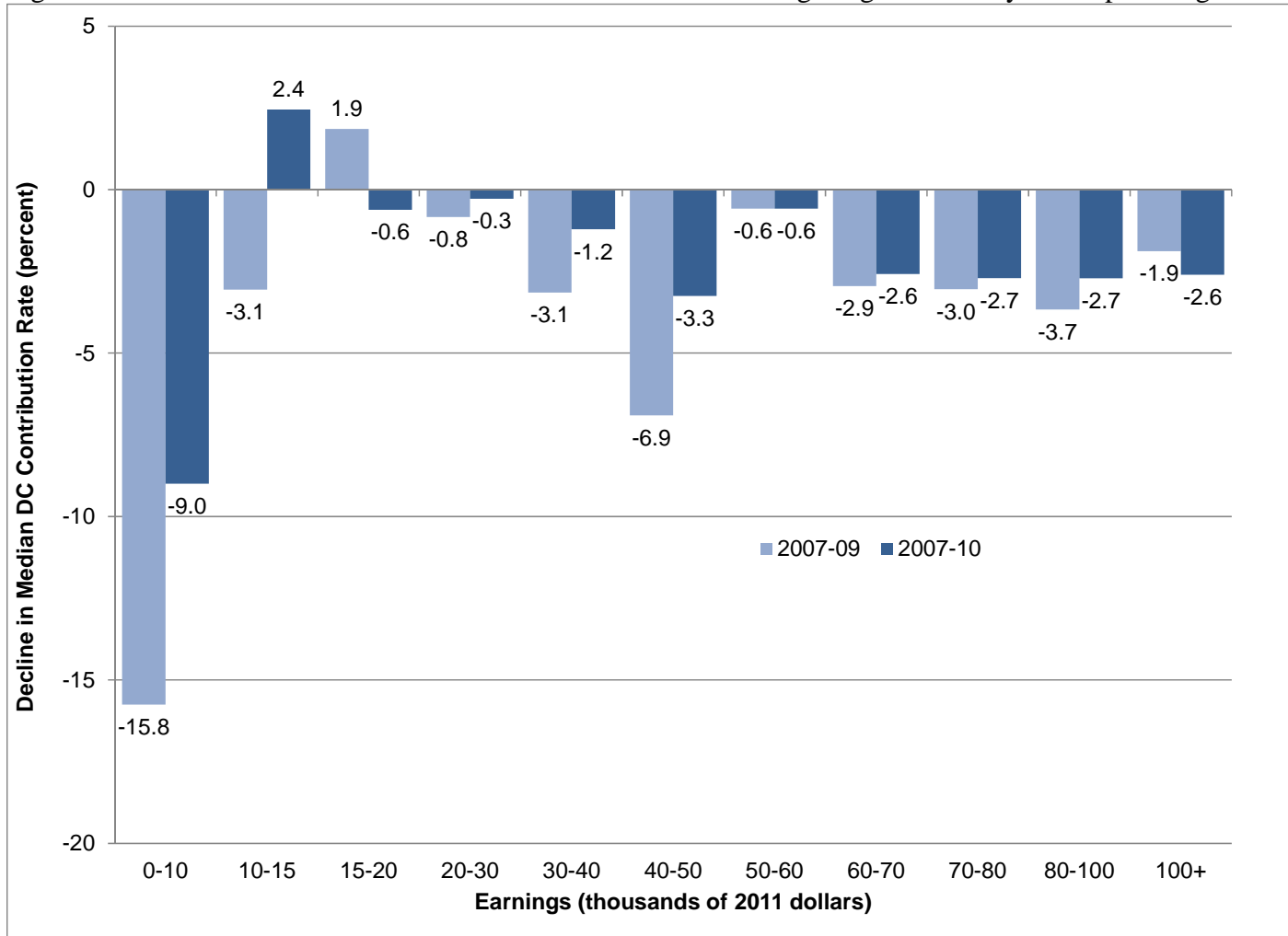
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 12. Median DC Contribution Rate (and Percent Drop) among Wage and Salary Participants, by Age and Year



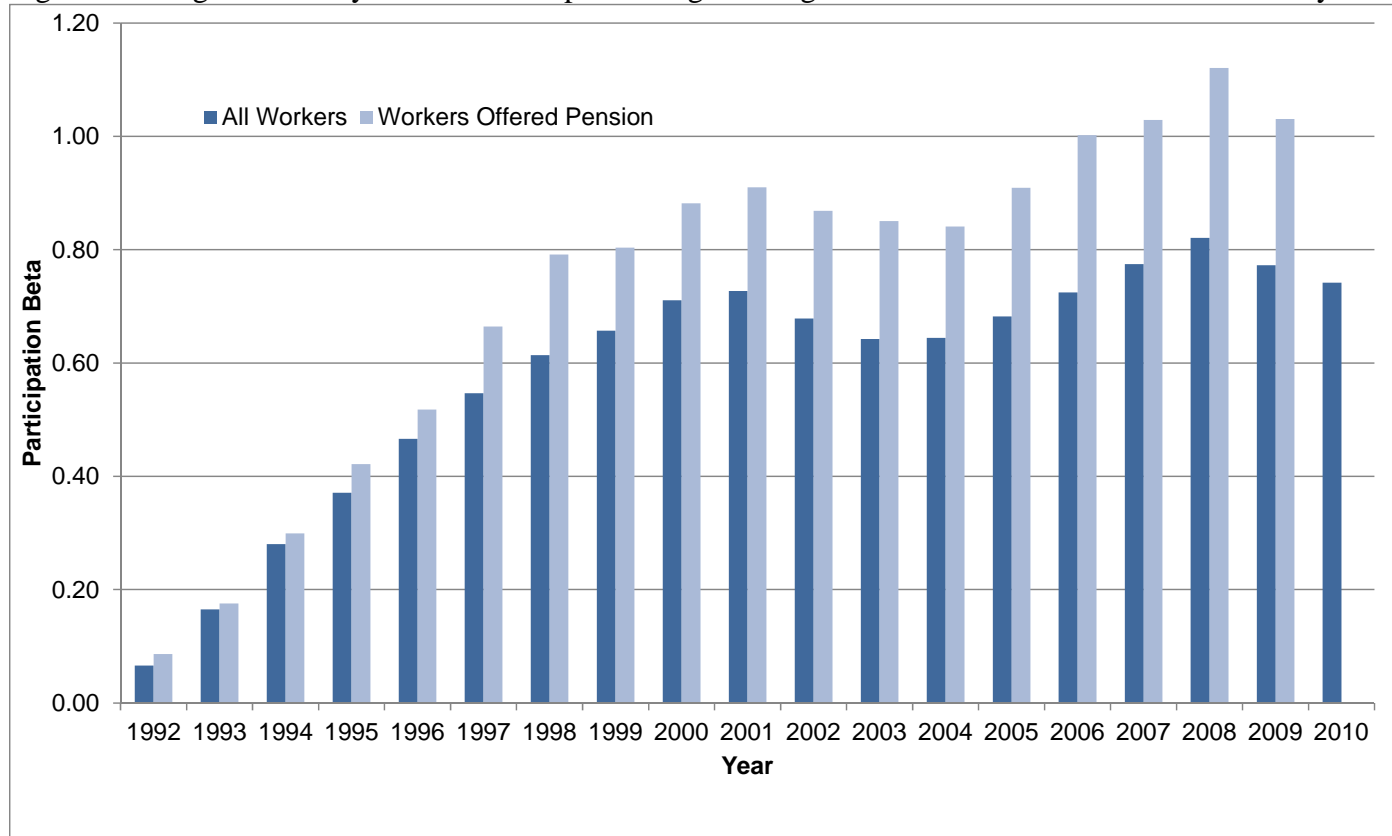
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 13. Percent Decline in Median DC Contribution Rate among Wage and Salary Participants Ages 20 to 69, by Earnings



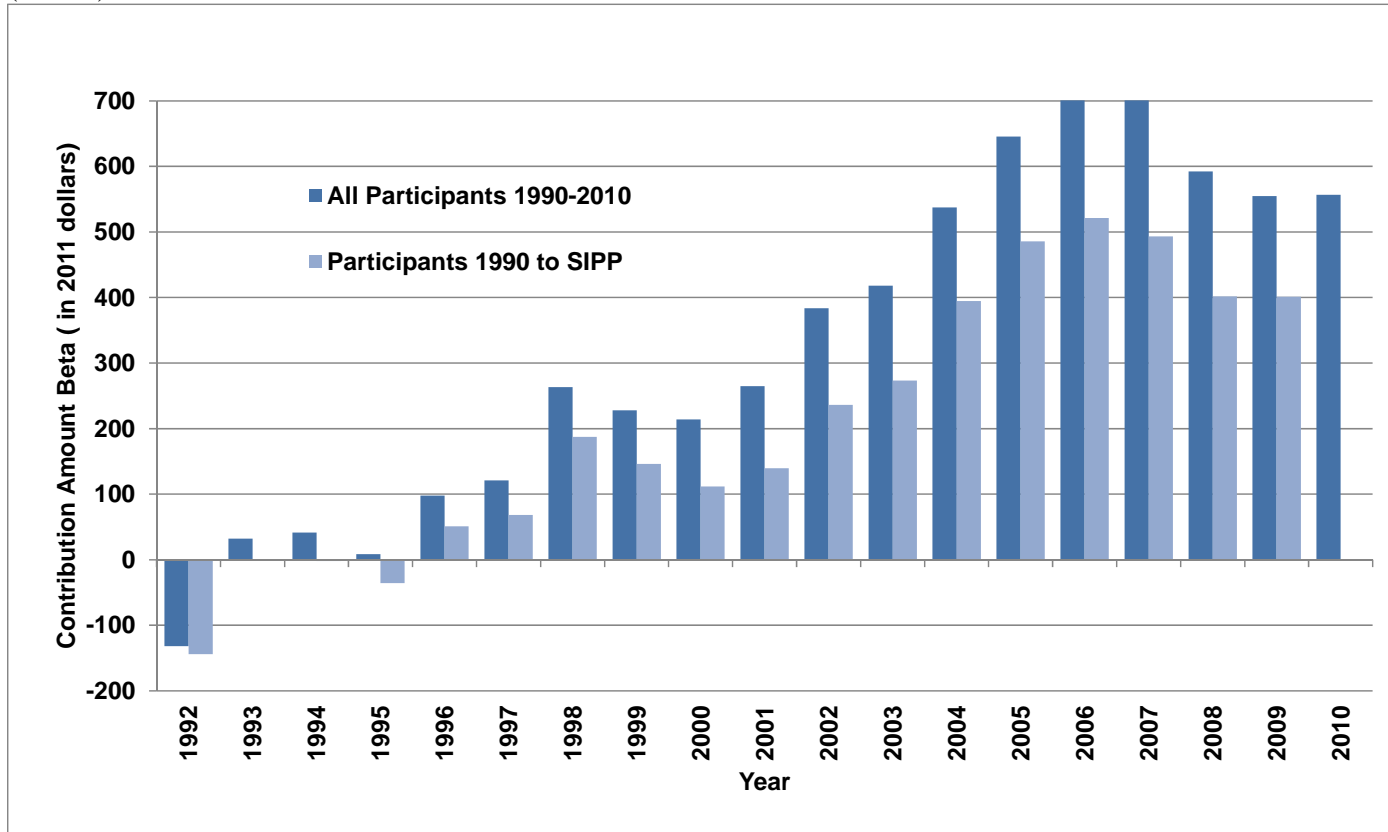
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 14. Wage and Salary Worker Participation Logistic Regression Parameter Estimates for Year by Estimation Sample



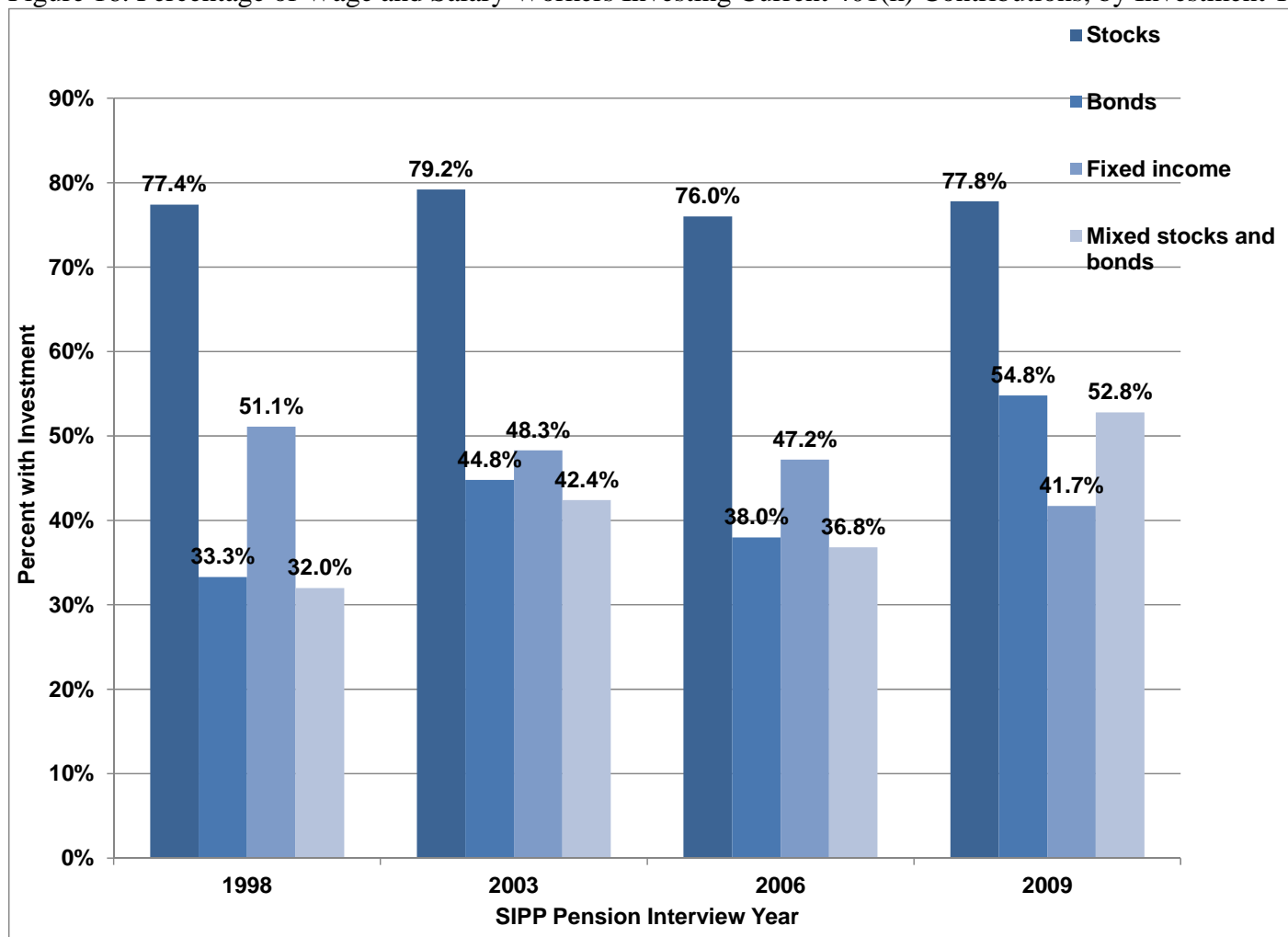
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 15. Wage and Salary Worker Contribution Amount OLS Regression Parameter Estimates for Year by Estimation Sample (\$2011)



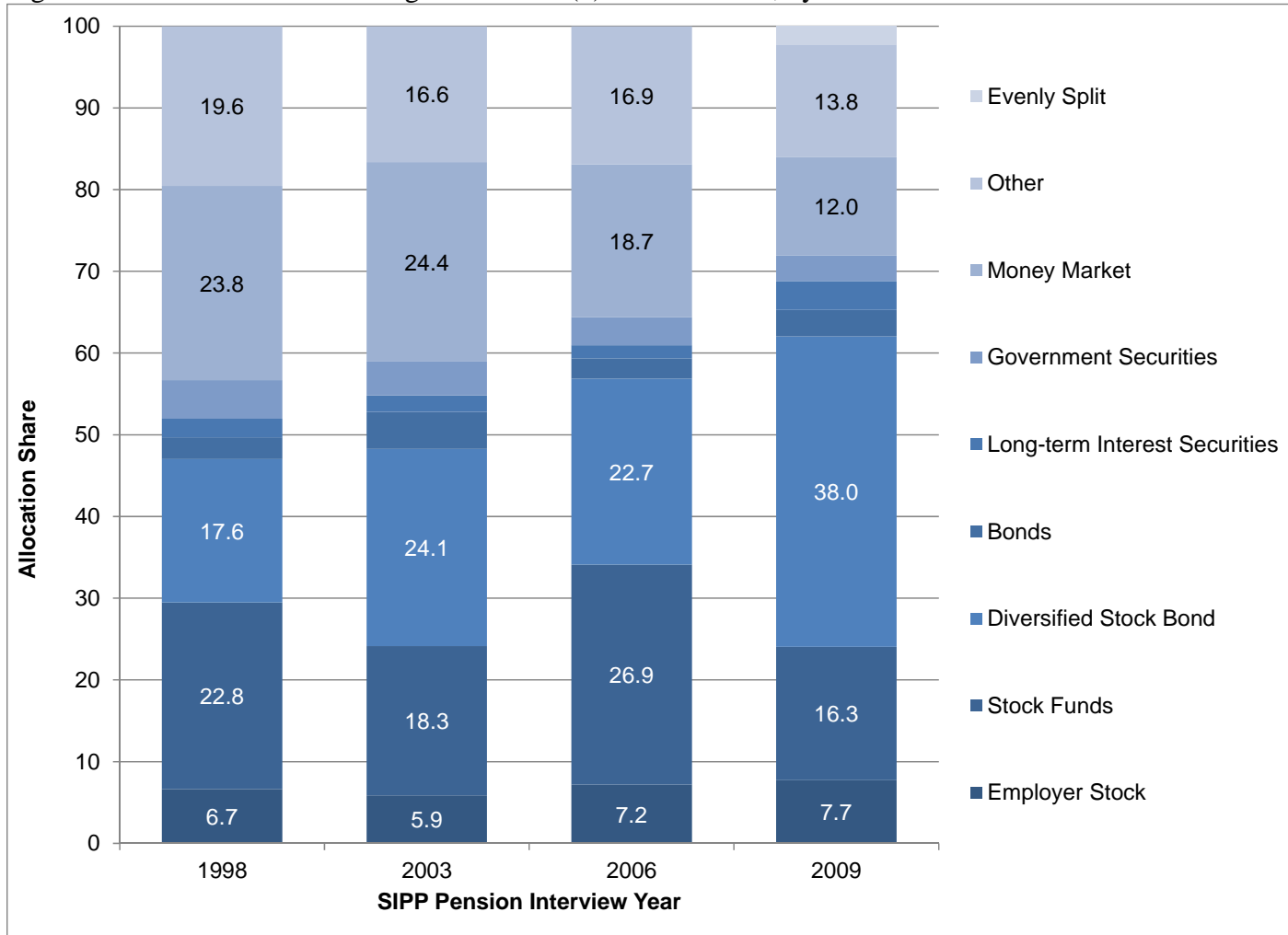
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Figure 16. Percentage of Wage and Salary Workers Investing Current 401(k) Contributions, by Investment Type and Year



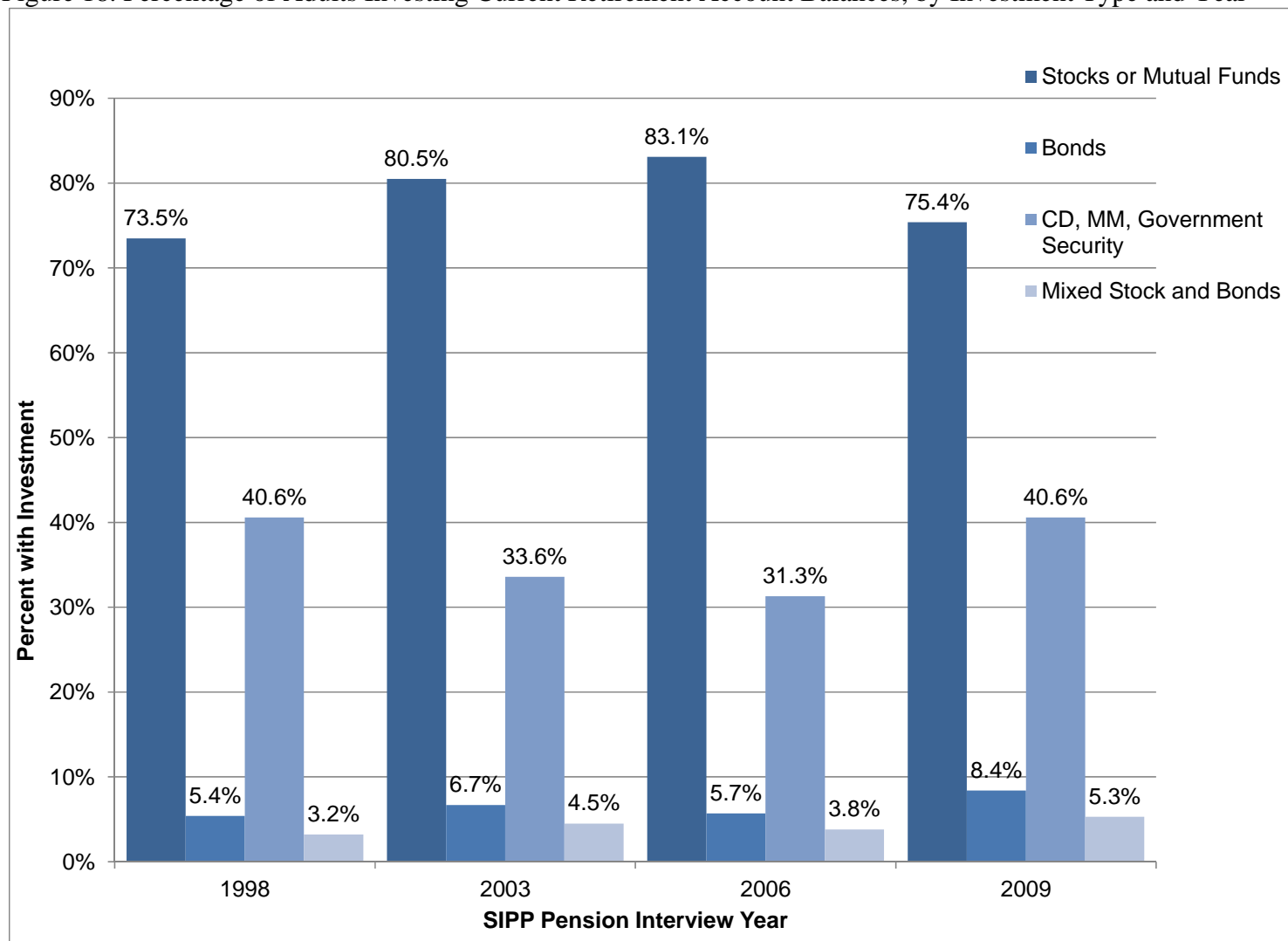
Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP pension topical modules.

Figure 17. Asset Allocation among Current 401(k) Contributions, by Year



Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP pension topical modules.

Figure 18. Percentage of Adults Investing Current Retirement Account Balances, by Investment Type and Year



Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP wealth topical modules (see text).

Table 1. Median Contribution Amount for Wage and Salary Participants Ages 20 to 69, by Year and Age (in 2011 dollars)

Year	Age						
	All	20-29	30-39	40-49	50-59	60-64	65-69
1990	2,233	1,247	2,007	2,722	3,606	4,028	3,595
1991	2,229	1,293	1,980	2,644	3,545	3,717	3,259
1992	2,188	1,179	1,957	2,646	3,574	3,849	2,405
1993	2,273	1,209	2,021	2,730	3,684	3,429	2,473
1994	2,299	1,227	2,056	2,721	3,605	3,300	2,550
1995	2,332	1,200	2,090	2,693	3,496	3,303	2,622
1996	2,398	1,236	2,183	2,724	3,502	3,450	2,731
1997	2,475	1,247	2,251	2,761	3,570	3,383	2,584
1998	2,577	1,377	2,362	2,875	3,643	3,608	3,201
1999	2,605	1,386	2,394	2,929	3,529	3,599	2,601
2000	2,608	1,394	2,419	2,901	3,545	3,287	2,362
2001	2,653	1,393	2,443	2,942	3,482	3,448	2,403
2002	2,653	1,386	2,448	2,993	3,570	3,402	2,520
2003	2,697	1,392	2,407	2,958	3,518	3,319	2,712
2004	2,750	1,290	2,402	3,042	3,603	3,570	2,974
2005	2,727	1,273	2,392	2,990	3,597	3,645	3,074
2006	2,698	1,236	2,360	2,978	3,577	3,580	2,922
2007	2,623	1,168	2,304	2,946	3,530	3,529	2,983
2008	2,542	1,132	2,226	2,835	3,360	3,492	2,829
2009	2,493	1,095	2,165	2,748	3,203	3,224	2,877
2010	2,488	1,030	2,166	2,705	3,309	3,378	2,845

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to 2010.

Table 2. Change in Median Contribution Amount for Wage and Salary Participants Ages 20 to 69, by Year and Age (percent)

Year	Age						
	All	20-29	30-39	40-49	50-59	60-64	65-69
1991	-0.1	3.7	-1.3	-2.9	-1.7	-7.7	-9.3
1992	-1.9	-8.8	-1.2	0.1	0.8	3.6	-26.2
1993	3.9	2.6	3.3	3.2	3.1	-10.9	2.8
1994	1.1	1.4	1.7	-0.3	-2.1	-3.8	3.1
1995	1.4	-2.2	1.7	-1.0	-3.0	0.1	2.8
1996	2.8	3.0	4.4	1.2	0.2	4.4	4.2
1997	3.2	0.8	3.1	1.3	1.9	-1.9	-5.4
1998	4.1	10.5	4.9	4.1	2.1	6.7	23.9
1999	1.1	0.6	1.4	1.9	-3.1	-0.2	-18.7
2000	0.1	0.6	1.1	-1.0	0.4	-8.7	-9.2
2001	1.7	-0.1	1.0	1.4	-1.8	4.9	1.8
2002	0.0	-0.5	0.2	1.7	2.5	-1.3	4.9
2003	1.7	0.4	-1.7	-1.2	-1.4	-2.4	7.6
2004	2.0	-7.3	-0.2	2.9	2.4	7.6	9.7
2005	-0.9	-1.3	-0.4	-1.7	-0.2	2.1	3.4
2006	-1.1	-2.9	-1.3	-0.4	-0.6	-1.8	-4.9
2007	-2.8	-5.5	-2.4	-1.1	-1.3	-1.4	2.1
2008	-3.1	-3.1	-3.4	-3.8	-4.8	-1.1	-5.2
2009	-2.0	-3.3	-2.7	-3.1	-4.7	-7.7	1.7
2010	-0.2	-5.9	0.1	-1.6	3.3	4.8	-1.1
2007-09	-4.9	-6.3	-6.0	-6.7	-9.3	-8.7	-3.6
2007-10	-5.1	-11.9	-6.0	-8.2	-6.3	-4.3	-4.6

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to 2010.

Table 3. Median Contribution Amount for Wage and Salary Participants Ages 20 to 69, by Year and Own Earnings (in 2011 dollars)

Year	Own Earnings (thousands of 2011 dollars)											
	All	0-10	10-15	15-20	20-30	30-40	40-50	50-60	60-70	70-80	80-100	100+
1990	2,233	326	536	699	919	1,374	1,957	2,450	3,126	3,813	4,776	7,636
1991	2,229	239	503	786	986	1,456	1,934	2,406	3,184	3,894	4,841	7,884
1992	2,188	197	525	641	932	1,389	1,925	2,446	3,144	3,854	4,899	8,019
1993	2,273	214	521	664	941	1,447	2,028	2,527	3,246	3,991	4,955	8,182
1994	2,299	217	552	692	986	1,487	1,989	2,606	3,298	3,955	5,149	8,397
1995	2,332	194	518	663	947	1,480	2,028	2,688	3,340	4,106	5,287	8,443
1996	2,398	220	545	724	951	1,518	2,078	2,711	3,512	4,225	5,294	9,005
1997	2,475	181	492	701	990	1,516	2,093	2,743	3,656	4,271	5,461	9,384
1998	2,577	231	555	708	987	1,529	2,130	2,760	3,549	4,458	5,626	9,833
1999	2,605	197	494	690	975	1,547	2,138	2,799	3,529	4,510	5,617	10,018
2000	2,608	212	492	682	957	1,543	2,099	2,828	3,629	4,461	5,792	10,156
2001	2,653	216	504	700	996	1,534	2,171	2,914	3,662	4,501	5,806	10,292
2002	2,653	206	494	684	953	1,538	2,141	2,898	3,732	4,528	6,022	10,650
2003	2,697	217	559	719	995	1,514	2,152	2,855	3,501	4,436	5,915	10,954
2004	2,750	204	509	661	958	1,473	2,150	2,868	3,543	4,406	5,909	11,297
2005	2,727	224	463	696	975	1,494	2,143	2,861	3,567	4,421	5,821	11,556
2006	2,698	214	464	633	958	1,441	2,134	2,884	3,526	4,432	5,813	11,771
2007	2,623	182	426	591	901	1,421	2,146	2,841	3,529	4,399	5,682	11,766
2008	2,542	195	431	574	910	1,410	2,160	2,827	3,570	4,374	5,460	11,672
2009	2,493	161	405	591	904	1,374	2,055	2,787	3,460	4,228	5,352	10,917
2010	2,488	160	434	571	897	1,409	2,097	2,777	3,457	4,272	5,410	11,185

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to 2010.

Table 4. Change in Median Contribution Amount for Wage and Salary Participants Ages 20 to 69, by Year and Own Earnings (percent)

Year	Own Earnings (thousands of 2011 dollars)											
	All	0-10	10-15	15-20	20-30	30-40	40-50	50-60	60-70	70-80	80-100	100+
1991	-0.1	-26.6	-6.1	12.3	7.3	6.0	-1.2	-1.8	1.8	2.1	1.4	3.2
1992	-1.9	-17.6	4.4	-18.3	-5.5	-4.6	-0.5	1.6	-1.3	-1.0	1.2	1.7
1993	3.9	8.3	-0.8	3.5	1.1	4.2	5.3	3.3	3.3	3.5	1.1	2.0
1994	1.1	1.4	5.9	4.3	4.7	2.7	-1.9	3.1	1.6	-0.9	3.9	2.6
1995	1.4	-10.5	-6.1	-4.2	-3.9	-0.5	2.0	3.2	1.3	3.8	2.7	0.5
1996	2.8	13.6	5.2	9.2	0.5	2.6	2.5	0.9	5.2	2.9	0.1	6.7
1997	3.2	-17.8	-9.7	-3.2	4.0	-0.2	0.7	1.2	4.1	1.1	3.2	4.2
1998	4.1	27.6	12.8	0.9	-0.3	0.9	1.8	0.6	-2.9	4.4	3.0	4.8
1999	1.1	-14.8	-11.1	-2.5	-1.2	1.2	0.4	1.4	-0.6	1.2	-0.2	1.9
2000	0.1	7.8	-0.3	-1.2	-1.9	-0.3	-1.8	1.0	2.8	-1.1	3.1	1.4
2001	1.7	1.8	2.5	2.6	4.1	-0.6	3.4	3.1	0.9	0.9	0.2	1.3
2002	0.0	-4.5	-2.1	-2.4	-4.3	0.2	-1.4	-0.6	1.9	0.6	3.7	3.5
2003	1.7	5.2	13.2	5.1	4.4	-1.5	0.5	-1.5	-6.2	-2.0	-1.8	2.9
2004	2.0	-6.0	-9.0	-8.1	-3.7	-2.7	-0.1	0.5	1.2	-0.7	-0.1	3.1
2005	-0.9	10.0	-9.0	5.4	1.7	1.4	-0.3	-0.2	0.7	0.3	-1.5	2.3
2006	-1.1	-4.5	0.2	-9.1	-1.7	-3.5	-0.4	0.8	-1.1	0.3	-0.1	1.9
2007	-2.8	-15.1	-8.1	-6.6	-6.0	-1.4	0.6	-1.5	0.1	-0.7	-2.2	-0.1
2008	-3.1	7.4	1.0	-2.9	1.1	-0.8	0.7	-0.5	1.1	-0.6	-3.9	-0.8
2009	-2.0	-17.5	-5.9	3.0	-0.7	-2.6	-4.9	-1.4	-3.1	-3.3	-2.0	-6.5
2010	-0.2	-0.8	7.3	-3.4	-0.8	2.5	2.1	-0.4	-0.1	1.0	1.1	2.5
2007-09	-4.9	-11.4	-5.0	0.0	0.4	-3.3	-4.2	-1.9	-2.0	-3.9	-5.8	-7.2
2007-10	-5.1	-12.1	1.9	-3.4	-0.4	-0.9	-2.3	-2.3	-2.1	-2.9	-4.8	-4.9

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to 2010.

Table 5. Median Contribution Rate for Wage and Salary Participants Ages 20 to 69, by Year and Age (percent)

Year	Age						
	All	20-29	30-39	40-49	50-59	60-64	65-69
1990	4.7	3.4	4.1	4.9	5.9	6.9	7.0
1991	4.7	3.7	4.1	4.9	6.0	6.7	6.3
1992	4.7	3.4	4.1	4.8	5.9	6.9	6.3
1993	4.8	3.6	4.2	5.0	6.0	6.7	6.3
1994	4.9	3.7	4.4	5.0	6.0	6.5	7.0
1995	4.9	3.6	4.5	5.0	6.0	6.3	6.4
1996	5.0	3.8	4.7	5.0	6.0	6.6	6.5
1997	5.0	3.7	4.7	5.0	6.0	6.6	6.6
1998	5.0	3.9	4.9	5.1	6.0	6.9	6.6
1999	5.1	3.9	4.9	5.1	6.0	6.8	6.6
2000	5.1	3.8	4.9	5.1	6.0	6.6	6.5
2001	5.2	3.9	5.0	5.2	6.0	6.9	7.1
2002	5.2	3.8	5.0	5.3	6.1	6.7	7.0
2003	5.2	3.8	4.9	5.2	6.1	6.6	7.2
2004	5.2	3.5	4.9	5.3	6.1	6.8	7.5
2005	5.2	3.6	4.9	5.2	6.1	7.1	7.2
2006	5.2	3.5	4.8	5.3	6.1	6.8	7.1
2007	5.1	3.3	4.7	5.2	6.1	6.7	7.0
2008	5.1	3.3	4.6	5.1	6.0	6.5	6.9
2009	5.0	3.2	4.4	5.0	5.8	6.2	6.5
2010	5.0	3.1	4.5	5.1	5.9	6.3	6.4

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to 2010.

Table 6. Median Contribution Rate for Wage and Salary Participants Ages 20 to 69, by Year and Own Earnings (percent)

Year	Own Earnings (thousands of 2011 dollars)											
	All	0-10	10-15	15-20	20-30	30-40	40-50	50-60	60-70	70-80	80-100	100+
1990	4.7	5.8	4.1	4.0	3.7	4.0	4.3	4.5	4.9	5.0	5.4	5.3
1991	4.7	4.3	4.0	4.5	3.9	4.1	4.2	4.4	5.0	5.1	5.4	5.5
1992	4.7	4.0	4.0	3.8	3.8	4.0	4.3	4.5	4.9	5.1	5.6	5.5
1993	4.8	4.0	4.1	3.7	3.8	4.1	4.5	4.7	5.0	5.3	5.7	5.7
1994	4.9	4.5	4.3	4.0	4.0	4.2	4.5	4.9	5.0	5.3	5.9	5.6
1995	4.9	4.0	4.0	3.8	3.8	4.1	4.6	5.0	5.1	5.5	6.0	5.5
1996	5.0	4.4	4.2	4.0	3.9	4.3	4.7	5.0	5.5	5.6	6.0	5.8
1997	5.0	3.8	4.0	3.9	4.0	4.3	4.8	5.0	5.7	5.8	6.1	5.9
1998	5.0	4.8	4.4	4.0	4.0	4.3	4.8	5.0	5.5	6.0	6.2	6.0
1999	5.1	4.2	4.1	3.9	3.9	4.4	4.9	5.1	5.5	6.1	6.2	6.0
2000	5.1	4.5	4.0	3.8	3.9	4.3	4.8	5.1	5.6	6.0	6.4	6.0
2001	5.2	4.4	4.0	4.0	4.0	4.4	5.0	5.2	5.7	6.0	6.4	6.1
2002	5.2	4.6	3.9	4.0	3.9	4.4	4.9	5.2	5.8	6.1	6.7	6.5
2003	5.2	4.5	4.5	4.1	4.0	4.3	4.9	5.1	5.4	6.0	6.6	6.5
2004	5.2	4.7	4.1	3.7	3.9	4.2	4.9	5.2	5.4	6.0	6.6	6.8
2005	5.2	4.7	3.6	4.0	3.9	4.2	4.9	5.2	5.5	6.0	6.4	6.8
2006	5.2	4.2	3.6	3.6	3.8	4.1	4.9	5.2	5.5	6.0	6.4	7.0
2007	5.1	4.0	3.3	3.2	3.6	4.1	4.9	5.1	5.4	5.9	6.3	6.9
2008	5.1	4.0	3.4	3.2	3.6	4.1	4.9	5.1	5.5	5.9	6.2	7.0
2009	5.0	3.4	3.2	3.3	3.6	4.0	4.6	5.1	5.3	5.7	6.0	6.8
2010	5.0	3.6	3.4	3.2	3.6	4.1	4.8	5.1	5.3	5.8	6.1	6.7

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to 2010.

Table 7. Logistic Regression of the Likelihood of Wage and Salary Workers Ages 20 to 69 Participating in 401(k) Plans, 1991 to 2010

	Model 1			Model 2		
	Parameter Estimate	Standard Error		Parameter Estimate	Standard Error	
Intercept	-14.696	0.031	**	-14.036	0.027	**
Log earnings (\$2011)	1.199	0.002	**	1.189	0.002	**
Gets a job this year after unemployment	-0.728	0.020	**	-0.732	0.020	**
Change jobs this year	-0.440	0.004	**	-0.435	0.004	**
Change jobs last year	-0.422	0.004	**	-0.419	0.004	**
Number of work years since age 20	0.021	0.000	**	0.021	0.000	**
Age	0.056	0.001	**			
Age Squared	-0.001	0.000	**			
Age Spline 20-29				0.062	0.001	**
Age Spline 30-39				-0.085	0.001	**
Age Spline 40-49				0.012	0.001	**
Age Spline 50-59				-0.007	0.001	**
Age Spline 60-69				-0.038	0.002	**
Year 1992	0.066	0.011	**	0.067	0.011	**
Year 1993	0.165	0.011	**	0.166	0.011	**
Year 1994	0.280	0.011	**	0.282	0.011	**
Year 1995	0.371	0.011	**	0.374	0.011	**
Year 1996	0.466	0.011	**	0.470	0.011	**
Year 1997	0.547	0.011	**	0.551	0.011	**
Year 1998	0.614	0.011	**	0.619	0.011	**
Year 1999	0.657	0.010	**	0.663	0.010	**
Year 2000	0.711	0.010	**	0.718	0.010	**
Year 2001	0.727	0.010	**	0.735	0.010	**
Year 2002	0.679	0.010	**	0.686	0.010	**
Year 2003	0.642	0.010	**	0.650	0.010	**
Year 2004	0.645	0.010	**	0.652	0.010	**
Year 2005	0.682	0.010	**	0.690	0.010	**
Year 2006	0.725	0.010	**	0.732	0.010	**
Year 2007	0.775	0.010	**	0.781	0.010	**
Year 2008	0.821	0.010	**	0.827	0.010	**
Year 2009	0.772	0.010	**	0.778	0.010	**
Year 2010	0.742	0.011	**	0.746	0.011	**
SIPP 2001	0.011	0.005		0.010	0.005	
SIPP 2004	0.026	0.004	**	0.025	0.004	**
SIPP 2008	-0.012	0.004		-0.014	0.004	
N (person-years)	2406035			2406035		
-2 Log Likelihood	2473126			2470566		

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Table includes all workers in all years 1991-2010. ** indicates p<0.001, * indicates p<0.01

Table 8. Logistic Regression Estimates of Whether a Wage and Salary Worker Offered a DC Plan Contributes to Their Plan (1996, 2001, 2004, 2008 SIPP)

	Model 1			Model 2		
	Parameter Estimate	Standard Error		Parameter Estimate	Standard Error	
Intercept	-9.310	0.068	**	-9.206	0.060	**
Married	-0.059	0.009	**	-0.068	0.009	**
Two earners	-0.540	0.009	**	-0.534	0.009	**
Number of dependents	-0.055	0.003	**	-0.059	0.004	**
Have a baby this year	0.146	0.018	**	0.119	0.018	**
Have a baby last year	0.082	0.017	**	0.055	0.017	
Purchase a home this year	-0.041	0.017		-0.052	0.017	
Purchase a home last year	-0.027	0.016		-0.039	0.016	
Own a home	0.176	0.007	**	0.180	0.007	**
Become work limited this year	0.373	0.066	**	0.371	0.066	**
Become work limited last year	0.223	0.064	*	0.221	0.064	*
Log of total earnings	0.789	0.005	**	0.782	0.005	**
Become divorced this year	-0.122	0.029	**	-0.134	0.029	**
Become widowed this year	-0.016	0.074		-0.027	0.074	
Get married this year	0.011	0.019		0.013	0.020	
Spouse contributes to a DC plan	0.219	0.011	**	0.219	0.011	**
Spouse's contribution rate (contribution/earnings)	1.786	0.114	**	1.798	0.114	**
Employer contributes to plan	-0.047	0.007	**	-0.046	0.007	**
Have a DB plan	0.344	0.007	**	0.347	0.007	**
Have a CB plan	0.213	0.015	**	0.213	0.015	**
Currently work limited	-0.171	0.022	**	-0.176	0.022	**
Spouse currently work limited	-0.025	0.018		-0.023	0.018	
Gets a job this year after unemployment	-1.102	0.041	**	-1.103	0.041	**
Spouse gets a job this year after unemployment	0.267	0.026	**	0.264	0.026	**
Change jobs this year	-0.331	0.008	**	-0.326	0.008	**
Spouse changes jobs this year	0.062	0.008	**	0.062	0.008	**
Change jobs last year	-0.374	0.008	**	-0.371	0.008	**
Spouse changes jobs last year	0.041	0.009	**	0.040	0.009	**
Spouses loses a job this year	-0.040	0.024		-0.041	0.024	
Spouse begins to contribute to DC plan this year	-0.059	0.022		-0.061	0.022	
Can borrow from pension plan	0.480	0.007	**	0.478	0.007	**
Number of work years since age 20	0.019	0.001	**	0.019	0.001	**
Age	0.020	0.002	**			
Age squared	0.000	0.000	**			
Age Spline 20-29				0.041	0.002	**
Age Spline 30-39				-0.058	0.003	**
Age Spline 40-49				0.007	0.002	
Age Spline 50-59				0.010	0.003	**
Age Spline 60-69				-0.037	0.005	**

Table 8. Logistic Regression Estimates of Whether a Wage and Salary Worker Offered a DC Plan Contributes to Their Plan (1996, 2001, 2004, 2008 SIPP)

	Model 1			Model 2		
	Parameter Estimate	Standard Error		Parameter Estimate	Standard Error	
Year 1992	0.086	0.022	**	0.088	0.022	**
Year 1993	0.176	0.022	**	0.178	0.022	**
Year 1994	0.299	0.021	**	0.302	0.021	**
Year 1995	0.422	0.021	**	0.426	0.021	**
Year 1996	0.518	0.020	**	0.522	0.020	**
Year 1997	0.664	0.020	**	0.669	0.020	**
Year 1998	0.791	0.020	**	0.796	0.020	**
Year 1999	0.804	0.022	**	0.810	0.022	**
Year 2000	0.882	0.021	**	0.888	0.021	**
Year 2001	0.910	0.021	**	0.915	0.021	**
Year 2002	0.869	0.020	**	0.873	0.020	**
Year 2003	0.851	0.020	**	0.854	0.020	**
Year 2004	0.841	0.021	**	0.845	0.021	**
Year 2005	0.909	0.021	**	0.912	0.021	**
Year 2006	1.002	0.020	**	1.003	0.021	**
Year 2007	1.029	0.023	**	1.031	0.023	**
Year 2008	1.121	0.023	**	1.122	0.023	**
Year 2009	1.031	0.023	**	1.029	0.023	**
SIPP 2001	-0.194	0.012	**	-0.193	0.012	**
SIPP 2004	-0.216	0.011	**	-0.214	0.011	**
SIPP 2008	-0.328	0.011	**	-0.325	0.011	**
N (person-years)	564,259			564,259		
-2 log likelihood	662,993			662,585		

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Table includes all workers from 1991 to 2009 over the duration of the SIPP interview pension job. ** indicates $p < 0.001$, * indicates $p < 0.01$

Table 9. OLS Regression Estimates of Contribution Amount Among Wage and Salary Participants Ages 20 to 69, 1991 to 2010

	Model 1			Model 2		
	Parameter Estimate	Standard Error		Parameter Estimate	Standard Error	
Intercept	-35574.00	79.694	**	-36765.00	65.646	**
Log earnings (\$2011)	3778.09	5.671	**	3786.65	5.682	**
Gets a job this year after unemployment	3315.92	64.965	**	3302.55	64.934	**
Change jobs this year	-519.54	10.008	**	-530.51	10.011	**
Change jobs last year	-226.59	11.397	**	-234.82	11.396	**
Number of work years since age 20	-28.18	0.996	**	-29.61	0.999	**
Age	-127.51	2.776	**			
Age Squared	2.37	0.031				
Age Spline 20-29				-85.33	3.136	
Age Spline 30-39				157.52	4.197	**
Age Spline 40-49				4.32	2.841	
Age Spline 50-59				70.85	3.066	**
Age Spline 60-69				-41.23	6.148	**
Year 1992	-131.56	30.909		-129.10	30.893	**
Year 1993	32.12	30.382		34.58	30.367	
Year 1994	41.71	29.775		43.75	29.760	
Year 1995	8.64	29.317		9.49	29.303	
Year 1996	97.99	28.885	*	97.97	28.871	*
Year 1997	121.24	28.450	**	120.55	28.435	**
Year 1998	263.41	28.059	**	261.99	28.046	**
Year 1999	227.99	27.832	**	225.40	27.818	**
Year 2000	214.20	27.617	**	211.48	27.603	**
Year 2001	264.72	27.520	**	260.95	27.507	**
Year 2002	383.79	27.598	**	379.09	27.585	**
Year 2003	418.14	27.671	**	413.96	27.657	**
Year 2004	537.60	27.626	**	533.28	27.613	**
Year 2005	645.29	27.543	**	640.33	27.530	**
Year 2006	700.78	27.408	**	695.57	27.396	**
Year 2007	700.49	27.269	**	695.71	27.256	**
Year 2008	592.37	27.223	**	587.55	27.210	**
Year 2009	554.62	27.425	**	551.66	27.411	**
Year 2010	556.56	27.579	**	554.59	27.565	**
SIPP 2001	9.06	12.420		10.00	12.414	
SIPP 2004	47.94	10.453	**	48.64	10.448	**
SIPP 2008	63.54	10.352	**	64.71	10.348	**
N (person-years)	878,618			878,618		
R-Squared	0.3864			0.3871		

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Table includes all workers in all years 1991-2010. ** indicates $p < 0.001$, * indicates $p < 0.01$

Table 10. OLS Regression Estimates of Contribution Amount Among Wage and Salary Participants Ages 20 to 69, 1991 to 2009

	Model 1			Model 2		
	Parameter Estimate	Standard Error		Parameter Estimate	Standard Error	
Intercept	-34304.00	101.653	**	-36735.0	86.418	**
Married	123.01	12.493	**	138.9	12.509	**
Two earners	-2080.87	13.084	**	-2092.6	13.105	**
Number of dependents	-42.49	5.533	**	-40.8	5.665	**
Have a baby this year	230.57	25.949	**	282.3	26.056	**
Have a baby last year	135.49	25.271	**	183.8	25.362	**
Purchase a home this year	-191.61	24.895	**	-172.1	24.899	**
Purchase a home last year	-129.09	24.351	**	-109.0	24.358	**
Own a home	103.40	10.577	**	96.7	10.576	**
Become work limited this year	235.03	86.001		234.3	85.961	
Become work limited last year	319.90	98.275		320.7	98.228	
Log of total earnings	3753.34	7.774	**	3762.7	7.788	**
Become divorced this year	-354.44	43.666	**	-329.9	43.659	**
Become widowed this year	-169.11	111.405		-148.0	111.356	
Get married this year	-57.46	29.164		-59.2	29.151	
Spouse contributes to a DC plan	-1625.09	15.601	**	-1619.2	15.597	**
Spouse's contribution rate (contribution/earnings)	17025.00	130.428	**	16981.0	130.383	**
Employer contributes to plan	6.00	11.479		7.6	11.474	
Have a DB plan	26.02	10.043		22.5	10.042	
Have a CB plan	148.17	22.015	**	148.1	22.005	**
Currently work limited	-223.94	37.569	**	-224.2	37.555	**
Spouse currently work limited	-275.22	29.526	**	-283.3	29.519	**
Gets a job this year after unemployment	1449.76	75.328	**	1432.1	75.296	**
Spouse gets a job this year after unemployment	1285.17	39.477	**	1290.2	39.459	**
Change jobs this year	-535.53	11.605	**	-545.0	11.608	**
Spouse changes jobs this year	189.56	11.932	**	189.9	11.926	**
Change jobs last year	-233.77	13.207	**	-241.2	13.205	**
Spouse changes jobs last year	120.58	13.587	**	123.1	13.581	**
Spouses loses a job this year	66.49	35.060		64.1	35.045	
Spouse begins to contribute to DC plan this year	257.24	30.450	**	260.2	30.436	**
Can borrow from pension plan	191.26	11.681	**	192.8	11.677	**
Number of work years since age 20	19.53	1.127	**	17.8	1.130	**
Age	-192.90	3.484	**			
Age squared	2.63	0.039	**			
Age Spline 20-29				-137.0	3.704	**
Age Spline 30-39				164.4	4.901	**
Age Spline 40-49				4.4	3.351	
Age Spline 50-59				77.9	3.661	**
Age Spline 60-69				-21.2	7.589	

Year 1992	-144.16	29.609	**	-141.67	29.595	**
Year 1993	0.68	29.109		3.03	29.096	
Year 1994	-2.10	28.539		-0.16	28.526	
Year 1995	-35.57	28.117		-34.63	28.104	
Year 1996	50.83	27.723		51.23	27.710	
Year 1997	68.21	27.329		68.08	27.318	
Year 1998	187.30	26.975	**	187.21	26.965	**
Year 1999	146.38	28.613	**	145.34	28.603	**
Year 2000	111.87	28.378	**	110.88	28.369	**
Year 2001	139.51	28.287	**	138.19	28.279	**
Year 2002	236.25	28.425	**	234.62	28.418	**
Year 2003	273.36	28.542	**	272.87	28.536	**
Year 2004	394.65	30.103	**	393.51	30.096	**
Year 2005	485.56	30.033	**	484.58	30.028	**
Year 2006	521.26	29.844	**	521.45	29.838	**
Year 2007	493.22	35.572	**	494.09	35.563	**
Year 2008	401.53	35.492	**	402.97	35.483	**
Year 2009	401.10	35.969	**	405.35	35.960	**
SIPP 2001	27.45	18.700		25.35	18.691	
SIPP 2004	63.05	16.550	*	60.78	16.544	*
SIPP 2008	87.94	16.741	**	85.77	16.737	**
N (person-years)	596635			596635		
R-squared	0.37			0.3706		

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Table includes all workers from 1991 to 2009 (to the SIPP interview). ** indicates $p < 0.001$, * indicates $p < 0.01$

Table 11. Logistic Regression of the Likelihood of Wage and Salary Workers Investing DC Contributions in Stocks

	Parameter Estimate	Standard Error	
Intercept	0.724	0.260	
Married	-0.051	0.039	
Two earners	-0.010	0.037	
Number of dependents	-0.007	0.013	
Own a home	0.023	0.029	
Log of total earnings	0.060	0.020	
Become divorced this year	-0.146	0.121	
Become widowed this year	0.053	0.304	
Get married this year	0.087	0.088	
Spouse contributes to a DC plan	0.002	0.042	
Spouse's contribution rate (contribution/earnings)	0.307	0.332	
Employer contributes to plan	0.203	0.031	**
Have a DB plan	-0.047	0.025	
Have a CB plan	-0.056	0.051	
Currently work limited	-0.002	0.071	
Spouse currently work limited	-0.047	0.061	
Spouse begins to contribute to DC plan this year	-0.087	0.083	
Can borrow from pension plan	0.239	0.025	**
Number of work years since age 20	0.007	0.003	
Age	-0.016	0.009	
Age squared	0.000	0.000	
Year 2003	0.095	0.039	
Year 2006	-0.048	0.033	
Year 2009	0.002	0.034	
N	42,294		
-2 Log Likelihood	44811		

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Table includes all workers in the pension job who contributed to their 401(k) accounts in the SIPP pension interview year. ** indicates $p < 0.001$, * indicates $p < 0.01$

Table 12. Logistic Regression of the Likelihood of Investing Retirement Account Balances in Stocks

	Parameter Estimate	Standard Error	
Intercept	0.667	0.157	**
Married	-0.006	0.032	
Two earners	-0.059	0.029	
Number of dependents	-0.017	0.012	
Own a home	0.242	0.027	**
Log of total earnings	0.029	0.004	**
Become divorced this year	0.042	0.117	
Become widowed this year	0.394	0.226	
Get married this year	-0.135	0.077	
Spouse contributes to a DC plan	0.090	0.036	
Spouse's contribution rate (contribution/earnings)	0.823	0.311	
Employer contributes to plan	0.193	0.026	**
Have a DB plan	-0.048	0.024	
Have a CB plan	0.172	0.056	
Currently work limited	-0.078	0.047	
Spouse currently work limited	-0.026	0.051	
Spouse begins to contribute to DC plan this year	-0.068	0.078	
Can borrow from pension plan	0.163	0.027	**
Number of work years since age 20	0.014	0.002	**
Age	-0.003	0.007	
Age squared	-0.0002	0.0001	
Year 2003	0.341	0.035	**
Year 2006	0.549	0.029	**
Year 2009	0.107	0.028	*
N	58,993		
-2 Log Likelihood	60128		

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Table includes all workers with retirement account assets in the SIPP asset interview year. ** indicates $p < 0.001$, * indicates $p < 0.01$

Table 13. The Short-Run Impact of the Recession on Retirement Account Balances for Participants Ages 20 to 69 (in 2011 dollars)

Accumulated Contributions 2007 through 2009	
Baseline	\$7,658
Alternative Scenario 1	\$7,868
Alternative Scenario 2	\$7,947
Difference in Accumulated Contributions Between Baseline and Alternative Scenario (\$)	
Alternative Scenario 1	\$210
Alternative Scenario 2	\$289
Difference in Accumulated Contributions Between Baseline and Alternative Scenario (%)	
Alternative Scenario 1	2.7%
Alternative Scenario 2	3.8%

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to 2010.

Alternative scenario 1 assumes that contributions in 2008 and 2009 remain at the 2007 level.

Alternative scenario 2 assumes that contributions increase 1 percent each year after 2007.

Table 14. The Long-Run Impact of the Recession on Retirement Account Balances at Age 62
(in 2011 dollars)

Year	Age	Average 30-year-old		Baseline		Alternative Scenario		
		Orig	%Change	Contrib.	Balance	Contrib.	Balance	
2007	30	2,304		2,304	2,304	2,304	2,304	
2008	31	2,327	1.0%	2,226	4,599	2,327	4,700	
2009	32	2,350	1.0%	2,165	6,902	2,350	7,191	
2010	33	2,374	1.0%	2,166	9,276	2,374	9,781	
2011	34	2,398	1.0%	2,188	11,742	2,398	12,472	
2012	35	2,422	1.0%	2,210	14,304	2,422	15,268	
2013	36	2,446	1.0%	2,232	16,965	2,446	18,171	
2014	37	2,470	1.0%	2,254	19,728	2,470	21,187	
2015	38	2,495	1.0%	2,277	22,596	2,495	24,317	
2016	39	2,520	1.0%	2,299	25,574	2,520	27,567	
2017	40	2,545	1.0%	2,322	28,663	2,545	30,939	
2018	41	2,570	1.0%	2,346	31,869	2,570	34,437	
2019	42	2,596	1.0%	2,369	35,194	2,596	38,067	
2020	43	2,622	1.0%	2,393	38,643	2,622	41,831	
2021	44	2,648	1.0%	2,417	42,219	2,648	45,734	
2022	45	2,675	1.0%	2,441	45,926	2,675	49,781	
2023	46	2,702	1.0%	2,465	49,769	2,702	53,976	
2024	47	2,729	1.0%	2,490	53,752	2,729	58,324	
2025	48	2,756	1.0%	2,515	57,880	2,756	62,830	
2026	49	2,783	1.0%	2,540	62,156	2,783	67,498	
2027	50	2,811	1.0%	2,565	66,586	2,811	72,334	
2028	51	2,839	1.0%	2,591	71,175	2,839	77,344	
2029	52	2,868	1.0%	2,617	75,927	2,868	82,532	
2030	53	2,897	1.0%	2,643	80,848	2,897	87,904	
2031	54	2,925	1.0%	2,670	85,944	2,925	93,467	
2032	55	2,955	1.0%	2,696	91,218	2,955	99,226	
2033	56	2,984	1.0%	2,723	96,678	2,984	105,187	
2034	57	3,014	1.0%	2,750	102,329	3,014	111,357	
2035	58	3,044	1.0%	2,778	108,177	3,044	117,741	
2036	59	3,075	1.0%	2,806	114,228	3,075	124,348	
2037	60	3,105	1.0%	2,834	120,488	3,105	131,184	
2038	61	3,136	1.0%	2,862	126,965	3,136	138,256	
2039	62	3,168	1.0%	2,891	133,665	3,168	145,572	
Change in Accumulated Balance								
Level								11,907
Percent								8.9%

Source: Authors' tabulations of the 1996, 2001, 2004, 2008 SIPP data matched to the Social Security Administration's Detailed Earnings Record (DER).

Note: Contributions are based on positive deferred contributions on the DER from 1990 to the SIPP interview year. The baseline scenario assumes that contributions increase 1 percent each year after 2010. The alternative scenario assumes that contributions increase 1 percent each year after 2007. Both scenarios assume a 3 percent rate of return on account balances.