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Testimony by

**Jack VanDerhei, Ph.D.**

Research Director

Employee Benefit Research Institute (EBRI)

[www.ebri.org](http://www.ebri.org)



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# Retirement (In)security: Examining the Retirement Savings Deficit

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*Jack VanDerhei, Research Director, Employee Benefit Research Institute*

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## 1 Introduction

Mr. Chairman and members of the committee, thank you for your invitation to testify today on retirement security in America . I am Jack VanDerhei, research director of the Employee Benefit Research Institute. EBRI is a nonpartisan research institute that has been focusing on retirement and health benefits for the past 34 years. EBRI does not take policy positions and does not lobby.

The testimony draws on the extensive research conducted by EBRI on these topics over the last 13 years with its Retirement Security Projection Model<sup>®</sup> as well as annual analysis of tens of millions of individual 401(k) participants dating back in some cases as far as 1996.

Today's testimony will deal with the following topics:

- What is the size of Americans' retirement savings gap?
- To what extent has this deficit been impacted by economic conditions over the past several years?
- What are the economic impacts of the retirement savings deficit on capital and labor markets and on individuals?
- What are the most effective and efficient strategies to encourage and facilitate greater savings for retirement?

## 2 What is the size of Americans' retirement savings gap?

### 2.1 How can this gap be best measured - are there specific metrics that should be considered?

The concept of measuring retirement security – or retirement income adequacy – is an extremely important topic. EBRI started a major project to provide this type of measurement in the late 1990s for several states that were concerned whether their residents would have sufficient income when they reached retirement age. After conducting studies for Oregon, Kansas and Massachusetts, we expanded the simulation model to a full-blown national model in 2003 and in 2010 updated it to incorporate several significant changes, including the impacts of defined benefit plan freezes, automatic enrollment provisions for 401(k) plans and the recent crises in the financial and housing markets.<sup>1</sup>

When we modeled the Baby Boomers and Gen Xers in 2012 (Figure 1) between 43.3–44.3 percent of those households were projected to have inadequate retirement income for even BASIC retirement expenses plus uninsured health care costs. Even though this number is quite large, the good news is that this is 5-8 percentage points LOWER than what we found in 2003.

The improvement over the last nine years is largely due to the fact that in 2003 very few 401(k) sponsors used automatic enrollment (AE) provisions and the participation rates among the lower income employees (those most likely to be at risk) was quite low. With the adoption of AE in the past few years, these percentages have often increased to the high 80s or low 90s.

Although there do not appear to be any major trends by age, Figure 2 shows that the lower-income households are MUCH more likely to be at risk for insufficient retirement income (even though we model our basic retirement expenses as a function of the household's expected retirement income). The 2012 baseline ratings for Early Boomers ranges from a projection that 87 percent of the lowest-income households are at risk to only 13 percent for the highest income households. Similar trends are evidenced for both the Late Boomers and Gen Xers.

While the lack of retirement income adequacy for the lowest income households should be of great concern, even more alarming is the rate at which they will run “short” of money during retirement. As documented in VanDerhei and Copeland (July 2010), 41 percent of early boomers in the lowest income quartile could run short of money within 10 years after they retire.<sup>2</sup>

While knowing the percentage of households that will be at risk for inadequate retirement income is important for public policy analysis, perhaps equally important is knowing just how large the accumulated deficits are likely to be. Figure 3 provides information on the average individual retirement income deficits by age cohort, as well as family status and gender, for baby boomers and Gen Xers. These numbers are present values at retirement age and represent the additional amount each individual in that group would need to have accumulated at age 65 to eliminate their expected deficits in retirement (which could be a relatively short period or could last decades). The values for those on the verge of retirement (Early Boomers) vary from approximately \$22,000 (per individual) for married households, increasing to \$34,000 for single males and \$65,000 for single females. Even though the present values are defined in constant dollars, the Retirement Savings Shortfalls (RSS) for both genders increases for younger cohorts. This is largely due to the impact of assuming health care-related costs will increase faster than the general inflation rate.

While the RSS values in Figure 3 may appear to be relatively small considering they represent the sum of the present values that may include decades of deficits, it is important to remember that less than half of the households modeled were considered to be “at risk.” In other words, the average RSS values represented in Figure 3 are reduced by households assumed to have zero deficits. Figure 4 portrays the average RSS values for those households where a non-zero deficit was simulated. Obviously, the RSS values in Figure 4 would be expected to be larger than the corresponding RSS values in Figure 3, sometimes considerably so. Now the values for Early Boomers vary from approximately \$70,000 (per individual) for married households, increasing to \$95,000 for single males and \$105,000 for single females.

The aggregate deficit number with the current Social Security retirement benefits and the assumption that net housing equity is utilized “as needed” is estimated to be \$4.3 trillion.<sup>3</sup>

## **2.2 Do individuals understand how to calculate how much they will need for retirement?**

Less than half of workers (42 percent) in the 2012 Retirement Confidence Survey (RCS)<sup>4</sup> report they and/or their spouse have tried to calculate how much money they will need to have saved so that they can live comfortably in retirement. This is comparable to most of the percentages measured from 2003–2011, but lower than the 53 percent recorded in 2000 and the 47 percent in 2008 (Figure 5).<sup>5</sup>

The likelihood of doing a retirement savings needs calculation increases with household income, education, and financial assets. In addition, married workers (compared with unmarried workers); those age 35 and older (compared with those age 25–34); retirement savers (compared with nonsavers); and participants in a defined contribution plan (compared with nonparticipants) more often report trying to do a calculation.

The 2012 RCS showed that workers often guess at how much they will need to accumulate (42 percent), rather than doing a systematic retirement needs calculation. The propensity to guess or do their own calculation, together with current feelings of financial stress, may help to explain why the amounts that workers say they need to accumulate for a comfortable retirement appear to be rather low. Thirty-four percent of workers say they need to save less than \$250,000 (up from 26 percent in 2007). Another 18 percent mention a goal of \$250,000–\$499,999. Twenty percent think they need to save \$500,000–\$999,999, while fewer than 1 in 10 each believe they need to save \$1 million–\$1.49 million (6 percent) or \$1.5 million or more (9 percent) (Figure 6). Savings goals tend to increase as household income rises.

Workers who have done a retirement savings needs calculation tend to have higher savings goals than do those who have not done the calculation. Twenty-two percent of workers who have done a calculation, compared with 9 percent of those who have not, estimate they need to accumulate at least \$1 million for retirement. At the other extreme, 27 percent of those who have done a calculation, compared with 39 percent who have not, think they need to save less than \$250,000 for retirement.

Two-thirds of retirees (64 percent) indicate they did some type of financial planning for retirement. Thirty-four percent of these retirees say they began to plan 20 years or more before they retired and 27 percent report beginning to plan between 10 and 19 years before retirement. However, 17 percent say they started planning five to nine years before retirement and 15 percent started less than five years before that point (Figure 7).

### **3 To what extent has this deficit been impacted by economic conditions over the past several years?**

#### **3.1 Impact of the financial and housing market crisis in 2008 and 2009 on retirement readiness**

The analysis in VanDerhei (February 2011) was designed to answer two questions:

1. What percentage of U.S. households became “at risk” of insufficient retirement income as a result of the financial market and real estate market crisis in 2008 and 2009?
2. Of those who are at risk, what additional savings do they need to make each year until retirement age to make up for their losses from the crisis?

As one would expect, the answer to the first question depends to a large extent on the size of the account balance the household had in defined contribution plans and/or IRAs as well as their relative exposure to fluctuations in the housing market. The resulting percentages of households that would not have been “at risk” without the 2008/9 crisis that ended up “at risk” vary from a low of 3.8 percent to a high of 14.3 percent.

The answer to the second question also depends on the size of account balances and exposure to the equity market; however, it is a more complicated question involving both the proximity of the household to retirement age (the closer to retirement age, the fewer years of additional savings available), the relative level of preretirement income, and the desired probability of adequate retirement income.

Looking at all households that would need to save an additional amount (over and above the savings already factored into the baseline model), the median percentage of additional compensation for Early Boomers desiring a 50 percent probability of retirement income adequacy would be 3.0 percent of compensation each year until retirement age to account for the financial and housing market crisis in 2008 and 2009. Similar values are 0.9 percent for Late Boomers and 0.3 percent for Gen Xers. A 90 percent probability of retirement income adequacy would require an even larger increase: The median percentage of additional compensation for Early Boomers desiring a 90 percent probability of retirement income adequacy would be 4.3 percent, to account for the financial and housing market crisis in 2008 and 2009.

Looking only at those households that had exposure to the market crisis in 2008 and 2009 from all three fronts (defined contribution plans, IRAs, and net housing equity) shows a median percentage for Early Boomers of 5.6 percent for a 50 percent probability and 6.7 percent for a 90 percent probability of retirement income adequacy. Younger cohorts experience a similar increase, going from the all-household analysis to the more select group.

## 3.2 What factors in the decades prior to the crisis contributed most to retirement insecurity?

### 3.2.1 Coverage and participation in employment-based retirement plans

Previous research by EBRI has demonstrated that one of the most important factors contributing to retirement income adequacy for the Boomers and Gen Xers is eligibility to participate in employment-based retirement plans. VanDerhei (August 2011) provides information on how the relative value of the defined benefit accruals impact retirement income adequacy. Figure 8 categorizes any positive value for a defined benefit accrual into quartiles for each income group. The largest reduction in at-risk ratings between the highest and lowest income-specific defined benefit value quartiles takes place for the lowest-income quartile. For these households, the at-risk ratings drop 36 percentage points, from 82 percent to 46 percent. Households in the second income quartile drop 25 percentage points (from an at-risk rating of 58 percent for those in the lowest defined benefit value quartile to 33 percent for those in the highest defined benefit value quartile) while those in the third and highest income quartile drop 24 and 21 percentage points, respectively.

VanDerhei (September 2010) provides similar information for eligibility in defined contribution plans for Gen Xers in 2012 (Figure 9). In this case we see that the number of future years the workers are eligible for participation in a defined contribution plan makes a tremendous difference in their at-risk ratings, even after adjusting for the worker's income quartile. For example, those in the lowest income quartile with no future years of eligibility are simulated to run short of money 86.8 percent of the time, whereas the same income cohort with twenty or more years of future eligibility would only experience this situation 61.1 percent of the time. A similar, albeit less dramatic, situation exists for the highest income quartile. In this case, those with no future years of eligibility in a defined contribution plan are simulated to run short of money 16.8 percent of the time, dropping to only 5.4 percent of the time for the highest income quartile with 20 or more years of eligibility.

Copeland (October 2011) provides the percentage of the work force that has participated in an employment-based retirement plan from 1987-2010. Figure 10 shows that the even though the percentage of the population covered depends to a large extent on how the population is defined, the values within any work force subset has been relatively constant over this 24 year period. In 2010, slightly more than ½ (54.5 percent) of all full-time, full-year wage and salary workers ages 21-64 were participating in an employment-based retirement plan according to calculations based on the 2011 March Current Population Survey.<sup>6</sup> However, when the same information is filtered to exclude workers with less than \$10,000 in annual earnings as well as those working for employers with less than 100 employees, the participation percentage in 2010 increases to 67.5 percent.<sup>7</sup>

### 3.2.2 Defined benefit freezes

The dawn of the new year in 2006 began with a flood of news reports about the “new” trend among private defined benefit plan sponsors of “freezing” their pension plans for current or new workers. In reality, these decisions have been quite prevalent in recent years, and are part of the well-documented and long-term decline of “traditional” pension plans; what’s unusual is the large size of some of the employers that have recently announced pension freezes, and the frequency of the announcements.

While it is obvious that pension plan freezes affect some workers negatively, it is *not* obvious *which* workers are affected, nor *to what degree* they are affected by a pension freeze. There are many reasons for this, most importantly the unique characteristics and terms of each pension plan and each freeze, and the age and characteristics of the workers. VanDerhei (March 2006) provides a detailed analysis of how pension freezes are likely to impact existing employees as a function of plan type and employee demographics.

The literature documenting the evolution from defined benefit (pension) to defined contribution (primarily 401(k)-type) retirement plans over the last 20 years is replete with studies analyzing the change in the relative composition of plans and participants; however, very few have focused on the sizeable number of large plan sponsors that have had *both* defined benefit and defined contribution plans in place, certainly since the advent of the 401(k) plan in the early 1980s. For these employers, the primary decision in many cases is not whether to retain *both* forms of retirement plan, but the relative financial value of each in terms of future accruals or contributions. While this may not be considered to be an optimal choice for some sponsors, after recognizing certain legal and/or financial constraints, such as the inability to terminate an underfunded pension plan (with the exception of certain sponsors satisfying the bankruptcy conditions necessary to trigger pension insurance coverage by the Pension Benefit Guaranty Corporation, or PBGC) and the imposition of a 20 percent or 50 percent excise tax on the recoupment of excess assets in the case of a reversion, the best available choice may be to gradually reduce the relative value of the defined benefit plan in the future by the imposition of a pension freeze.<sup>8</sup>

VanDerhei (March 2006) analyzes the financial consequences of a pension freeze for the general population of participants in private defined benefit plans in 2006. This is accomplished by utilizing the accumulation portion of the RSPM. Briefly, the model takes the current population of workers in the private sector in 2006, statistically attributes whether or not they are participating in a defined benefit plan and, if so, what type of plan and the attendant generosity parameters.

The model incorporates a stochastic job tenure algorithm that provides information on how long the employee has already participated in the defined benefit plan and how much longer after 2006 he or she is likely to remain with the employer. With this information, the reduction in the future estimated defined benefit income as a result of a pension freeze in 2006 can be estimated, and the indemnification contribution rate for each defined benefit participant can be determined.

This calculation will be sensitive to the choice of the rates of return on various asset classes—and it is clear that there is no consensus on what future returns in the financial markets will be for the next 30 years. Therefore, RSPM suppresses the stochastic rate of return mechanism typically employed by this type of analysis and substitutes a constant rate of return of either 4 percent nominal per year or 8 percent. This allows readers to choose which rate they believe is more likely for the future and use the corresponding set of results.

In addition, one more modification is made by RSPM before undertaking this analysis. It is a well-known fact that job tenure is longer for defined benefit participants than for either defined contribution participants or workers in general, given the financial consequences of job change upon employees participating in a final-average defined benefit pension plan. Therefore, the typical tenure distributions are replaced with those for participants *exclusively* in defined contribution plans to account for the increased job mobility that is likely to accompany the pension freeze.

**4 percent rate of return:** The median indemnification contribution rate for a career-average defined benefit pension plan is 11.6 percent, assuming a 4 percent rate of return (Figure 11). An indemnification contribution rate of 18.8 percent would be sufficient to cover 75 percent of the employees covered by this type of plan. The median rate for a final-average plan is larger, as expected: 13.5 percent, and the threshold rate for the 75<sup>th</sup> percentile increases to 21.0 percent. Cash balance plans have a median indemnification contribution rate of 4.6 percent, with a 75<sup>th</sup> percentile threshold rate of 6.3 percent using the current interest credits. These values increase to 5.7 percent and 7.3 percent if, instead, the cash balance plans are assumed to credit interest at the intermediate long-term assumption for the interest rate of the Treasury special public-debt obligation bonds issuable to the OASDI trust funds, as specified in the 2005 Trustees of the OASDI Trust Funds Report (5.8 percent).

**8 percent rate of return:** If the rate of return assumption is increased to 8 percent nominal (Figure 12), the median indemnification contribution rate for a career-average defined benefit plan is 6.6 percent. An indemnification contribution rate of 14.8 percent would be sufficient to cover 75 percent of the employees covered by this type of plan. The median for a final-average plan is 8.1 percent and the 75<sup>th</sup> percentile threshold increases to 16.0 percent. Cash balance plans have a median indemnification contribution rate of 2.7 percent, with a 75<sup>th</sup> percentile threshold of 4.5 percent using the current interest credits. These values increase to 3.1 percent and 5.2 percent if the cash balance plans are assumed to credit interest at 5.8 percent.

Copeland and VanDerhei (2010) simulated the impact of such freezes on expected future pension wealth for new employees. Looking at this portion of pension wealth provides one estimate of the impact on overall retirement wealth but it is incomplete, since many sponsors either increase employer DC contributions or set up new DC plans coincident with the pension freeze. Factoring in these enhanced DC contributions (if any), we estimate the net loss that future employees may experience is small overall, amounting to a 0.5-2 percentage point reduction in replacement rates. Some employees, as many as 30 percent of the under age 35 group, may even be better off in retirement due to the enhanced contributions.

### 3.2.3 Risk management techniques in retirement

Another factor that contributed to retirement insecurity in the last few decades is the sub-optimal risk management strategies chosen by individuals at retirement age. VanDerhei (September 2006) illustrates this in terms of a “building block” approach whereby investment risk, longevity risk and the risk of “stochastic” health care risks are added sequentially to a simulation model showing the overall strategies necessary to achieve a 50, 70 and 90 percent probability of success for stylized individuals at various retirement ages.

While it is true that the first two risks enumerated above (investment and longevity) have, in many cases, been shifted from the employer to the employee as a consequence of the evolution from defined benefit structures to defined contribution plans,<sup>9</sup> these can be dealt with through a combination of post-retirement investment strategies, as well as annuitization of some or all of the account balances at retirement.<sup>10</sup> However, regardless of the asset allocation and/or degree of annuitization utilized by the retiree, there remains a considerable chance that they (or their spouse) may encounter a lengthy stay in a nursing home that may leave the family unit with a much higher probability of “running short” of money in retirement. VanDerhei (2005) uses the EBRI RSPM model to evaluate the impact of purchasing long-term care insurance on retirement income adequacy. The analysis suggests that this may be a particularly powerful risk management technique, especially for retirees in the second and third income quartiles.<sup>11</sup>

## 4 What are the economic impacts of this deficit on capital and labor markets and on individuals?

### 4.1 To what extent has market volatility over the past several years impacted individuals’ risk tolerance or asset allocations?

Figure 13 provides evidence from VanDerhei, Holden, Alonso and Bass (2011) on the average asset allocation of 401(k) participants from the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project for selected years between 1999 and 2010, inclusive. Although any time-series comparison of asset allocation from this database needs to be accompanied by the caveat that the universe of data providers (as well as plan sponsors and participants) has gradually changed over this time period, the overall asset allocations to equity funds per se have fluctuated as one would expect with changes in the equity markets. Overall, 53 percent of 401(k) assets in the EBRI/ICI database were in equity funds at



year-end 1999. This value decreased to 37 percent at the end of 2008 and then increased to 42 percent by year-end 2010.

However, one needs to be extremely careful in interpreting these results since two other trends were taking place at the same time. First, the overall allocation to company stock decreased substantially during this period. In the 1999 EBRI/ICI database, almost 1/5<sup>th</sup> of all 401(k) money (19 percent) was invested in company stock. By 2010, this value had decreased to only 8 percent. Moreover, during that period the percentage of newly-hired (those with two or fewer years of tenure) 401(k) participants in a plan offering company stock as an investment option that held company stock decreased from 61.0 percent to 33.0 percent.

During the same time there was a substantial change in the amount of money held in balanced funds, increasing from 7 percent in 1999 to 18 percent in 2010. Looking at recently hired 401(k) participants provides a more focused method of analyzing the change in participant's investment choices without a confounding impact of the change in market values on current account balances. VanDerhei, Holden, Alonso and Bass (2011) find that, in 1999, 31.3 percent of recently hired 401(k) participants held balanced funds but that by 2010 this figure had increased to 63.0 percent. The EBRI/ICI data base was not able to bifurcate the balanced fund category into target date funds and non-target date balanced funds until 2006 but even during that five year period there has been a tremendous increase in the percentage of recently-hired participants holding these funds: 28.3 percent at year-end 2006, increasing to 47.6 percent by year-end 2010.

Moreover, of the recently-hired participants investing in balanced or target date funds, the percentage choosing them as essentially their exclusive investment has increased dramatically. VanDerhei, Holden, Alonso and Bass (2011) found that in 1998, only 7.3 percent of recently-hired participants who invested in balanced funds had at least 90 percent of their portfolio in these funds. This value had increased to 69.8 percent by 2010. When a similar analysis was done for target date funds in 2010, a total of 73.6 percent of the newly-hired 401(k) participants holding target-date funds had at least 90 percent of their portfolio invested in target date funds.

Comparing the overall 1998 average asset allocations of newly-hired 401(k) participants with those in 2010, VanDerhei, Holden, Alonso and Bass (2011) find that aggregating across all age groups, equity funds decreased from 64.8 percent to 38.0 percent and company stock decreased from 8.6 percent to 4.3 percent. However this was at least partially offset by an increase in balanced funds from 9.1 percent to 30.7 percent.

Another possible area of interest would be participant trading activity during this period of time. In an analysis of Vanguard participants, Utkus and Young (2011) find that the percentage of participants trading in 2008 (16 percent) was actually lower than what it was in 2005 (19 percent) and similar to what it had been in 2007 (15 percent). The value decreased to only 13 percent in 2009. They also find that 27 percent of the participants traded over the 2007-2010 period but that only 3 percent of the participants sold out of stocks entirely and that 1 percent traded to 100 percent equities. Five percent of the participants decreased equities by more than 10 percentage points during this period but that was partially offset by 4 percent of the participants who increased equities by 10 percentage points or more.

While it is difficult to predict the extent to which market volatility over the past several years will have a long term impact on individuals' risk tolerance or asset allocations, the increasing utilization of AE since the passage of the Pension Protection Act of 2006 has resulted in more 401(k) assets invested in target date funds due to the qualified default investment alternative regulations. Moreover, given the relative inertia experienced with respect to asset allocation for participants automatically enrolled in 401(k) plans, this is likely to be the case even if AE utilization stays constant in the future. Therefore, there is

every reason to expect that participant asset allocations will have less reaction to market volatility as the fund managers continue to rebalance during market cycles.<sup>12</sup>

#### 4.2 Are there other ways that individuals have responded to recent market conditions?

In an analysis of Vanguard participants, Utkus and Young (2011) find that the percentage of participants stopping contributions was 2.8 percent in 2005 and then decreased to 2.5 percent in 2006 and 2.4 percent in 2007 before increasing slightly to 3.1 percent in 2008. The value decreased to 2.9 percent in 2009 and was estimated to be only 2.0 percent in 2010.

With respect to plan loans, in the 15 years that the EBRI/ICI database has been tracking loan activity among 401(k) plan participants, there has been little variation.<sup>13</sup> From 1996 through 2008, on average, less than one-fifth of 401(k) participants with access to loans had loans outstanding. At year-end 2009, the percentage of participants who were offered loans with loans outstanding ticked up to 21 percent and remained at that level at year-end 2010. However, not all participants have access to 401(k) plan loans—factoring in all 401(k) participants with and without loan access in the database, only 18 percent had a loan outstanding at year-end 2010. On average, over the past 15 years, among participants with loans outstanding, about 14 percent of the remaining account balance was taken out as a loan.

The percentage of participants taking hardship withdrawals appears to have increased slightly during this period. In an analysis of Vanguard participants, Utkus and Young (2011) find that 1.7 percent of the participants took a hardship withdrawal in 2006. This value increased to 1.8 percent in 2007 and 2.0 percent in 2008 before reaching 2.2 percent in 2009 and 2010.

In the wake of the 2008 financial crisis, a number of employers chose to reduce, suspend, and/or terminate their matching contributions.<sup>14</sup> A Towers Watson analysis of 260 companies that made changes to employer match contributions to deal with the recent economic crisis finds 231 originally suspended their matches, while 29 chose to reduce them. According to Towers Watson, the majority of the analyzed companies chose to reinstate their match (75 percent). Of those that reinstated their match, 105 companies (74 percent) reintroduced the original match amount. Among these plan sponsors, the most frequent match formula before and after the crisis was 50 percent of up to 6 percent of salary. The median duration for match suspensions was 12 months, for companies with quantifiable dates. Most companies reinstated their match after nine or 12 months.

By the middle of 2009, almost 10 percent of Fidelity recordkept defined contribution plans suspended or reduced their contribution dollars, although by December 2010, 55 percent of plan sponsors indicated they planned to reinstate their match within the next 12 months. Fidelity also reported that among larger companies, those with more than 5,000 employees, most (71 percent) had already reinstated or planned to reinstate their match. More than 60 percent of employers with a plan size of between 500-999 employees had already reinstated or indicate they plan to reinstate their match — up from 38 percent just 10 months earlier. As for employers with fewer than 1,000 workers, Fidelity noted that the applicable percentage was over 46 percent.

In February of 2012, the IRS interim report of responses from its 401(k) Compliance Check Questionnaire revealed the number of 401(k) plan sponsors that:<sup>15</sup>

- Suspended or discontinued matching contributions in their plans increased from 1 percent in 2006 to 4 percent in 2008.

- Suspended or discontinued the non-elective contribution in their plans increased from 2 percent in 2006 to 5 percent in 2008.
- Reduced non-elective contributions in their plans increased from 1 percent in 2006 to 5 percent in 2008.

A common concern with respect to plan sponsors suspending their contributions is the potential impact on employee savings. For example, if an employee were contributing 6 percent of compensation to receive the maximum match from a plan with a 50 percent match on the first 6 percent of compensation, would a suspended match end up decreasing the total contribution for the employee from 9 percent to 6 percent, or would the reduced incentive drive this down below 6 percent (perhaps to zero)?

In an attempt to provide preliminary evidence with respect to the impact of suspending employer contributions on employee behavior, VanDerhei (November 2009) analyzed all 401(k) plans in the EBRI/ICI 401(k) database with more than \$100,000 in employer contributions in 2007,<sup>16</sup> and none in 2008.<sup>17</sup> The percentage of 401(k) participants continuing to contribute in 2008 after a suspension in employer contributions was analyzed as function of a match rate proxy.<sup>18</sup>

For all plans with a match rate proxy of less than 50 percent, the percentage of 401(k) participants continuing to contribute in 2008 was at least 86 percent. However, the percentage decreased substantially for those with more generous match rate proxies. For participants with a match rate proxy between 50 and 100 percent, only 80 percent of the participants continued to contribute after the suspension. For those with match rate proxies in excess of 100 percent, the percentage was only 73 percent.

#### **4.3 What are the long term impacts of recent market volatility on retirement savings?**

Figure 14 shows EBRI projections of the estimated percentage of consistent participants who have more money in their 401(k) accounts on March 1, 2012 than they did at the market high (October 8, 2007). The results are displayed by age and tenure and, as expected, 401(k) participants with relatively short tenure have a higher percentage of having recovered given that their ratio of contributions to account balance is likely to be much larger. Overall 95 percent of the participant balances were projected to have recovered to their level at the market high, though less than 90 percent of those with more than 20 years of tenure were likely to have recovered to that level.<sup>19</sup>

#### **4.4 To what extent will the retirement of the Baby Boomers impact capital and labor markets?**

This question is particularly problematic for several reasons. First, with respect to the impact on capital markets, assumptions will need to be made with respect to what the Baby Boomers will do with their asset allocations in retirement as well as the rate at which they will spend-down the assets in their retirement accounts. Unfortunately there is extremely limited information at the current time to allow informed estimates in this regard. However, as part of its research mission, EBRI's Center for Research on Retirement Income is currently integrating administrative records of millions of 401(k) participants with those of IRA account holders. One of the first publications from this endeavor (scheduled for later in 2012) will be to investigate the change in asset allocation at retirement and to track subsequent changes as retirees age. A follow-up study is planned that will begin to link successive years of the integrated defined contribution/IRA data and track the spend-down behavior of retirees as a function of several demographic and portfolio characteristics.

Secondly, the impact on labor markets will depend to a large extent on when the Baby Boomers choose to retire (at least initially). Much of the public policy research in this area has assumed that employees will retire at age 65 and then attempt to assess the probability of “success.” While success is certainly defined in several different ways, all of the models identify at least a significant percentage of the population as failing to meet that criteria. Since the genesis of the RSPM project in the late 1990s, the model had always assumed a retirement age of 65. While there was abundant evidence of many individuals retiring earlier (e.g., as soon as they became eligible for Social Security retirement benefits at age 62), the model was constructed to measure the households probability of retirement income adequacy if this temptation were avoided and retirement deferred to age 65.<sup>20</sup> However, even with this admittedly optimistic assumption, the results in both 2003 and 2010 showed that the median additional percentage of compensation that would be required for retirement income adequacy at more than a 50 percent probability would exceed 25 percent of compensation annually (until age 65) for many age/income combinations.

As a result, the 2011 version of RSPM added a new feature that would allow households to defer retirement age past age 65<sup>21</sup> in an attempt to determine whether retirement age deferral is indeed sufficiently valuable to mitigate retirement income adequacy problems for most households (assuming the worker is physically able to continue working and that there continues to be a suitable demand for his or her skills). The answer, unfortunately, is not always “yes,” even if retirement age is deferred into the 80s.

Using the threshold of retirement income adequacy described above (essentially sufficient retirement income to pay for basic retirement expenses and uninsured medical costs for the entire retirement period), RSPM baseline results indicate that the lowest preretirement income quartile would need to defer retirement age to 84 before 90 percent of the households would have a 50 percent probability of success. Although a significant portion of the improvement takes place in the first four years after age 65, the improvement tends to level off in the early 70s before picking up in the late 70s and early 80s. Households in higher preretirement income quartiles start at a much higher level, and therefore have less improvement in terms of additional households reaching a 50 percent success rate as retirement age is deferred for these households.

The problem with using a 50 percent probability of success, of course, is that households is in a position where they will “run short of money” in retirement one chance out of two. While most households (at least those that are cognizant of these risks) are likely to have a risk aversion level that would make this risk assumption untenable, switching to a higher probability of success will significantly reduce the percentage of households capable of satisfying the threshold at any given retirement age. For example, if the success rate is moved to a threshold of 70 percent, only 2 out of 5 households in the lowest-income quartile will attain retirement income adequacy even if they defer retirement age to 84. Increasing the threshold to 80 percent reduces the number of lowest preretirement income quartile households that can satisfy this standard at a retirement age of 84 to approximately 1 out of 7.

One of the factors that makes a major difference in the percentage of households satisfying the retirement income adequacy thresholds at any retirement age is whether the worker is still participating in a defined contribution plan after age 65. The increase in the percentage of households that are predicted to have adequate retirement income as a result of defined contribution participation varies by retirement age, preretirement income quartile and probability of retirement income adequacy, but this factor alone results in at least a 10 percentage point difference in the majority of the retirement age/income combinations investigated.

Another factor that has a tremendous impact on the value of deferring retirement age is whether stochastic post-retirement health care costs are excluded (or the stochastic nature is ignored). In essence, the true value of deferring retirement age is substantially muted if the full stochastic nature of nursing home and home health care costs is not appropriately modeled. This is especially true for those desiring a high probability of a successful retirement. Figure 18 shows that the value of deferring retirement age (even as much as 20 years), as those with at least an 80 percent probability of success decreases considerably when the impact of stochastic health care costs are excluded. For the lowest preretirement income quartile, the value of deferral (in terms of percentage of additional households that will meet the threshold by deferring retirement age from 65 to 84) decreases from 16.0 percent to 3.8 percent by excluding these costs. The highest preretirement income quartile experiences a similar decrease, from 12.8 percent to 2.6 percent.

## **5 What are the most effective and efficient strategies to encourage and facilitate greater savings for retirement?**

### **5.1 Automatic enrollment**

VanDerhei and Copeland (2008) simulated the impact of 401(k) sponsors changing from voluntary to automatic enrollment; however, given its close proximity to the passage of the Pension Protection Act of 2006 (PPA) there was no way of knowing what the AE plan design parameters in that legislation would look like. As a result, the PPA safe harbor provision was used as a prototype in the 2008 study. Moreover, there was no way of knowing the plan design parameters of 401(k) sponsors that would subsequently choose to adopt AE. As determined in a joint EBRI/Mercer study (VanDerhei, July 2007), there is a high correlation between those employers that choose to adopt AE for their 401(k) plans and those that froze/closed their defined benefit (DB) pension plans. Fortunately, EBRI was able to circumvent these limitations in late 2009 with data on actual retirement plan sponsor activity from Benefit SpecSelect™ (a trademark of Hewitt Associates LLC).

VanDerhei (April 2010) simulated the difference between AE and voluntary enrollment by comparing large 401(k) sponsors with actual plan design parameters. Figure 15 shows only post-2009 accumulations (and rollovers) and, as expected, the simulated balances (as a multiple of final earnings) would be minimal for older age cohorts. However, for those with a major portion of their careers remaining, the differences in additional accumulations due to auto-enrollment prove to be quite significant: When workers currently ages 25–29 are compared, the median 401(k) balances increase from approximately 1.5 times final earnings under voluntary enrollment to more than 6.0 times final earnings in the auto-enrollment scenario.

The 6.0 multiple in Figure 15 might appear to be too small to reach conventional retirement income targets.<sup>22</sup> Therefore, Figure 16 recasts the AE results from Figure 15 for just the youngest cohort and provides further breakouts by the number of years eligible for participation in a 401(k) plan as well as the relative income level. For those workers assumed to be eligible (whether or not they choose to participate) for more than 30 years, the median multiples range from approximately 7.6–8.5 times final salary, depending on salary level.

VanDerhei and Lucas (2010) demonstrate the profound influence of plan design variables, as well as assumptions of employee behavior in auto-enrollment 401(k) plans. Even with a relatively simple definition of “success,” large differences in success rates can be seen, depending on which plan design factors and employee behavior assumptions are used.<sup>23</sup>

- The probability of success for the lowest-income quartile increases from the baseline probability of 45.7 percent to 79.2 percent when all four factors are applied.
- The impact on the highest-income quartile is even more impressive, with an increase in the probability of success from 27.0 percent to 64.0 percent.

When viewed in isolation, it is clear that the impact of increasing the limit on employee contributions is much greater than any of the other three factors. However, the importance of including one or more additional factors, along with the increase in the limit on employee contributions, can more than double the impact of increasing the limit by itself.

## 5.2 What incentives have the greatest bearing on the behavior of employers and employees

### 5.2.1 Tax incentives

Two major proposals have recently emerged that could have an impact on employment-based retirement plan designs, specifically 401(k) plans:

- The National Commission on Fiscal Responsibility and Reform proposal on federal debt reduction, “The Moment of Truth,” issued in December 2010. The document puts forth a tax reform plan that would modify private-sector retirement plans by capping annual “tax-preferred contributions to [the] lower of \$20,000 or 20% of income” (page 31). This is often referred to as the “20/20 cap.”
- A plan (Gale, 2011) that would modify the existing tax treatment of both worker and employer 401(k) contributions and introduce a flat-rate refundable credit that serves as a federal matching contribution into a retirement savings account.

Some of the financial projections associated with these proposals have assumed status quo, meaning no behavioral changes by either the employers that sponsor 401(k) plans or the workers who participate in them if those proposals were to become a reality, and that current rates of worker deferrals, employer matching contributions, and plan availability would remain unchanged.

Previous EBRI research has provided an initial quantification of how these proposals would likely affect individual participant retirement savings, by age and income.<sup>24</sup> These earlier projections, however, were not based on survey evidence of how employers—the sponsors of private-sector 401(k) retirement plans—would be likely to react to potential changes in the tax treatment of these contributions, or how those decisions might, in turn, affect participant-savings accumulation. Additionally, while those projections incorporated the potential impact of the specific provisions of the Gale proposal, they were based on worker responses to generic questions about changes to the taxability of 401(k) contributions.

Integrating new data from plan sponsors, VanDerhei (March 2012) provides a perspective on the impact of a scenario where the current tax treatment of employer and worker pre-tax contributions was modified such that workers would have to pay federal taxes on these amounts currently, rather than on a deferred basis, as under current law, and participants would receive an 18 percent government match (as contemplated in the Gale proposal).

In September 2011, the U.S. Senate Finance Committee held a hearing on “Tax Reform Options: Promoting Retirement Security.” One of the primary topics during the hearing was an assessment of the potential benefits and consequences that may result from a proposal to modify the federal tax treatment of 401(k) plan contributions in exchange for a flat-rate government match. Gale (2011) updated a 2006 analysis by Gale, Gruber, and Orszag and analyzed a plan that would change the treatment of retirement saving in three ways:<sup>25</sup>

“First, unlike the current system, workers’ and firms’ contributions to employer-based 401(k) accounts would no longer be excluded from income subject to taxation, contributions to IRAs would no longer be tax-deductible, and any employer contributions to a 401(k) plan would be treated as taxable income to the employee (just as current wages are). Second, all qualified employer and employee contributions would be eligible for a flat-rate refundable tax credit, given to the employee. Third, the credit would be deposited directly into the retirement saving account, as opposed to the current deduction, which simply results in a lower tax payment than otherwise.”

Regarding the proposed tax credit, Gale (2011) reports estimates from the Tax Policy Center for both an 18 percent credit and a 30 percent credit. The paper includes a distributional analysis of the winners and losers under the two versions of the proposal; however, the underlying analysis holds retirement saving contributions constant for both employers and participants (page 6). Gale mentions that the proposal “could conceivably affect incentives for firms to offer 401(k)s or pensions” (page 7) but concludes that this seems unlikely. He also dismisses as likely overstated the concern that the tax credit/matches called for in the proposal may discourage employer matches to 401(k) plans, but offers no supporting data for this assumption

These two papers provide an interesting analysis of a proposal with profound public-policy implications. The assumptions based on responses (or lack thereof), both from individual workers and the plan sponsors themselves, will likely be the focus of serious debate. Moreover, public policy consideration of this proposal will undoubtedly be subject to a cost-benefit analysis beyond the assumption that retirement savings contributions will remain constant on the part of participants and/or plan sponsors.

On a cautionary note, it is admittedly very difficult to determine how those workers not currently covered and/or participating in a defined contribution plan would react to this set of incentives, and EBRI will continue to work with actual participant data to better assess some of the behavioral tendencies of this group. Until this type of information is available, it will be quite difficult to fully assess the “benefit” portion of the cost-benefit analysis suggested above. EBRI did provide an analysis of some of the likely “costs” in terms of reduced retirement benefits for those currently in the 401(k) system at a September 2011 Senate Finance Committee hearing. However, no information on plan sponsor reaction to the proposal was available at that time. Consequently, the 2011 EBRI analysis presented there was based on several alternative scenarios.<sup>26</sup> Moreover, the information used to model potential 401(k) participant reaction to the proposal was limited to “an analysis of two new questions from the 21st wave of the Retirement Confidence Survey (RCS) reflecting how workers indicated they would likely react if they were no longer allowed to defer retirement savings plan contributions from taxable income.”<sup>27</sup>

### **5.2.1.1 New Survey Analysis**

#### **5.2.1.1.1 Plan Sponsors**

In recent months, two surveys have provided additional information on potential responses from plan sponsors with respect to this type of proposed modification of the 401(k) system. A survey conducted on behalf of The Principal Financial Group (2011) determined that if workers’ ability to deduct any amount of the 401(k) contribution from taxable income was eliminated, 65 percent of the plan sponsors responding to the survey would have less desire to continue offering their 401(k) plan.<sup>28</sup>

A separate survey by AllianceBernstein in 2011 provided plan sponsors with the following question and potential responses:<sup>29</sup>

Suppose U.S. legislation were enacted such that employees were no longer allowed to deduct retirement savings plan contributions from their federal taxable income. In addition, suppose that the employee had to pay federal income tax on anything an employer contributed to the employee's retirement savings account in the year it was contributed. In exchange for this modification of the current tax incentives, assume the U.S. government would match 18% of whatever was contributed to a retirement savings plan. What do you believe would be the most likely change to your plan?

- No change
- Terminate our plan
- Reduce our average employer match
  - 1–24%
  - 25–49%
  - 50–74%
  - 75–100%
- Begin to provide an average fixed contribution
- Increase a current, average fixed contribution
  - 1–24%
  - 25–49%
  - 50–74%
  - 75–100%
- Don't know / not sure
- Other

Responses were obtained from 1,018 plan sponsors grouped into the following size categories based on total retirement plan assets:

1. <\$1 million.
2. \$1 million–\$10 million.
3. \$10 million–\$50 million.
4. \$50 million–\$250 million.
5. \$250 million–\$500 million.
6. >\$500 million.

#### 5.2.1.1.2 Participants

With respect to potential worker reactions to this proposal, a new set of questions concerning participant behavior in response to the specific federal tax modifications proposed in Gale (2011) was



included in the 2012 RCS. Specifically, workers currently contributing to a workplace retirement plan were asked:

1. Suppose you were no longer allowed to deduct your retirement savings plan contributions for federal income tax purposes and that anything your employer contributed to your retirement savings this year on your behalf was also treated as part of your taxable income. Suppose the government matched 18% of contributions so that for every \$100 you or your employer contributed to your retirement savings plan this year, the government would contribute \$18. What do you think you would be most likely to do?<sup>30</sup>
  - a. Stop contributing altogether
  - b. Reduce the amount you contribute
  - c. Continue to contribute what you do now
  - d. Increase the amount you contribute

Follow-up questions were asked of those who indicated they would either increase or decrease the amount they currently contribute:

2. By about how much do you think you would reduce your contribution? Would you:
  - a. Reduce it by about a quarter
  - b. Cut it in half, or
  - c. Reduce it by about three-quarters
  
3. By about how much do you think you would increase your contribution? Would you increase it by about
  - a. A quarter
  - b. Half
  - c. Three-quarters, or
  - d. Double it

#### 5.2.1.1.3 Impact on 401(k) Balances at Retirement Age<sup>31</sup>

VanDerhei (March 2012) utilizes the defined contribution participant responses to the RCS questions above, as well as the plan sponsor responses to the AllianceBernstein survey, to parameterize the voluntary enrollment module of RSPM in order to estimate the likely impact of the proposed federal-tax modifications on projected 401(k) balances at retirement age, assuming the modifications took effect immediately.

Prior to estimating the potential impact on accumulations resulting from 401(k) contribution changes, a set of baseline results first needs to be run to determine the likely values if the various tax reform options are not imposed on the current 401(k) system. The model used in this article is based on the 401(k) voluntary-enrollment modules from RSPM. It is similar in many respects to the one used in Holden and VanDerhei (2002) in that it looks only at current 401(k) participants and does not attempt to include eligible nonparticipants<sup>32</sup> or workers who are currently not eligible.<sup>33</sup> However, unlike the 2002 model, this analysis assumes no job turnover, withdrawals, or loan defaults.<sup>34</sup>

Using the 401(k) voluntary enrollment modules from RSPM, VanDerhei shows in the November 2011 *Issue Brief* that the median real-replacement rates at age 67 from 401(k) balances exclusively for participants currently ages 25–29 by income quartiles.<sup>35</sup> The values vary from a low of 53 percent for the lowest-income quartile to a high of 77 percent for the highest-income quartile.<sup>36</sup> The simulated rates of return are explained in more detail in VanDerhei and Copeland (2010), but they are based on a stochastic process with a mean equity return of 8.9 percent and a mean fixed-income return of 6.3 percent (expressed in nominal terms).

#### *5.2.1.1.3.1 Age and Salary*

Figure 17 shows the baseline average percentage reductions in 401(k) account balances at Social Security normal retirement age due to expected modifications of plan sponsors and participants in reaction to the proposal to modify the federal tax treatment of employer and worker contributions for 401(k) plans in exchange for an 18 percent match from the federal government, by age and age-specific salary quartiles.<sup>37</sup> The average percentage reductions for the youngest cohort (those currently 26–35) are largest for those in the lowest-income quartile (22.2 percent).<sup>38</sup> The reductions for the youngest cohort decrease to 13.0 percent for those in the second-income quartile and reach a minimum of 6.1 percent for those in the third-income quartile. The reductions increase to 10.8 percent for those in the highest-income quartile.

Measuring the impact on older cohorts (those over age 35) is somewhat problematic in that the values are influenced by plan-sponsor and participant reactions to the tax proposal as well as the distribution of tenure with the current employer within each age group. For example, if a 401(k) participant in the oldest cohort (those currently 56–65) has recently changed jobs and has a relatively low account balance in his or her current 401(k) plan, any reported decrease in contributions would have a much larger impact than it would on the same individual (with the same survey response) had that worker not recently changed jobs and had a significantly larger 401(k) balance. Therefore, the analysis in VanDerhei (March 2012) filters out anyone over age 35 whose tenure with their current employer is less than their current age minus 30.<sup>39</sup>

The average-percentage reductions for the “long-tenure” cohort currently ages 36–45 are again largest for those in the lowest-income quartile (24.9 percent). The reductions for this age cohort decrease to 7.2 percent for those in the second-income quartile and then increase to 10.0 percent for those in the third-income quartile. The reductions increase to 17.1 percent for those in the highest-income quartile.

The average-percentage reductions for the “long-tenure” cohort currently ages 46–55 are largest for those in the lowest-income quartile (21.1 percent). The reductions for this age cohort decrease to 9.9 percent for those in the second-income quartile and then increase to 11.6 percent for those in the third-income quartile. The reductions increase to 14.1 percent for those in the highest-income quartile.

Analysis of the oldest cohort (those currently 56–65) show a marked decrease in the average percentage reductions for the “long-tenure” cohort in the lowest-income quartile (12.7 percent), although it should be noted that the average reduction will be most muted by previous account balances for 401(k) participants in this age group. Moreover, the lowest-income quartile no longer has the largest reduction, as the reduction for the second-income quartile is slightly larger at 13.3 percent. The reductions for this age cohort decrease to 11.4 percent for those in the third-income quartile and then decrease to 8.7 percent for those in the highest-income quartile.

#### *5.2.1.1.3.2 Plan Size*

An interesting finding of the AllianceBernstein survey of plan sponsors with respect to potential federal tax modifications is the impact of plan size on the expected plan sponsor response. The reasons to

expect an increased sensitivity by smaller plans to federal tax modifications has previously been documented by others.<sup>40</sup> However, Figure 18 shows the average percentage reductions in 401(k) account balances at Social Security normal retirement age due to expected modifications in response to the proposal to modify the federal tax treatment of employer and worker contributions for 401(k) plans in exchange for an 18 percent match from the federal government, by plan size and age-specific salary quartiles for workers currently ages 26–35.<sup>41</sup> For all four income quartiles, the average percentage reduction for plan sponsors in the two smallest plan size categories (less than \$1 million and \$1–\$10 million in assets) are more than 1.5 times the value of the average percentage reduction for plans sponsors in any of the larger-size categories.

## **5.2.2 Impact of Employer Matches on 401(k) Saving**

It is understood that 401(k) plans differ from traditional employment-based defined benefit pension plans in that employees are permitted to make voluntary pre-tax contributions. Hence, the sensitivity of participation and contributions to plan characteristics—notably the employer matching rate—may play a critical role in retirement saving.

It has long been assumed that matching employer contributions—the allure of “free money” to participants (and would-be participants)—provided a strong financial motivation to contribute to defined contribution plans, notably 401(k)s. Industry surveys have suggested that employee contribution levels tend to cluster around the matching levels—and that has reinforced the notion of a cause-and-effect connection.

### **5.2.2.1 Reasons for employers to provide matching contributions**

Historically, providing employer matching contributions to 401(k) plans was thought to be a primary means of increasing the likelihood of passing the nondiscrimination (ADP) tests (Brady, 2006). However Ippolito (1997) provides an economic analysis of the feasibility of this approach and determines that an alternative explanation might be more plausible: In essence, employers use the 401(k) match to attract and retain a workforce with specific characteristics and matches are used to reward workers with lower discount rates. Mitchell, Utkus, and Yang (2006) posit that employee demand could be another alternative explanation, with the result that that highly compensated employees demand more generous tax-deferred employer matches. Both of these latter arguments see the employer match as a workforce management tool, rather than a regulatory response.

### **5.2.2.2 Empirical studies on the impact of matching contributions on participation**

In the last 20 years, several empirical studies<sup>42</sup> have analyzed the effect of the existence of matching contributions on the probability of participating in 401(k) plans that use voluntary enrollment. The magnitude of the results vary considerably depending on the type of database used, the methodologies employed, and the assumptions utilized; however, the overall consensus is that, for 401(k) plans that have not employed automatic enrollment, an employer match has a positive impact on plan participation.

An important caveat is that most available survey data do not contain detailed information on plan design. In an attempt to mitigate this problem, Mitchell, Utkus and Young (2007) use 2001 data on 500 401(k) retirement plans covering nearly 740,000 employees to evaluate how employer matching incentives influence retirement saving. Their analysis of the impact of employer matching contributions on participation included two important innovations: First, they evaluated employee saving behavior separately for NHCEs and HCEs at the firm level. Second, in an attempt to deal with nonlinear 401(k) matching formulae (explained in more detail later), they bifurcated the formulae into an “incentive

element” (the degree to which the employer matches various increments of employee compensation) and a “liquidity element” (indicating how much the employee must contribute in order to receive the entire employer incentive payment).

The authors analyze the data with OLS regression and find that each \$0.10 increase in the match rate raises NHCE participation rates by around 1 percentage point. However, for this group, the participation incentives are statistically insignificant between 3 and 6 percent of pay, and turn negative for matches above 6 percent of pay.

The authors conclude that the incentive effects of employer matching contributions are quite small. Summarizing their empirical results as follows (Mitchell, Utkus and Young, 2007):

The empirical model implies that close to 65 percent of NHCEs at the typical firm would join their 401(k) plan regardless of the presence of a match. Plan participation would be estimated to rise over a narrow range, by five to 15 percentage points, responding to a range of match offerings, from a modest (\$0.25 per dollar on the first three percent of pay) to a very generous match (\$1.00 per dollar up to six percent of pay). At the modal promised employer match (\$0.50 per dollar on six percent), over one-quarter of NHECs fails to participate in the 401(k) plan; even with a generous match, more than 20 percent still fails to join.

Given that the participation percentages for certain groups of eligible participants (especially the young and low income) have increased substantially under automatic enrollment (AE), many have wondered whether the matching contributions would continue to be associated with higher participation rates under these plans.

Beshears, Choi, Laibson, and Madrian (2007) estimated the employer match’s impact on savings plan participation under automatic enrollment in two ways:

- They analyzed a plan sponsor with an AE 401(k) plan that replaced its employer match with a non-elective contribution.<sup>43</sup> They found that plan participation rates decreased by 5 to 6 percentage points at most among new hires after the plan change.<sup>44</sup>
- They pooled data for nine firms with automatic enrollment to identify the relationship between participation rates and the match and found that a 1 percentage point decrease in the maximum potential match was associated with a 1.8 to 3.8 percentage point decrease in plan participation at six months of eligibility.

Based on these findings, the authors estimate that for a typical employer match (viz., 50 percent match on the first 6 percent of pay), eliminating the match under an AE plan could reduce plan participation by 5 to 11 percentage points.

Dworak-Fisher (2008) uses microdata from the National Compensation Survey (NCS) to offer a new line of research on the impact of employer matches on 401(k) participation rates. The author splits the participants into three different income groups and concludes that:

- For those with the lowest income, employer matches have little or no effect on participation, while automatic enrollment has dramatic effects, but
- Among workers in the middle income group, employer matches have substantial effects that may be larger than the effects of automatic enrollment.

It should be noted, however, that the author use NCS microdata from the respondents initiated in 2002 and 2003, and that only a small percentage of the plans in the sample (6 percent) were governed by automatic enrollment provisions.

### 5.2.2.3 Empirical studies on the impact of matching contributions on contribution behavior in voluntary enrollment 401(k) plans<sup>45</sup>

While the logic behind an employer match increasing the *incentive* for an employee to contribute to a 401(k) plan appears uncontroversial, the analysis becomes more complex with respect to the *level* of contributions the employee will make. This may happen for two reasons:

- While a larger match rate will provide a larger financial incentive for the employee to contribute (at least within a specified range), the employee may have a certain target in mind with respect to the total (employee and employer) contribution that needs to be made each year to satisfy their financial planning objectives. For example, if the employee has determined that he or she needs to save a total of 9 percent of compensation, the required employee contribution would be 6 percent if the employer matched 50 percent up to 6 percent of compensation but only 4.5 percent if the employer matched 100 percent up to (at least) 4.5 percent of compensation. Thus, for some employees, a higher match rate may result in a lower employee contribution rate.
- Empirical analysis emphasizing the match rate exclusively (as opposed to the match cap or the interaction between the two) may provide unexpected results. For example, if the employee's primary concern is to make sure they receive the maximum match possible from the plan sponsor, they would be more likely to contribute at least as much as the match cap. In this case, an employer match of 50 percent of the first 6 percent of compensation would likely generate a larger employee contribution rate than one matching 100 percent of the first 3 percent of compensation—even though the maximum total employer match for that single worker would be 3 percent of compensation in either case.

This helps explain some of the early empirical work in this area. For example, using plan data from Form 5500 filed annually by ERISA-qualified plans with the IRS, Papke (1995) finds that substantial employee contribution increases occur when an employer moves from a zero to a small or moderately sized match rate proxy, but that at higher match rates employee contributions fall. Using a subset of the EBRI/ICI 401(k) database with salary information, Holden and VanDerhei (2001) performed a regression analysis of the influence of the match rate on participants' contribution rates and found that participant before-tax contribution rates fell minimally as the employer match rate rose.<sup>46</sup> However, that analysis also found that as the match cap chosen by the employer increased, participant contribution rates rose.

Kusko, Poterba, and Wilcox (1994) utilized employee-level data from the 401(k) plan at a medium-sized U.S. manufacturing firm to analyze the participation and contribution decisions of workers eligible for this plan. Their analysis suggested that contribution decisions of eligible employees are relatively insensitive to the rate of employer matching on worker contributions and that most employees maintain the same participation status and contribution rate year after year despite substantial changes in the employer's match rate. Moreover, they find that institutional constraints on contributions, imposed by either the employer or the IRS, are an extremely important influence on contributor behavior.

This was confirmed by Yakoboski and VanDerhei (1996) when they analyzed the 401(k) participant data from three large 401(k) sponsors. Moreover, they found a significant amount of clustering around the match cap. For example:

- Company A had a maximum pretax contribution of 9 percent of earnings and a match rate of 30 percent for the first 5 percent of earnings. A total of 21 percent of participants contributed 5 percent of pay to the plan and 45 percent contributed 9 percent of pay while 1 percent contributed up to the 402(g) maximum for that year. The average deferral percentage for Company A was 6.7 percent.

- The non-highly compensated employees in Company B were allowed to contribute a maximum of 15 percent pretax and had a 100 percent match for the first 3 percent of earnings. Twenty-one percent of all non-highly compensated participants contributed 3 percent of pay while 10 percent contributed 15 percent and only 0.1 percent contributed at the 402(g) limit. The average deferral rate was 5.4 percent.
- The highly compensated employees in Company B were allowed to contribute a maximum of 10 percent pretax and had a 100 percent match for the first 3 percent of earnings. Fifteen percent of all highly compensated participants contributed 3 percent of pay while 10 percent contributed 10 percent and 15 percent contributed at the 402(g) limit. The average deferral rate was 5.9 percent.
- Company C had a maximum pretax contribution of 16 percent of earnings and a match rate of 2/3 for the first 6 percent of earnings. A total of 30 percent of participants contributed 6 percent of pay to the plan and 7 percent contributed 16 percent of pay while 12 percent contributed up to the 402(g) maximum for that year. The average deferral percentage for Company A was 6.3 percent.

Even though this analysis includes the experience of only three plan sponsors, the conclusion should be obvious: In addition to individual-specific characteristics (e.g., age, wage and tenure), employee contribution behavior will undoubtedly be influenced to a large extent by plan design variables (viz., the match cap and plan limits for pretax contributions) as well as the 402(g) limits.

VanDerhei and Copeland (2001) attempted to deal with these plan design influences on employee contribution behavior by working with a small subset of the EBRI/ICI 401(k) database.<sup>47</sup> There was sufficient information to track accurately 137 different “pure” matching formulas, that is, one without a nonelective contribution.<sup>48</sup> Participants in the database were excluded if they were under age 20 or over age 64, had been with the current employer for less than one year, and/or had less than \$10,000 in earnings. After applying each of these screens and deleting any participants with existing account balances who did not make employee contributions in 1998, a total of 163,346 participants were available for analysis.

In previous research, the level of contributions was estimated by assuming that they were a function of demographic variables and some measure of a match rate of the plan. However, this approach fails to account for the fact that some plans have different match rates for different levels of the percentage of compensation contributed. For example, a plan may offer a dollar-for-dollar match for the first 2 percent of compensation contributed and a 50 percent match for the next 3 percent of compensation contributed. In addition, the strategy does not clearly distinguish between a plan that matches 50 percent of contributions for the first 4 percent of compensation from those plans that match 50 percent of contributions for the first 6 percent of compensation. Since the data used in this research contain plan-specific matching formulas, the actual match rate at each percentage level of contributions is known. Therefore, VanDerhei and Copeland (2001) used an estimation procedure that takes advantage of knowing the differing incentives that an employee eligible to contribute to a 401(k) faces at each percentage of compensation level of contributions.

The parameters of a model for the first increment can be estimated from the entire sample by dividing it into two groups: those who make the contribution and those who do not. The parameters of a model for the second increment can be estimated by dividing the subsample of those who make the first incremental contribution into those who make the next 1 percent of compensation contribution and those who do not. Successive iterations are estimated until the maximum plan limit of all match formulas is obtained. In this model, the decision of an eligible employee is examined at each of level of possible contributions for the employee. Consequently, the changes in the incentives of contributing an

additional percentage of compensation are captured through this strategy as well as the ability to control whether or not the participant is allowed to contribute (e.g., in some plans an HCE might be cut off from making additional contributions after 6 percent of compensation, while an NHCE may be allowed to contribute to 15 percent of compensation).

The application of this model is illustrated in Figure 8 of VanDerhei and Copeland (2001) with an example of the computation of the probability that a 22-year-old employee with one year of tenure with the current employer and wages of \$15,000 who already contributed 4 percent of compensation will contribute an additional percent. This value is estimated to be as low as 81 percent if this is the last interval of compensation that is matched by the employer (i.e., the additional match is equal to zero). In contrast, the same employee is estimated to have a 90 percent probability of contributing the extra percent of compensation if they would forfeit the option to earn an extra 1 percent of employer match if they continued to contribute to MAXMATCH. In each of the three illustrated intervals, the model predicts that those with the lowest estimated probability of contributing the extra percent of compensation when the additional match is set equal to zero (young employees and those with lower levels of wage and tenure) will experience the most sensitivity to increases in the additional match level.

Figure 19 provides predicted contributions for stylized participants under typical plan matching formulas. This shows that older participants and those with higher levels of wage and tenure are expected to have higher employee contributions for a given plan design. However, this also allows one to investigate how the change in plan design will impact the expected contribution behavior. For example, a change from a 50 percent match on the first 6 percent of compensation to a 75 percent match over the same range results in an expected increase in employee contributions for all of the stylized participants. Moreover, this figure demonstrates the ability of the model to predict contributions under a two-tier matching formula (e.g., a 75 percent match on the first 2 percent of compensation, decreasing to 50 percent for the next 3 percent of compensation) as well as the ability to model employees participating in a plan with no employer match.

#### **5.2.2.4 The impact of adopting automatic enrollment on employer contribution rates**

Soto and Butrica (2009) conclude that among a sample of large 401(k) plans, match rates are lower among firms with automatic enrollment than among those without automatic enrollment after controlling for firm characteristics. However, there were two major limitations of this analysis:

- This study was based on U.S. Department of Labor Form 5500 data that *do not include* specific information on 401(k) match rates. Instead, the authors constructed an estimate for the match rate as the ratio of employer-to-employee contributions for each 401(k) plan.
- They merged the Form 5500 data with information on automatic enrollment from the *Pensions & Investments* database of the top 1,000 pension funds, which includes a flag indicating whether plan administrators reported offering automatic enrollment in their defined contribution (401(k)-type) plans. However, this database does not report the year that the automatic enrollment provision was adopted, so there is no way to tell from this data source how long auto-enrollment had been implemented in a plan.

The authors ran regression analysis on this database and produced a finding that:

*suggests a negative relationship between automatic enrollment and match rates and is statistically significant at the firm-level. In particular, match rates are about 7 percentage points lower among firms with automatic enrollment than among those without automatic enrollment, after controlling for firm characteristics.*

The authors correctly point out that although the regressions *suggest* a relationship between automatic enrollment and match rates, they do not necessarily imply that auto-enrollment *causes* lower match rates; however, this crucial qualification has been generally ignored in third-party accounts of the study.

These conclusions conflict with previous EBRI research,<sup>49</sup> which surveyed defined benefit plan sponsors administered by Mercer Human Resource Consulting to gauge their recent activity and planned modifications to their defined benefit (pension) and defined contribution (401(k)-type) plans. The survey also was able to determine what, if any, increases in employer contributions to defined contribution plans were made in conjunction with reductions to their defined benefit plans.

Although the association between the adoption of automatic enrollment and employer contributions to 401(k) plans was not the focus of the study, one-third of the defined benefit plan sponsors surveyed indicated that they had already increased or planned to increase their employer match to a defined contribution plan, and 20.9 percent indicated that they had already increased or planned to increase their nonmatching employer contributions to a defined contribution plan. There was some overlap between the two groups, but overall, 42.5 percent of the defined benefit plan sponsors surveyed indicated that they had already increased or planned to increase their employer match and/or nonmatching employer contribution to a defined contribution plan. This was particularly evident among defined benefit plan sponsors that had closed a defined benefit plan to new hires, frozen their defined benefit plan to all members in the last two years, or planned to do so in the next two years.<sup>50</sup>

Moreover, the 2007 EBRI study found an extremely large correlation between the adoption of automatic enrollment for a 401(k) plan and the freezing or closing of the defined benefit plan.<sup>51</sup> Of those defined benefit plan sponsors that had closed their defined benefit plans in the last two years, 80.5 percent had either already adopted or were currently considering adopting automatic enrollment features for their 401(k) plans. Of those defined benefit plan sponsors that had closed their defined benefit plans in the last two years, 76.1 percent had either already adopted or were currently considering adopting automatic enrollment features for their 401(k) plans.<sup>52</sup>

VanDerhei (April 2010) analyzes in detail plan-specific data of approximately 1,000 large defined contribution plans for salaried employees from Benefit SpecSelect™ (a trademark of Hewitt Associates LLC) in 2005 and 2009. From that information, a subsample of plan sponsors was created that had adopted automatic enrollment 401(k) plans by 2009, but did not have them in 2005 (the last observation that was not influenced by PPA). The following information was coded for each plan:

- The default contribution rate for the AE plan in 2009.
- The entire match rate contribution formulae for both years.<sup>53</sup>
- All nonelective contributions paid to the defined contribution participants by the employer.

Whether plan sponsors were more or less generous after adopting AE was measured with three different metrics:

- The average 2009 first-tier match rate was 87.78 cents for each dollar contributed, while the average 2005 first-tier match rate was 81.26 cents for each dollar contributed. The difference of 6.52 cents for each dollar contributed suggests that, to the extent that this sample is representative of the universe of large 401(k) sponsors, those sponsors adopting AE were *more generous* to the 401(k) participants when measured by this variable after automatic enrollment was implemented than they were before.
- The average effective match rate<sup>54</sup> for 2009 was 4.32 percent of compensation, but only 4.00 percent of compensation in 2005. The increase of 0.32 percentage points again suggests that



large 401(k) sponsors adopting AE were *more generous* to the 401(k) participants when measured by this variable after the adoption of automatic enrollment than before.

- The average total employer contribution rate<sup>55</sup> for 2009 was 6.35 percent of compensation and 5.46 percent of compensation in 2005. The increase of 0.89 percentage points once more suggests that those large 401(k) sponsors adopting AE were *more generous* to the 401(k) participants when measured by this variable than before.

This information was then combined with the defined benefit information for the same sponsor in an attempt to analyze whether EBRI's 2007 findings of the association between defined benefit freezing/closing and enhanced 401(k) contributions were corroborated. Figure 1 of VanDerhei (April 2010) demonstrates that the average improvements for all three metrics were much higher for sponsors that had frozen/closed their defined benefit plans than for the overall average. For example, the change in the total employer contribution rate for all frozen plans was 1.64 percent of compensation versus 0.89 percent for the overall average. Employers that had closed their defined benefit plans to new employees had an even larger average improvement: 2.82 percent of compensation. The defined benefit plan sponsors that had frozen or closed their plans were then split into those that had done so prior to adopting AE and those that had changed their defined benefit plans between 2005 and 2009. If the hypothesis that the 401(k) improvements were a result, at least partially, of a simultaneous quid pro quo for the decreased accruals in the defined benefit plan, one would expect that the earlier modifications would be less generous than the modifications that took place approximately at the time of the conversion to AE. In fact, this is exactly what is found for all six comparisons in the study. For example, the average total employer contribution improvement for firms that had frozen their plans prior to 2005 was 0.69 percent of compensation, compared with 2.45 percent for those that froze between 2005 and 2009. Similar evidence is found for those that closed their pension plans to new employees: The average improvement in total employer 401(k) contribution was only 0.56 percent of compensation for those that closed prior to 2005, but 3.34 percent for those that closed the plan between 2005 and 2009.

## 6 Appendix A: Brief Description of RSPM<sup>56</sup>

One of the basic objectives of RSPM is to simulate the percentage of the population that will be “at risk” of having retirement income that is inadequate to cover basic expenses and pay for uninsured health care costs for the remainder of their lives once they retire.<sup>57</sup> However, the EBRI Retirement Readiness Rating™ also provides information on the distribution of the likely number of years before those at risk “run short of money,” as well as the percentage of compensation they would need in terms of additional savings to have a 50, 70, or 90 percent probability of retirement income adequacy.

Appendix C describes how households (whose heads are currently ages 36–62) are tracked through retirement age, and how their retirement income/wealth is simulated for the following components:

- Social Security.
- Defined contribution balances.
- IRA balances.
- Defined benefit annuities and/or lump-sum distributions.
- Net housing equity.<sup>58</sup>

A household is considered to run short of money in this model if aggregate resources in retirement are not sufficient to meet aggregate minimum retirement expenditures, which are defined as a combination

of deterministic expenses from the Consumer Expenditure Survey (as a function of income), and some health insurance and out-of-pocket health-related expenses, plus stochastic expenses from nursing home and home health care expenses (at least until the point they are picked up by Medicaid). This version of the model is constructed to simulate "basic" retirement income adequacy; however, alternative versions of the model allow similar analysis for replacement rates, standard-of-living calculations, and other ad hoc thresholds.

The version of the model used for the analysis in this testimony assumes all workers retire at age 65 and immediately begin to withdraw money from their individual accounts (defined contribution and cash balance plans, as well as IRAs) whenever the sum of their basic expenses and uninsured medical expenses exceed the after-tax<sup>59</sup> annual income from Social Security and defined benefit plans (if any). If there is sufficient money to pay expenses without tapping into the tax-qualified individual accounts,<sup>60</sup> the excess is assumed to be invested in a non-tax-advantaged account where the investment income is taxed as ordinary income.<sup>61</sup> The individual accounts are tracked until the point at which they are depleted; if the Social Security and defined benefit payments are not sufficient to pay basic expenses, the entity is designated as having "run short of money" at that time.

## **7 Appendix B: Brief Chronology of RSPM**

The original version of RSPM was used to analyze the future economic well-being of the retired population at the state level. EBRI and the Milbank Memorial Fund, working with the governor of Oregon, set out in the late 1990s to see if this situation could be addressed for Oregon. The analysis<sup>62</sup> focused primarily on simulated retirement wealth with a comparison to ad hoc thresholds for retirement expenditures, but the results made it clear that major decisions lie ahead if the state's population was to have adequate resources in retirement.

Subsequent to the release of the Oregon study, it was decided that the approach could be applied to other states as well. Kansas and Massachusetts were chosen as the next states for analysis. Results of the Kansas study were presented to the state's Long-Term Care Services Task Force on July 11, 2002,<sup>63</sup> and the results of the Massachusetts study were presented on Dec. 1, 2002.<sup>64</sup> With the assistance of the Kansas Insurance Department, EBRI was able to create Retirement Readiness Ratings based on a full stochastic decumulation model that took into account the household's longevity risk, post-retirement investment risk, and exposure to potentially catastrophic nursing-home and home-health-care risks. This was followed by the expansion of RSPM and the Retirement Readiness Ratings to a national model and the presentation of the first micro-simulation retirement-income-adequacy model built in part from administrative 401(k) data at the EBRI December 2003 policy forum.<sup>65</sup> The basic model was then modified for testimony for the Senate Special Committee on Aging in 2004 to quantify the beneficial impact of a mandatory contribution of 5 percent of compensation.<sup>66</sup>

The first major modification of the model was presented at the EBRI May 2004 policy forum. In an analysis to determine the impact of annuitizing defined contribution and IRA balances at retirement age, VanDerhei and Copeland, 2004, were able to demonstrate that for a household seeking a 75 percent probability of retirement income adequacy, the additional savings that would otherwise need to be set aside each year until retirement to achieve this objective would decrease by a median amount of 30 percent. Additional refinements were introduced in 2005 to evaluate the impact of purchasing long-term care insurance on retirement income adequacy.<sup>67</sup>

The model was next used in March of 2006 to evaluate the impact of defined benefit freezes on participants by simulating the minimum employer-contribution rate that would be needed to financially indemnify the employees for the reduction in their expected retirement income under various rate-of-

return assumptions.<sup>68</sup> Later that year, an updated version of the model was developed to enhance the EBRI interactive Ballpark E\$timate<sup>®</sup> worksheet by providing Monte Carlo simulations of the necessary replacement rates needed for specific probabilities of retirement-income adequacy under alternative-risk-management treatments.<sup>69</sup>

RSPM was significantly enhanced for the May 2008 EBRI policy forum by allowing automatic enrollment of 401(k) participants with the potential for automatic escalation of contributions to be included.<sup>70</sup> Additional modifications were added in 2009 for a Pension Research Council presentation that involved a winners/losers analysis of defined benefit freezes and the enhanced employer contributions to defined contribution plans provided at the time the defined benefit plan was frozen.<sup>71</sup>

A new subroutine was added to the model to allow simulations of various styles of target-date funds for a comparison with participant-directed investments in 2009.<sup>72</sup> In April 2010, the model was completely re-parameterized with 401(k) plan-design parameters for sponsors that have adopted automatic-enrollment provisions.<sup>73</sup> A completely updated version of the national model was produced for the May 2010 EBRI policy forum and used in the July 2010 *Issue Brief*.<sup>74</sup>

The new model was used to analyze how eligibility for participation in a defined contribution plan impacts retirement income adequacy in September 2010.<sup>75</sup> It was also used to compute retirement savings shortfalls for Baby Boomers and Generation Xers in October 2010.<sup>76</sup>

In October 2010 testimony before the Senate Health, Education, Labor and Pensions Committee on “The Wobbly Stool: Retirement (In)security in America,” the model was used to analyze the relative importance of employer-provided retirement benefits and Social Security.<sup>77</sup>

In February 2011, the model was used to analyze the impact of the 2008-2009 crisis in the financial and real estate markets on retirement income adequacy.<sup>78</sup>

An April 2011 article introduced a new method of analyzing the results from the RSPM.<sup>79</sup> Instead of simply computing an overall percentage of the simulated life paths in a particular cohort that will not have sufficient retirement income to pay for the simulated expenses, the new method computed the percentage of households that would meet that requirement more than a specified percentage of times in the simulation.

As explored in the June 2011 *Issue Brief*, the RSPM allowed retirement-income adequacy to be assessed at retirement ages later than 65.<sup>80</sup>

In a July 2011 *Notes* article<sup>81</sup>, it provided preliminary evidence of the impact of the “20/20 caps” proposed by the National Commission on Fiscal Responsibility and Reform on projected retirement accumulations.

The August 2011 *Notes* article<sup>82</sup> evaluated the importance of defined benefit plans for households, assuming they retire at age 65, while demonstrating the impact of defined benefit plans in achieving retirement income adequacy for Baby Boomers and Gen Xers.

Finally, the September 2011 Senate Finance testimony<sup>83</sup> analyzed the potential impact of various types of tax-reform options on retirement income adequacy. This was expanded in the November 2011 EBRI *Issue Brief*<sup>84</sup> and a new set of survey results were added to the model in the March 2012 *Notes* article.<sup>85</sup>

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## 9 Endnotes

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<sup>1</sup> A brief description of the EBRI Retirement Security Projection Model<sup>®</sup> (RSPM) is provided in Appendix A followed by a chronology of its development and utilization in Appendix B.

<sup>2</sup> It should be noted that the baseline assumptions used in the 2010 analysis did not allow for the utilization of net housing equity to ensure retirement income adequacy. A future publication will include a 2012 update for this analysis with housing equity used “as needed.”

<sup>3</sup> This number is somewhat smaller than the \$4.6 trillion reported in VanDerhei (October 2010); however, the baseline assumptions used in the 2010 analysis did not allow for the utilization of net housing equity to ensure retirement income adequacy. When the 2012 analysis is repeated with the same assumptions as used in 2010, the aggregate deficit increases to \$4.8 trillion.

<sup>4</sup> These findings are part of the 22<sup>nd</sup> annual Retirement Confidence Survey (RCS), a survey that gauges the views and attitudes of working-age and retired Americans regarding retirement, their preparations for retirement, their confidence with regard to various aspects of retirement, and related issues. The survey was conducted in January 2012 through 20-minute telephone interviews with 1,262 individuals (1,003 workers and 259 retirees) age 25 and older in the United States. Random digit dialing was used to obtain a representative cross section of the U.S. population. To further increase representation, a cell phone supplement was added to the sample. Starting with the 2001 wave of the RCS, all data are weighted by age, sex, and education to reflect the actual proportions in the adult population. Data for waves of the RCS conducted before 2001 have been weighted to allow for consistent comparisons; consequently, some data in the 2012 RCS may differ slightly with data published in previous waves of the RCS. Data presented in tables in this report may not total to 100 due to rounding and/or missing categories.

<sup>5</sup> Helman, Copeland and VanDerhei (2012)

<sup>6</sup> In Dushi, Iams, and Lichtenstein (2011), the results from another individual response survey, the Survey of Income and Program Participation (SIPP), are compared with tax records, where they found that a number of individuals said they made contributions to a defined contribution plan but the tax records said they didn’t and others made contributions according to the tax records but didn’t report the contributions in the survey. When the percentages are netted out, the tax records show a 5 percentage point higher level of participation than what the survey responses show. Consequently, there are issues with the accuracy of certain individual responses in retirement plan participation.

<sup>7</sup> Figure 30 from Copeland (October 2011).

<sup>8</sup> It should be noted that there is more than one definition of a pension freeze:

- A **“hard freeze”** is one in which no additional benefits will accrue to any current plan participants from either additional tenure or increases in compensation.
- A **“soft freeze”** will generally limit increases for current participants in accrued benefits for additional years of participation, but the definition of compensation used in the formula may be allowed to increase.
- In addition, a plan sponsor may choose to implement a **partial freeze** in which the plan is frozen for some but not all participants.

<sup>9</sup> This is true only in those cases in which the defined benefit participant ends up with an annuity in retirement. Those who have been cashed out or chose to take a lump sum distribution would still need to deal with (post-retirement) investment risk and longevity risk on their own.

<sup>10</sup> In recent years the longevity risk may also be dealt with via longevity insurance or longevity annuities. See Park (2011) for more detail.

<sup>11</sup> Those in the lowest income quartile will be more likely to benefit from Medicaid while those in the highest income quartile are more likely to be able to self-insure the risk without a catastrophic impact on their future retirement income.

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<sup>12</sup> Utkus and Bapat (2011) analyzed defined contribution plan participants at Vanguard and found that five-year returns (2005-2010) for single target-date investors ranged from 3.62 percent to 4.65 percent per year for the 5<sup>th</sup> and 95<sup>th</sup> percentiles with a mean of 3.93 percent. Among participant-directed funds, five-year returns ranged from -0.02 percent to 8.09 percent per year for the 5<sup>th</sup> and 95<sup>th</sup> percentiles with a mean of 3.76 percent.

<sup>13</sup> VanDerhei, Holden, Alonso and Bass (2011).

<sup>14</sup> It should be noted that some plan sponsors may have turned to their 401(k) plans as a means of freeing up cash flow that is required for their legally required minimum contributions to defined benefit plans. A review by Salisbury and Buser (2009) of 251 401(k) plan sponsors that have suspended matching contributions for their approximately 4.4 million workers finds that those employing 50 percent of the workers also maintained an open defined benefit plan. An additional 16 percent of workers were with employers that were still obligated to fund a frozen defined benefit plan. Further, 8 percent of the workers were with an employer that had both an open and a frozen defined benefit plan that carried funding obligations.

<sup>15</sup> Twelve hundred 401(k) plan sponsors were randomly selected to complete the 401(k) Questionnaire via a secure website.

<sup>16</sup> More refined analysis is currently underway to link the 2006 and 2007 contributions on a plan-specific basis and filter out mid-year suspensions.

<sup>17</sup> All plans were still active as of year-end 2008.

<sup>18</sup> The proxy was plan aggregate employer contributions divided by employee contributions for 2007. This is obviously only a rough proxy and will be inaccurate to the extent nonelective contributions exist for the plan and/or employees contribute in excess of the maximum amount needed to obtain the full match. This analysis is currently being refined using year-end 2010 data.

<sup>19</sup> It should be noted that this analysis was done using both new contributions and investment return to offset the investment losses experienced during the market crisis. Based on an analysis of more than 3 million participants from more than 2,000 plans, Utkus and Young (2011) found that the median rise in account balances between December 2007 and December 2010 was 31 percent. A subsequent analysis of nearly 2 million participants during the same time period by Utkus and Bapat (2011) showed a positive average annual total return (0.11 percent). The latter were based on investment results alone – before considering the effect of contributions.

<sup>20</sup> While 65 seems to still be a societal norm, even Social Security has now adopted a later age for full benefits.

<sup>21</sup> VanDerhei and Copeland (2011). A future version of the model will include the ability to model retirement ages prior to Medicare eligibility.

<sup>22</sup> It is important to note that this models *all U.S. workers*. As a result, the balances will be significantly smaller than simulation models of those *current 401(k) participants* (Holden and VanDerhei, 2002) or those eligible for participation (Holden and VanDerhei, 2005).

<sup>23</sup> The simulation model analyzes how success changes with:

- The maximum level of employee contributions allowed by the plan sponsor (6, 9, 12 and 15 percent of compensation).
- The annual increase in contributions (1 vs. 2 percent of compensation).
- Whether employees are assumed to opt out of the automatic escalation.
- Whether employees are assumed to remember/retain their previous level of contributions when they change jobs vs. reverting back to the plan's initial default.

<sup>24</sup> VanDerhei (September 2011).

<sup>25</sup> Gale (2011).

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<sup>26</sup> The analysis for the Senate Finance Committee hearing modeled the following scenarios:

- Employer contributions are modified in such a manner that the total match (employer plus government match) remains constant.
- All plan sponsors drop the plan match, and all employees receive a 30 percent match from the government.
- All plan sponsors drop the plan match, and all employees receive an 18 percent match from the government.

In later EBRI analysis (VanDerhei, November 2011), the following scenarios were added:

- No plan sponsors drop the plan match, and all employees receive an 18 percent match from the government.
- No plan sponsors drop the plan match, and all employees receive a 30 percent match from the government.

<sup>27</sup> VanDerhei (September 2011). The 2011 RCS questions were fielded in January 2011 and therefore did not ask 401(k) participants about the specific provisions used in the September 2011 Gale proposal.

<sup>28</sup> This survey was conducted online within the United States by Harris Interactive commissioned by the Principal Financial Group from May 17– June 17, 2011. It surveyed 798 employee-benefit decision makers for companies with three to 1,000 employees that do offer defined contribution retirement plans. These decision makers were selected from a Principal Financial Group client list, and their data were not weighted.

<sup>29</sup> A similar question was asked with the 30 percent government match provision suggested in Gale, Gruber, and Orszag (2006).

<sup>30</sup> A similar question was asked for a 30 percent government match. However, follow-up information for those indicating an increase or decrease in contributions is not available.

<sup>31</sup> The results assumed none of the 401(k) participants were automatically enrolled in these retirement plans; instead, they presumed that workers' rate of contribution after the first year were driven primarily by age and income characteristics rather than tenure with the current employer, as they might be in auto-enrollment plans with an automatic escalation of worker contributions. The exclusion of auto-enrollment plans in this analysis was necessary given the current modeling assumption of no job change. It would be very difficult to provide an accurate analysis of the average percentage reductions in 401(k) balance under auto-enrollment if the plans included an automatic escalation provision. For example, if a participant's contribution rate had already been escalated to 8 percent of compensation at one employer, and upon job change was automatically enrolled into another 401(k) plan, would they "remember" their current rate of deferral and start deferring in the new plan at that rate, or would their contribution rate drop to the default rate of the new plan? Undoubtedly many 401(k) participants in this automatic enrollment situation follow the latter approach. As additional information becomes available on workers' behavioral responses to auto-enrollment, EBRI will update this analysis to provide a more robust model.

<sup>32</sup> See Holden and VanDerhei (2005).

<sup>33</sup> See VanDerhei and Copeland (2008).

<sup>34</sup> The full stochastic nature of the model will be included in future analysis.

<sup>35</sup> It is important to note that the annuitized accumulations in this analysis are from 401(k) contributions exclusively and do not include projected Social Security retirement benefits. This is in contrast to other EBRI research (e.g., VanDerhei and Lucas, November 2010) that includes both components. However, in the previous analysis, the experience of all workers (not just those who were currently 401(k) participants) was simulated and job change was allowed.

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<sup>36</sup> These estimates compare quite favorably to those in Holden and VanDerhei (2002) when the difference between nominal and real replacement rates are considered. However, this is to be expected given the assumptions listed above (especially the lack of job turnover and therefore the suppression of cashouts prior to retirement).

<sup>37</sup> The baseline results in Figures 17 and 18 were simulated assuming the midpoint value for each category in the AllianceBernstein survey. Sensitivity analysis of this assumption is shown in Figures 3 and 4 of VanDerhei (March 2012) for the minimum reduction in account balances, and in Figures 5 and 6 of the same publication for the maximum reduction in account balances. The average percentage reductions in account value in Figure 3 vary from 3.1 to 19.7 percent (depending on income quartile) for 401(k) participants currently 26–35 under the minimum reduction scenario. Figure 5 shows that they vary from 8.8 to 24.4 percent (depending on income quartile) for 401(k) participants currently 26–35 under the maximum reduction scenario

<sup>38</sup> Under the baseline assumptions, the average percentage reduction in employee contributions for this group in response to the proposal is 14.3 percent. Account balances will also be reduced due to the plan-sponsor reaction.

<sup>39</sup> For example, a 40-year-old participant would need to have a tenure of at least 10 years with the current employer to be included in this analysis. Alternative specifications of minimum tenure were used with essentially the same results.

<sup>40</sup> See pages 10–11 of Miller (2011) for an example.

<sup>41</sup> Given the much larger simulated account balance reductions for smaller plans shown in Figure K, it is important to note that the plan-size distribution used in this simulation model is based on those found in the EBRI/Investment Company Institute (ICI) 401(k) database, not the universe of 401(k) plans. Evidence of the magnitude of possible statistical bias in this regard can be found in VanDerhei, Holden, Alonso and Bass (2011). The third panel of Figure 4 (page 8) in that publication shows the distribution of plans in the EBRI/ICI 401(k) database in 2010 vs. 2008 Department of Labor (DOL) Form 5500 for all 401(k) plans and suggests an under-representation of small plans for the EBRI/ICI 401(k) database. The plan-size variable was specified in terms of participants instead of assets, but a similar distribution would be expected in the latter case. If this is indeed the case, the RSPM estimates for overall average benefit reductions presented here would be expected to be smaller than those that would be evidenced by the full 401(k) universe.

<sup>42</sup> Andrews (1992); Even and Macpherson (1996); Basset, Fleming and Rodrigues (1998); Even and Macpherson (2005); Englehardt and Kumar (2007); GAO (1997); Kusko, Poterba and Wilcox (1998); Mitchell, Utkus and Yang (2007); Papke (1995) and Papke and Poterba (1995); Yakoboski (1994);

<sup>43</sup> The original matching contribution was 25 percent on the first 4 percent of pay contributed. It was replaced with an employer contribution equal to 4 percent of pay plus an annual profit-sharing contribution

<sup>44</sup> The average employee contribution rate fell by 0.65 percent of pay.

<sup>45</sup> Although the impact of matching contributions on employee contribution behavior has been studied extensively in voluntary enrollment 401(k) plans, there has been relatively little research on automatic enrollment plans at this point in time. Nesmith, Utkus and Young (2007) provide evidence that new employees hired under automatic enrollment 401(k) plans have participation rates nearly double those for new employees hired under voluntary enrollment 401(k) plans (86 percent versus 45 percent). However, they show that overall plan contribution rates under automatic enrollment fall because many new participants who would have voluntarily chosen a higher contribution rate remain at the low default levels. Additional research in this field has been conducted on a relatively small sample of 401(k) plans in Madrian and Shea (2001); Choi, Laibson, and Madrian (2004); and Choi, Laibson, Madrian, and Metrick (2006)

<sup>46</sup> This result is from a regression on a sample of all participants (whether contributing or not) for whom match rate and match level information was provided or derived. The regression model included age, tenure, salary, plan loan provision (yes/no), employer match rate, and employer match level variables to examine their effects on participant before-tax contribution rates.

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<sup>47</sup> The EBRI/ICI 401(k) database has detailed individual participant records (including demographic information and contribution behavior) from more than 60,000 plans (VanDerhei, Holden, Alonso and Bass, 2011). However, because of strict confidentiality standards, no information on the plan sponsor's identity was included.

<sup>48</sup> Even for those plans without nonelective contributions, we found several participants with employer contributions that were not equal to the predicted amount based on the plan's matching formulas and the employee's before-tax or after-tax contributions, or both. This may be because of the 401(k) plan using a different definition of compensation than that contained in the database, and we attempted to control for this unknown effect by computing the difference between actual and predicted employer contributions (as a percentage of compensation) and excluding any participant with more than a 0.2% of compensation differential.

<sup>49</sup> See VanDerhei (July 2007).

<sup>50</sup> The percentage of defined benefit plan sponsors that indicated that they had already increased or planned to increase their employer match and/or nonmatching employer contribution to a defined contribution plan varied from 62 percent for those that had frozen the defined benefit plan in the last two years to 81 percent for those that planned to close the plan for new members in the next two years.

<sup>51</sup> As hypothesized in VanDerhei (July 2007), some employers that have discontinued accruals in the defined benefit plans may want to continue to have a very large percentage of their eligible employees participating each year. As shown in many industry studies, the participation rates among eligible young and low-income employees are significantly higher in general under 401(k) plans with an automatic enrollment feature.

<sup>52</sup> Similar levels applied to those defined benefit plans that were to be closed or frozen in the next two years.

<sup>53</sup> It is important to keep in mind that many of the plans will use a multi-tier formula (which is another reason why using simple averages of employer-to-employee contributions is problematic).

<sup>54</sup> The effective match rate is a measure of the total amount of employer's contribution via the matching formulae for the employee IF the employee contributes enough to receive the full match. This simultaneously controls for the match rate, the maximum amount matched, and the possibility of multiple-tiered formula. For example, an employer that matches 100 percent of the first 1 percent of compensation and 50 percent of the next 5 percent would have an effective match of:  $1*1+.5*5 = 3.5$  (percent of compensation).

<sup>55</sup> This is the sum of the effective match rate and the nonelective contribution rate.

<sup>56</sup> This material first appeared in VanDerhei and Copeland (July 2010).

<sup>57</sup> The nominal cost of these expenditures increases with component-specific inflation assumptions. See the appendix for more details.

<sup>58</sup> Net housing equity is introduced into the model in three different mechanisms (explained below).

<sup>59</sup> IRS tax tables from 2009 are used to compute the tax owed on the amounts received from defined benefit plans and Social Security (with the percentage of Social Security benefits subject to Federal Income Tax proxied as a function of the various retirement income components) as well as the individual account withdrawals.

<sup>60</sup> Roth IRA and 401(k) accounts are not used in this version of the model but will be incorporated into a forthcoming EBRI publication.

<sup>61</sup> Capital gains treatment is not used in this version of the model.

<sup>62</sup> VanDerhei and Copeland (2001).

<sup>63</sup> VanDerhei and Copeland (July 2002).

<sup>64</sup> VanDerhei and Copeland (December 2002).

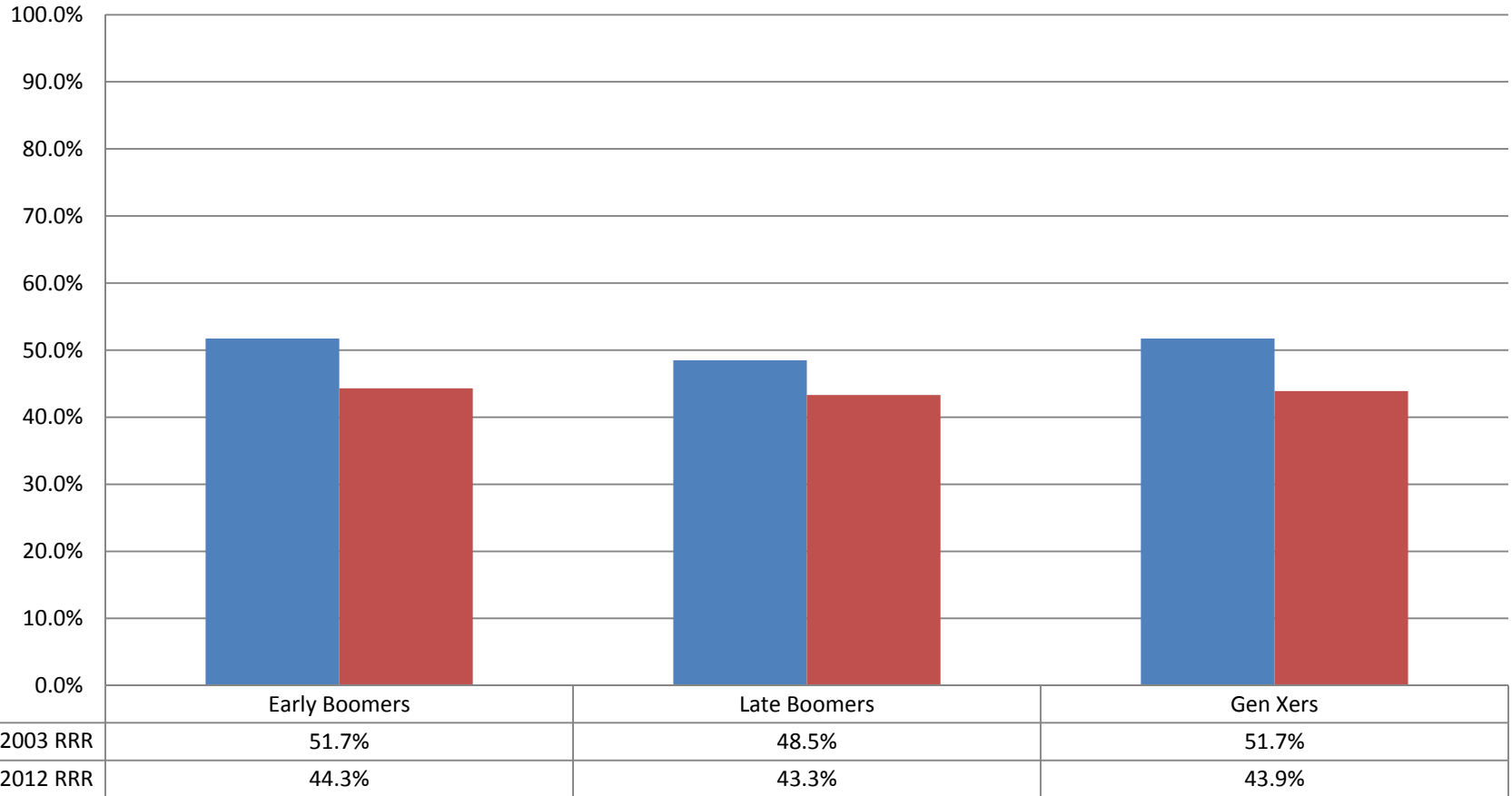
<sup>65</sup> VanDerhei and Copeland (2003)

<sup>66</sup> VanDerhei (January 2004).

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- <sup>67</sup> VanDerhei (2005).
- <sup>68</sup> VanDerhei (March 2006).
- <sup>69</sup> VanDerhei (September 2006)
- <sup>70</sup> VanDerhei and Copeland (2008).
- <sup>71</sup> Copeland and VanDerhei (2010).
- <sup>72</sup> VanDerhei (2009).
- <sup>73</sup> VanDerhei (April 2010).
- <sup>74</sup> VanDerhei and Copeland (2010).
- <sup>75</sup> VanDerhei (September 2010).
- <sup>76</sup> VanDerhei (October 2010a).
- <sup>77</sup> VanDerhei (October 2010b).
- <sup>78</sup> VanDerhei (February 2011).
- <sup>79</sup> VanDerhei (April 2011).
- <sup>80</sup> VanDerhei and Copeland (June 2011).
- <sup>81</sup> VanDerhei (July 2011).
- <sup>82</sup> VanDerhei (August 2011).
- <sup>83</sup> VanDerhei (September 2011).
- <sup>84</sup> VanDerhei (November 2011)
- <sup>85</sup> VanDerhei (March 2012).

# Figure 1

**EBRI Retirement Readiness Rating™ (RRR): 2003 vs. 2012**  
**(Status Quo for Social Security, Housing Equity Used "As Needed")**  
**Percentage of population at risk\* for inadequate retirement income, by age cohort (baseline assumptions)**

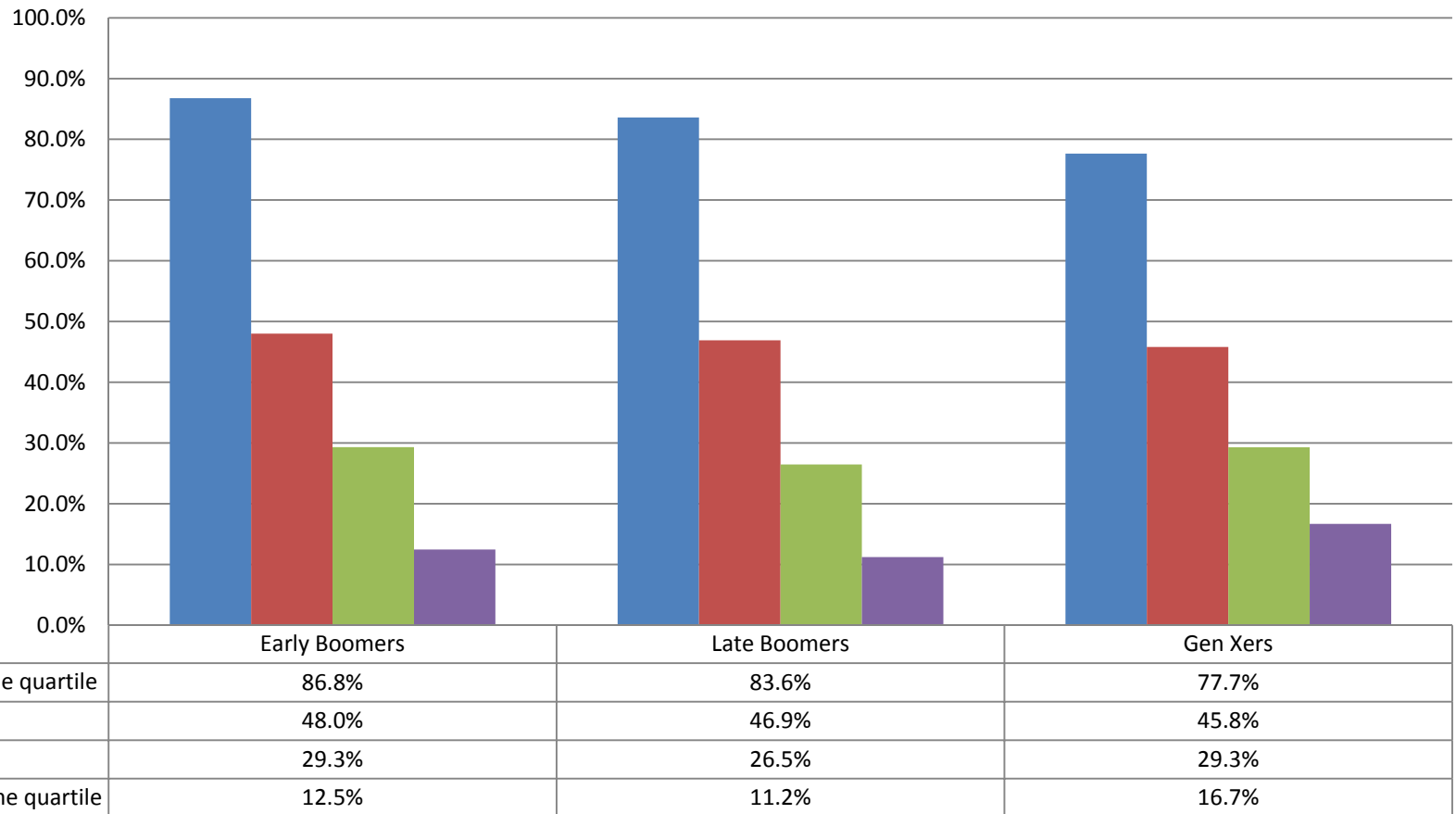


Sources: EBRI Retirement Security Projection Model™ versions 1501 and 1502.

\* See text for definition of "at risk"

## Figure 2

**EBRI Retirement Readiness Rating™ (RRR): 2003 vs. 2012**  
**(Status Quo for Social Security, Housing Equity Used "As Needed")**  
**Percentage of population at risk\* for inadequate retirement income, by age cohort and income quartile (baseline assumptions)**



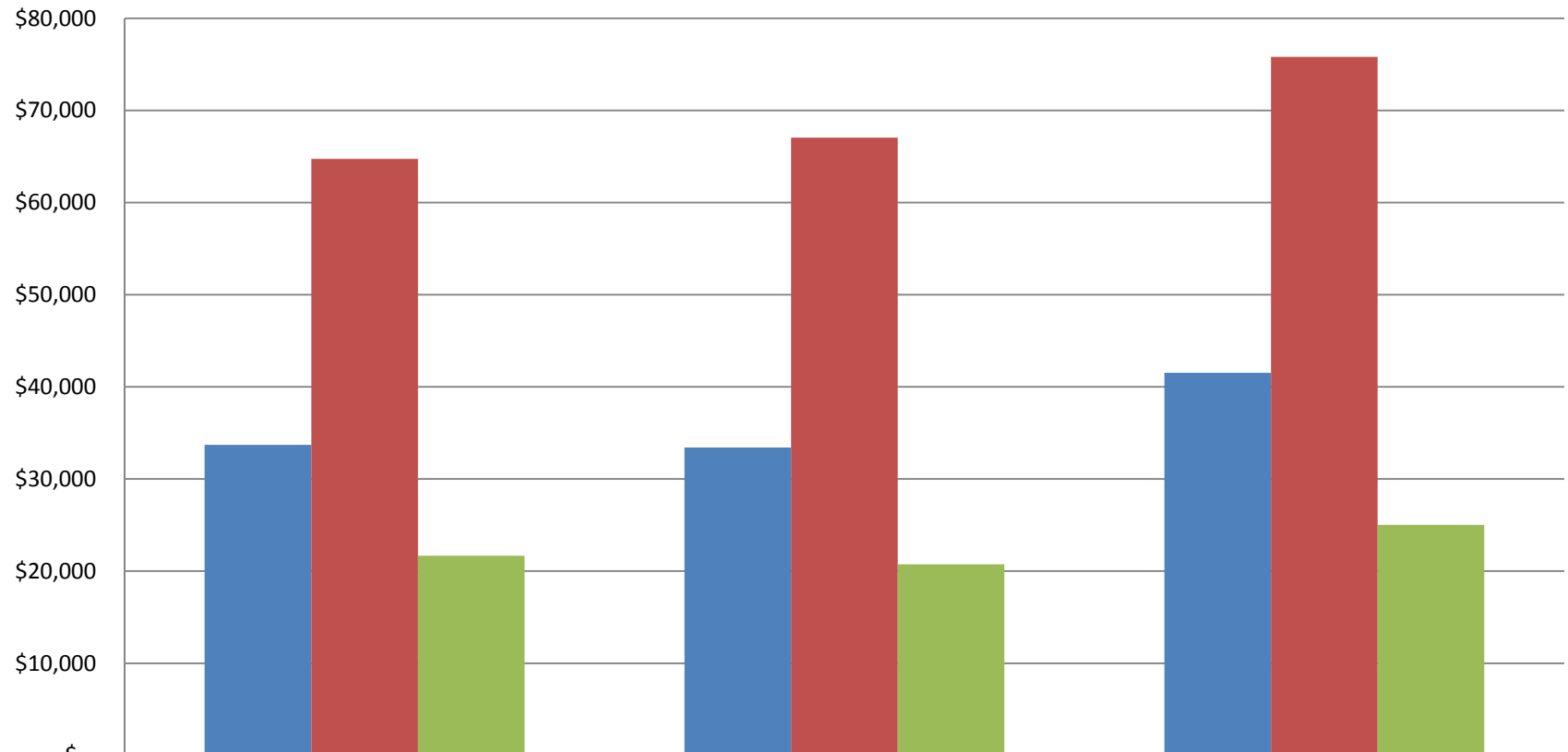
Sources: EBRI Retirement Security Projection Model® versions 1501 and 1502.

\* See text for definition of "at risk"



### Figure 3

2012 Unconditional Retirement Savings Shortfall\* numbers by age cohort, marital status and gender



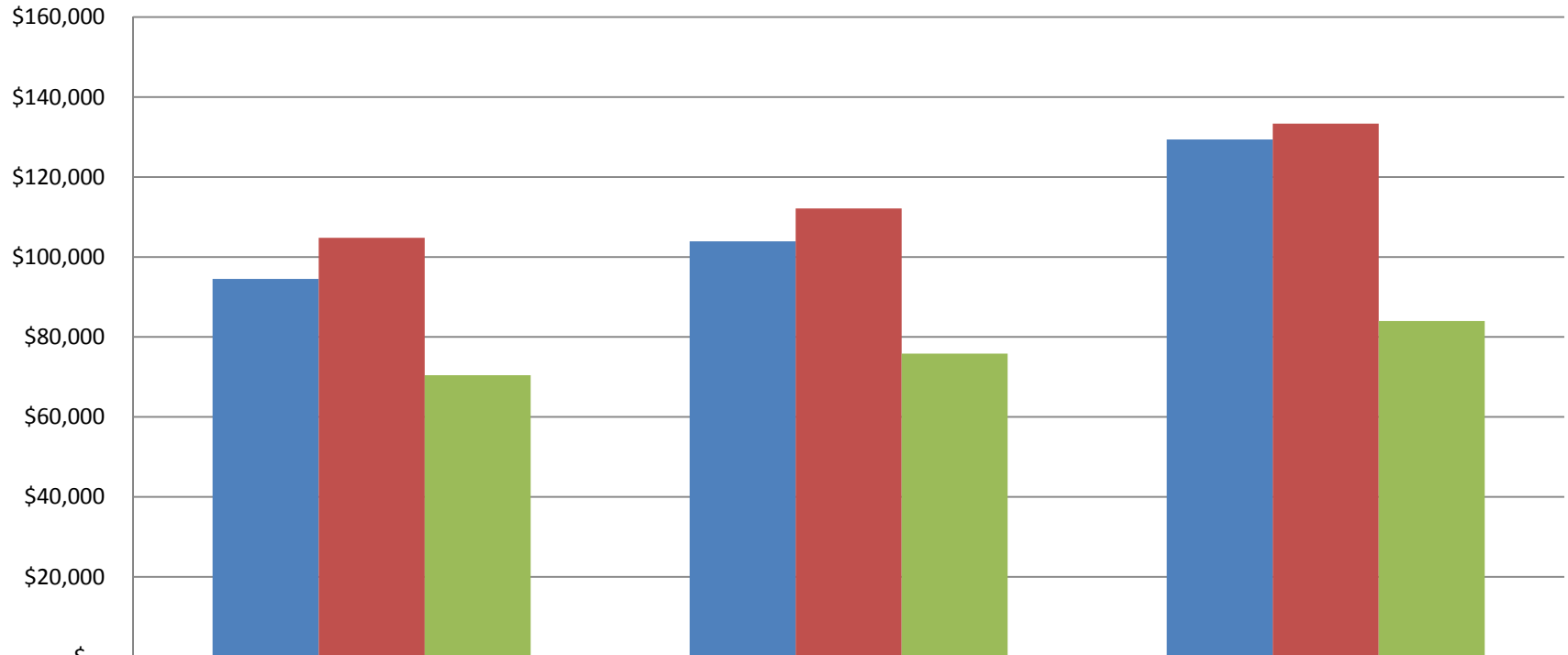
	Early Boomers	Late Boomers	Gen Xers
Single Male	\$33,704	\$33,420	\$41,529
Single Female	\$64,749	\$67,057	\$75,827
Married	\$21,672	\$20,738	\$25,018

\*The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.

Sources: EBRI Retirement Security Projection Model® versions 1501 and 1502.

## Figure 4

### 2012 Conditional Retirement Savings Shortfall\* numbers by age cohort, marital status and gender

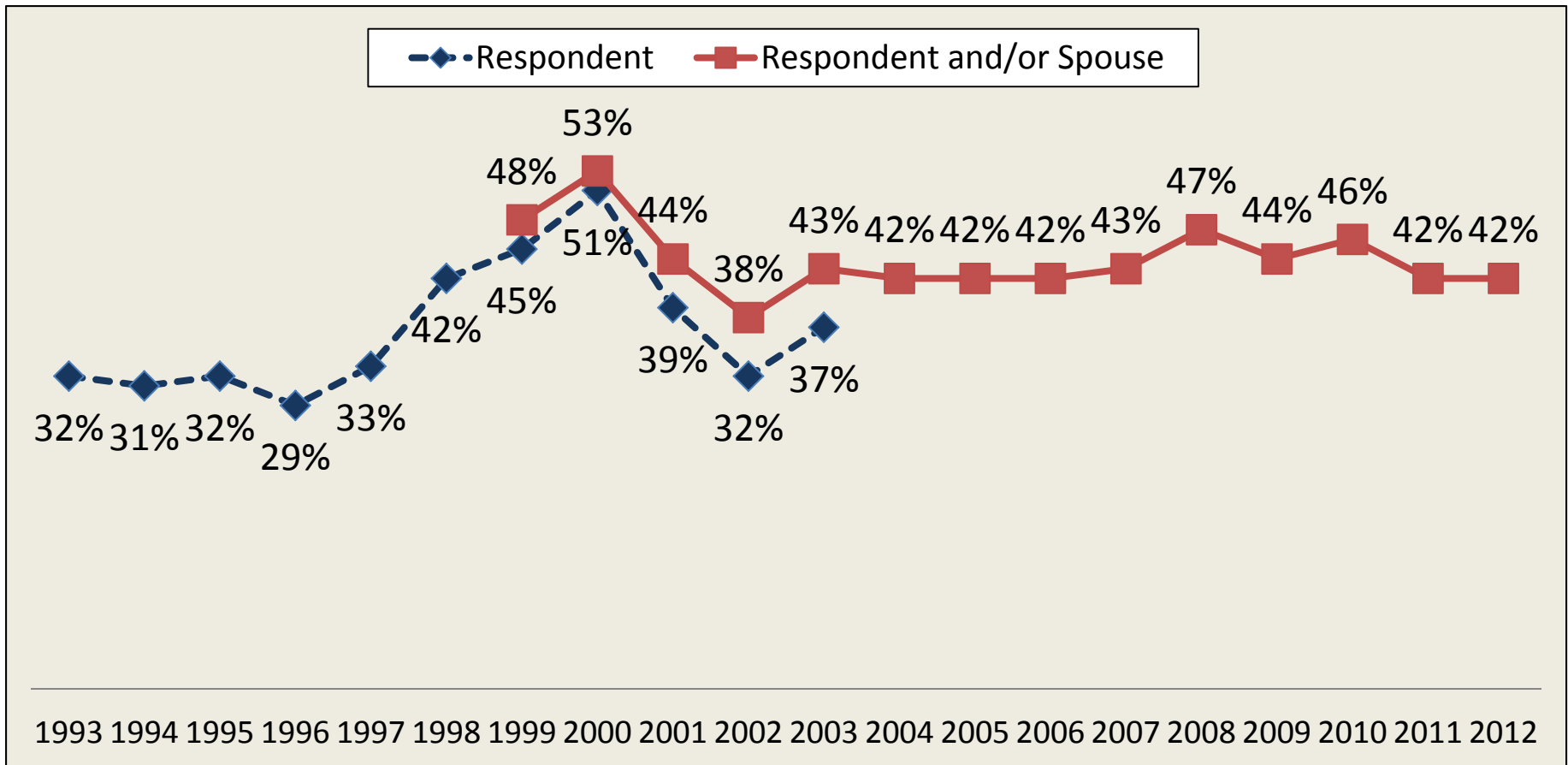


	Early Boomers	Late Boomers	Gen Xers
■ Single Male	\$94,509	\$103,918	\$129,398
■ Single Female	\$104,799	\$112,120	\$133,349
■ Family	\$70,440	\$75,849	\$83,970

\*The Retirement Savings Shortfalls (RSS) are determined as a present value of retirement deficits at age 65.  
 Sources: EBRI Retirement Security Projection Model® versions 1501 and 1502.

# Figure 5

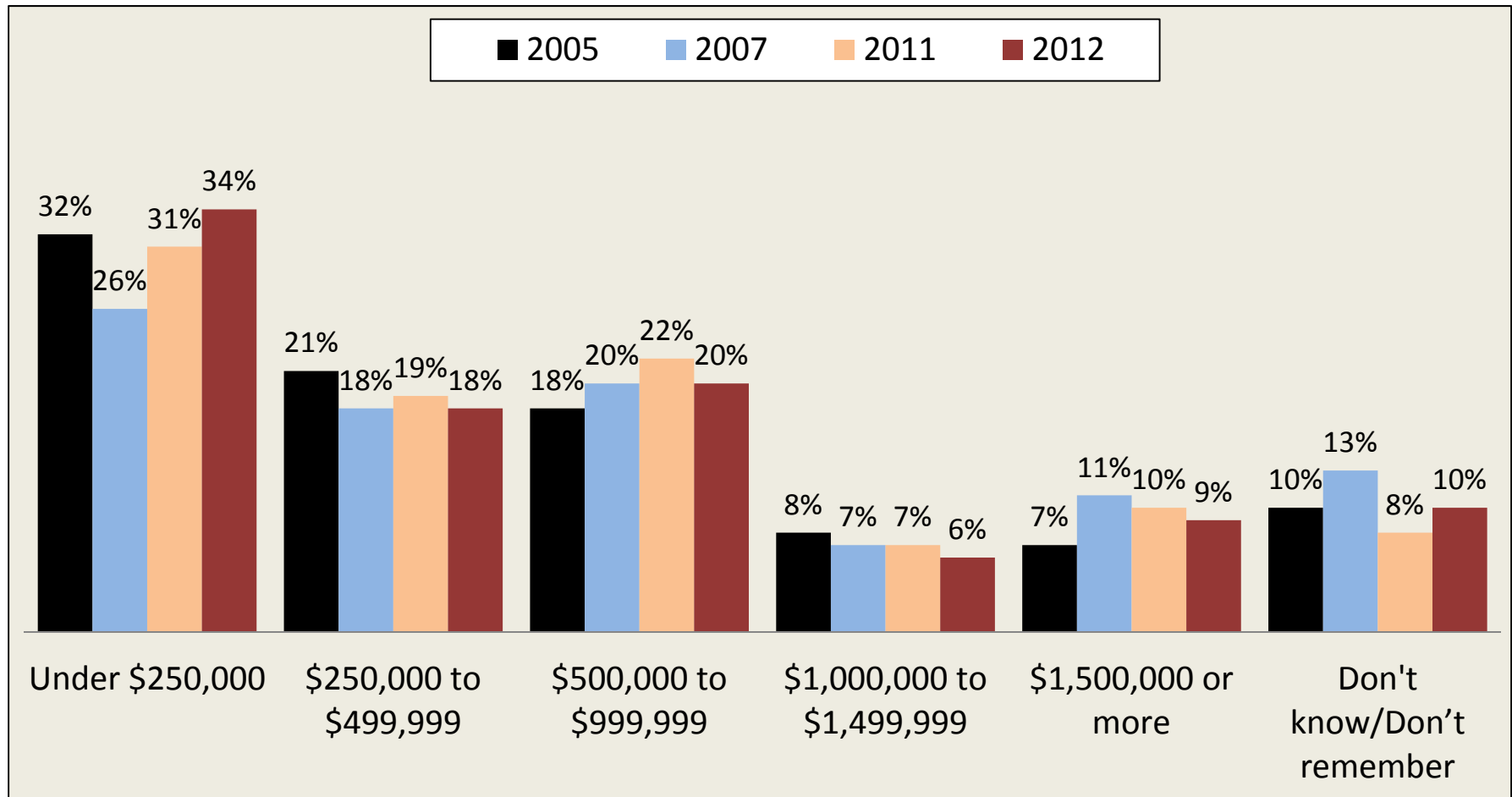
## Workers Having Tried to Calculate How Much Money They Need to Save for a Comfortable Retirement



Source: Employee Benefit Research Institute and Mathew Greenwald & Associates, Inc., 1993–2012 Retirement Confidence Surveys.

# Figure 6

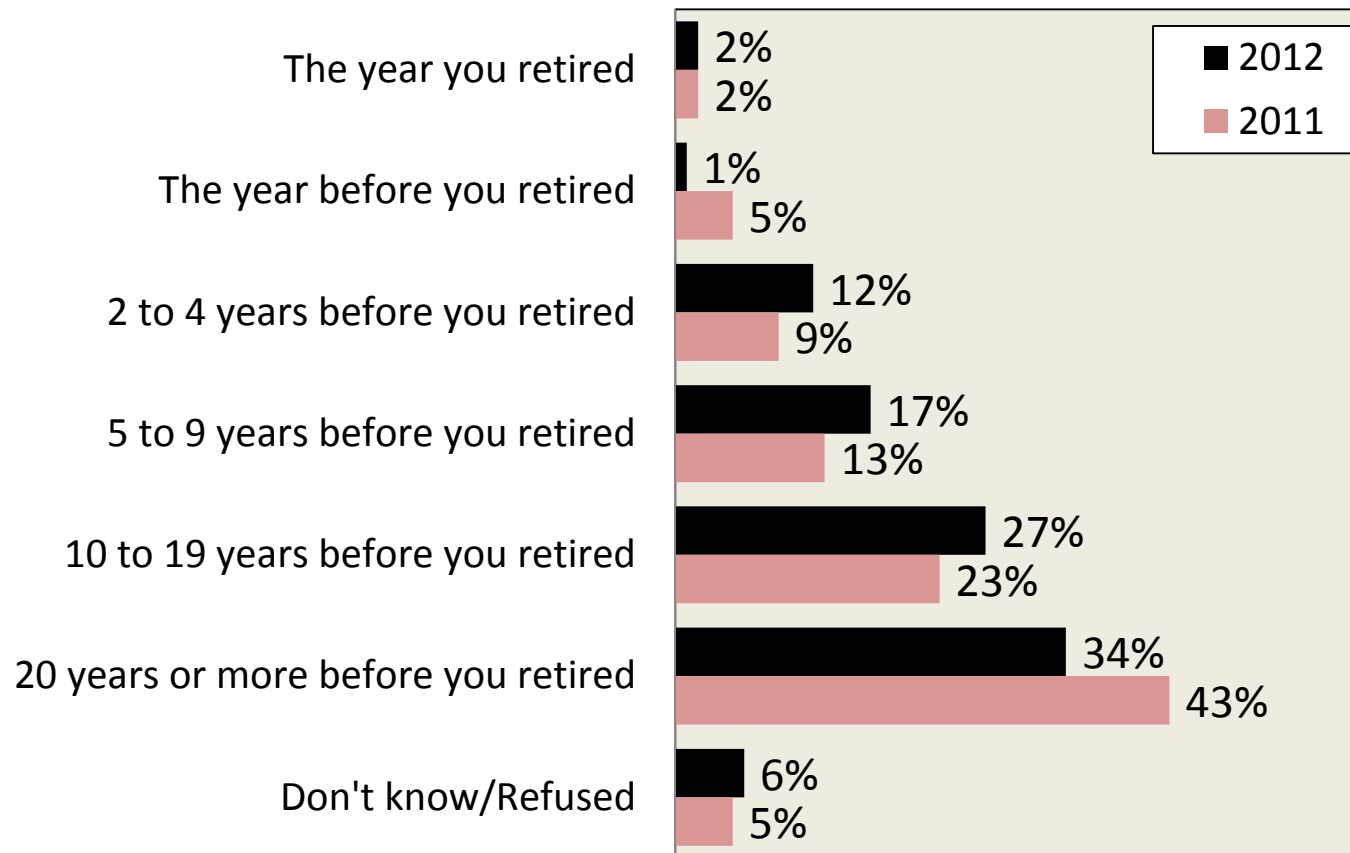
## Amount of Savings Workers Think They Need for Retirement



Source: Employee Benefit Research Institute and Mathew Greenwald & Associates, Inc., 2005–2012 Retirement Confidence Surveys.

# Figure 7

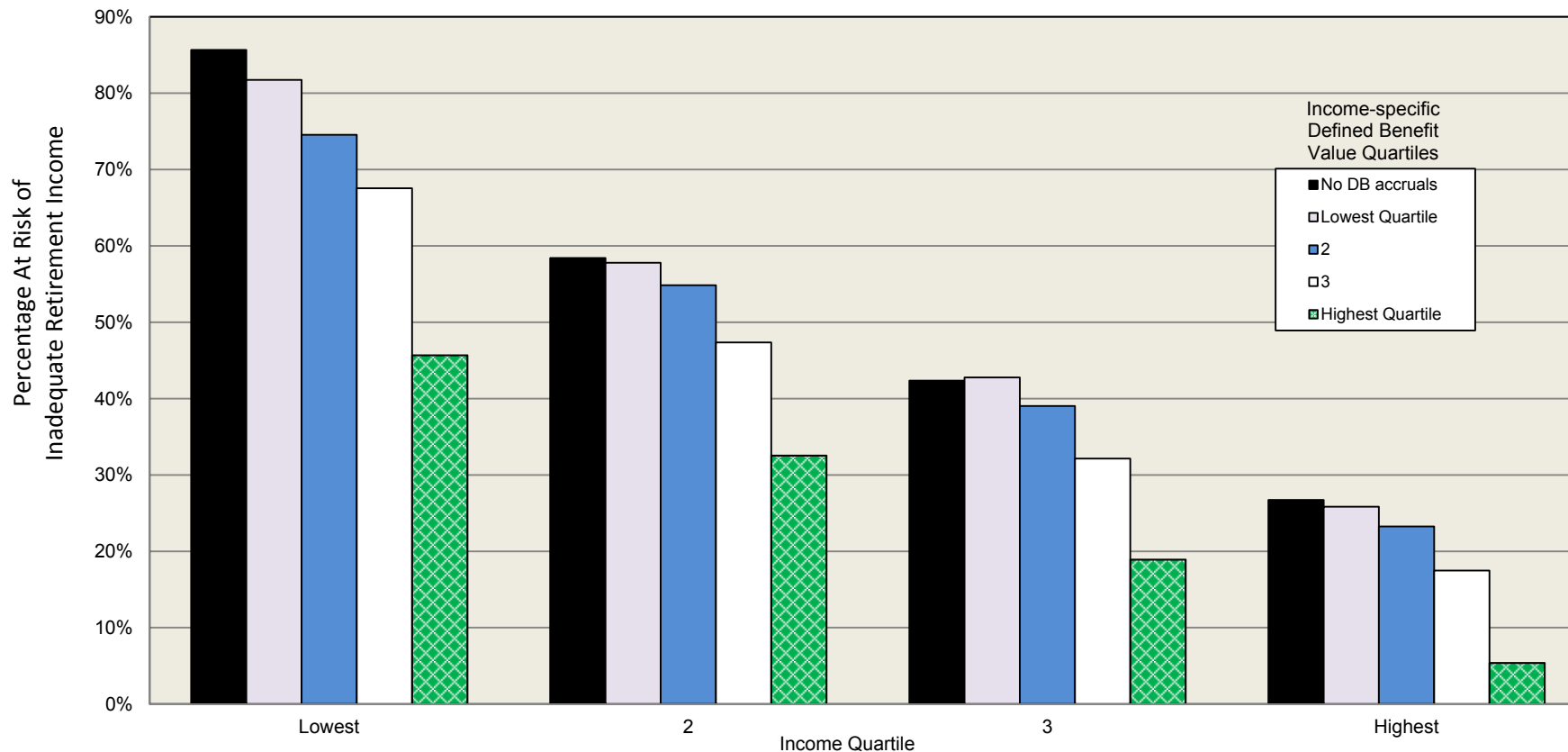
## Timeframe When Retirees Began to Plan Financially for Retirement, Among Retirees Who Planned for Retirement



Source: Employee Benefit Research Institute and Mathew Greenwald & Associates, Inc., 2011–2012 Retirement Confidence Surveys. <sup>3</sup>

## Figure 8 Impact of Income and Relative Value of Defined Benefit Accrual at Retirement Age on At-Risk\* Probabilities

Percentage of population "at risk" for inadequate retirement income, by age-specific remaining career income quartiles and income-specific defined benefit value quartiles (baseline assumption)

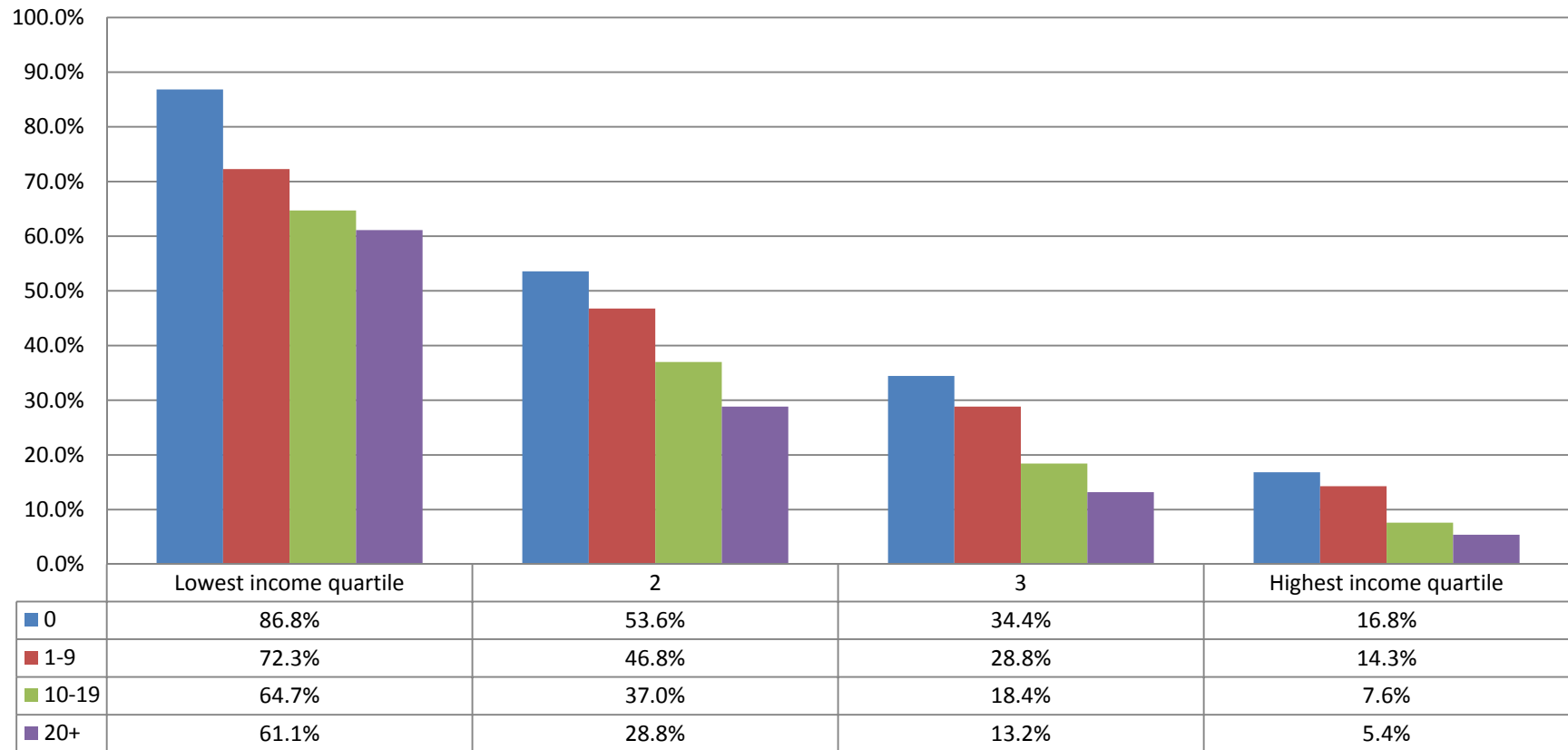


Source: EBRI/ERF Retirement Security Projection Model® version 110714e.

\* An individual or family is considered to be "at risk" in this version of the model if their aggregate resources in retirement are not sufficient to meet aggregate minimum retirement expenditures defined as a combination of deterministic expenses from the Consumer Expenditure Survey (as a function of income) and some health insurance and out-of-pocket health-related expenses, plus stochastic expenses from nursing home and home health care expenses (at least until the point they are picked up by Medicaid). The resources in retirement will consist of Social Security (either status quo or one of the specified reform alternatives), account balances from defined contribution plans, IRAs and/or cash balance plans, annuities from defined benefit plans (unless the lump-sum distribution scenario is chosen), and (in some cases) net housing equity (either in the form of an annuity or as a lump-sum distribution). This version of the model is constructed to simulate "basic" retirement income adequacy; however, alternative versions of the model allow similar analysis for replacement rates, standard-of-living, and other ad hoc thresholds.

## Figure 9

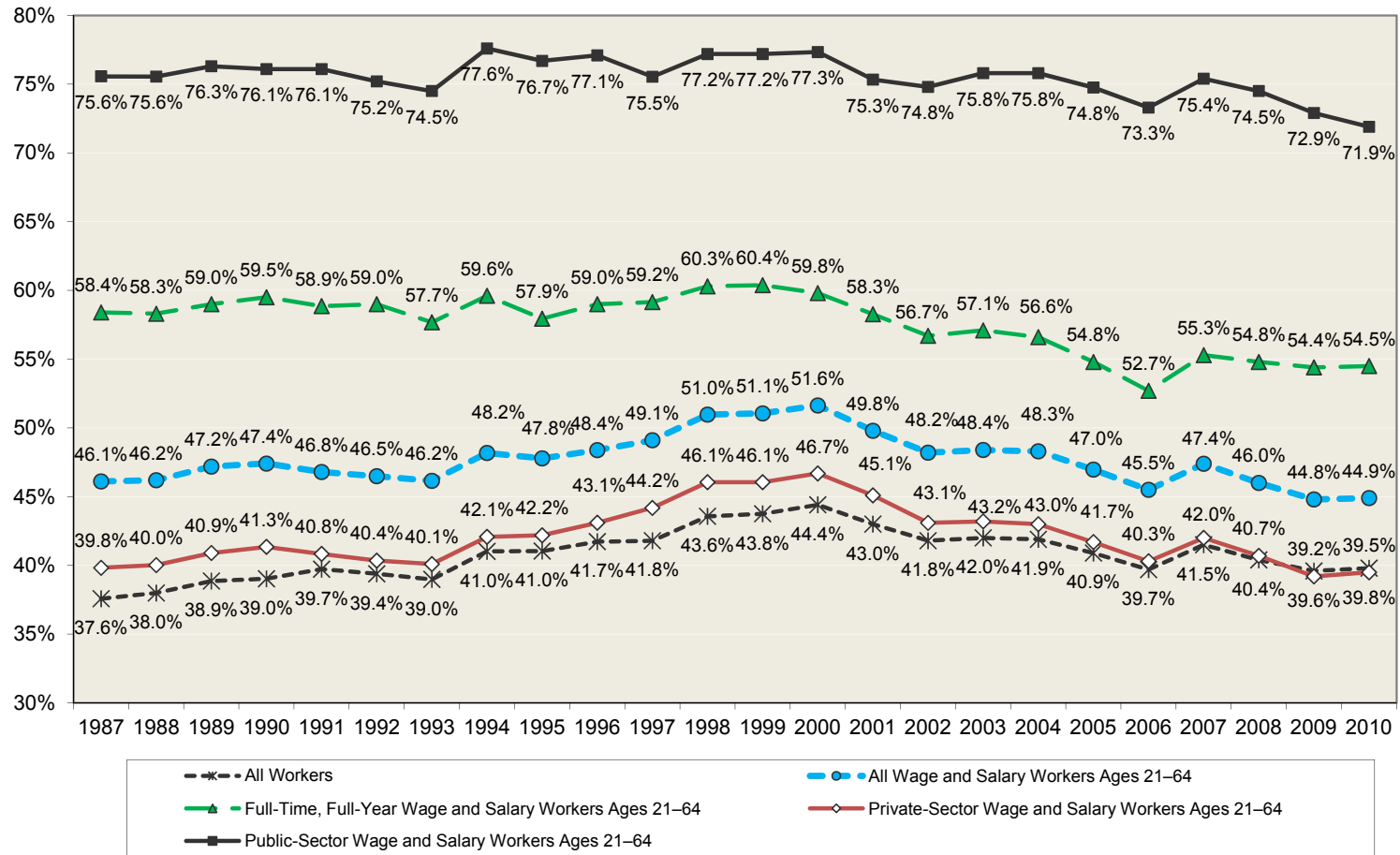
### Impact of future years of 401(k) eligibility on 2012 at-risk\* ratings for Gen Xers by income quartile



\*An individual is considered to be at-risk in this version of the model if their aggregate resources in retirement are not sufficient to meet aggregate minimum retirement expenditures defined as a combination of deterministic expenses from the Consumer Expenditure Survey (as a function of income) and some health insurance and out-of-pocket health-related expenses, plus stochastic expenses from nursing home and home health care expenses (at least until the point they are picked up by Medicaid). The resources in retirement will consist of Social Security (either status quo or one of the specified reform alternatives), account balances from defined contribution plans, IRAs and/or cash balance plans, annuities from defined benefit plans (unless the lump-sum distribution scenario is chosen), and net housing equity (in the form of a lump-sum distribution). This version of the model is constructed to simulate "basic" retirement income adequacy; however, alternative versions of the model allow similar analysis for replacement rates, standard-of-living and other thresholds.

Source: EBRI Retirement Security Projection Model,® Version 120201.

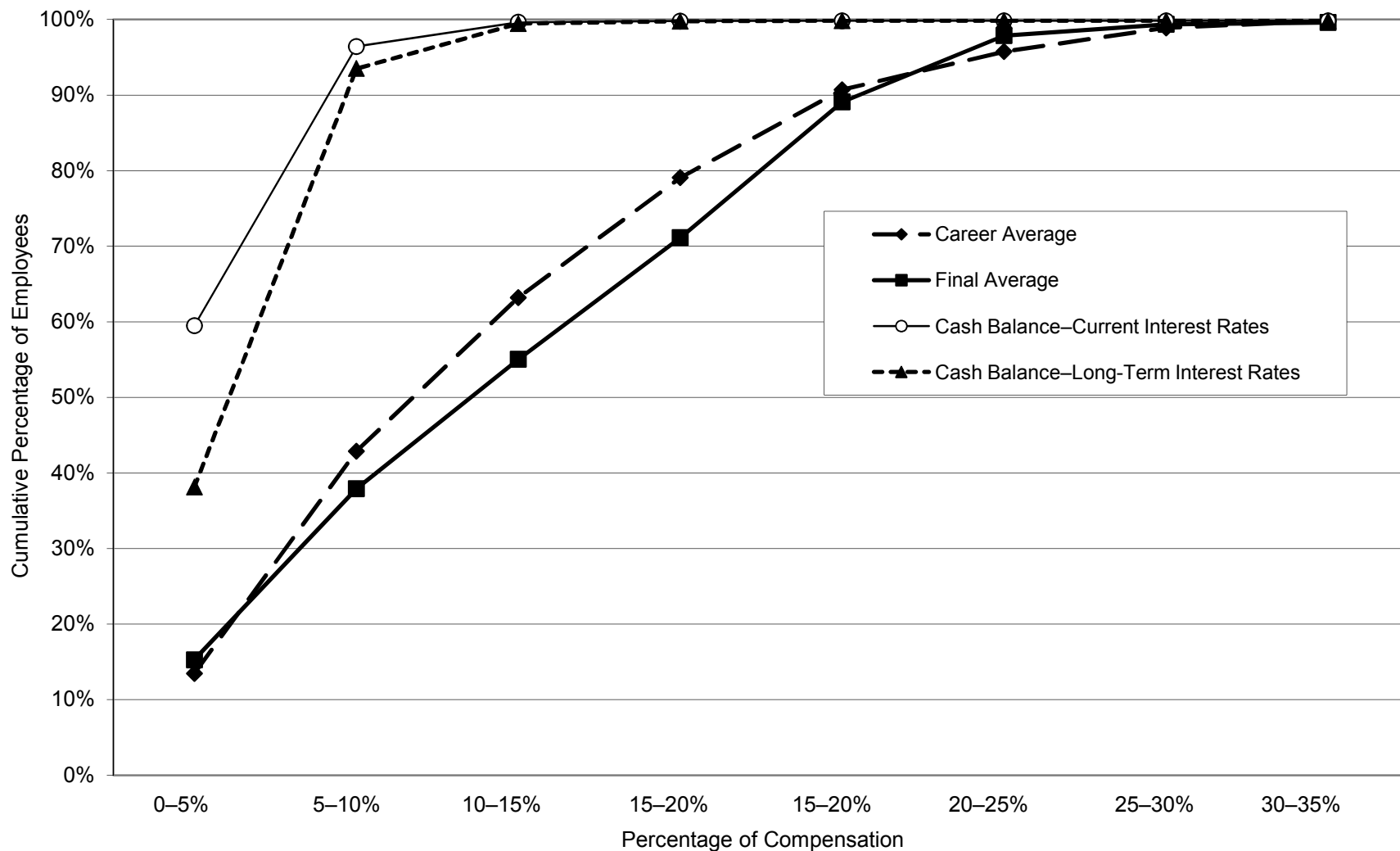
Figure 10  
**Percentage of Various Work Forces That Participated  
 in an Employment-Based Retirement Plan, 1987–2010**



Source: Employee Benefit Research Institute estimates from the 1988–2011 March Current Population Surveys.

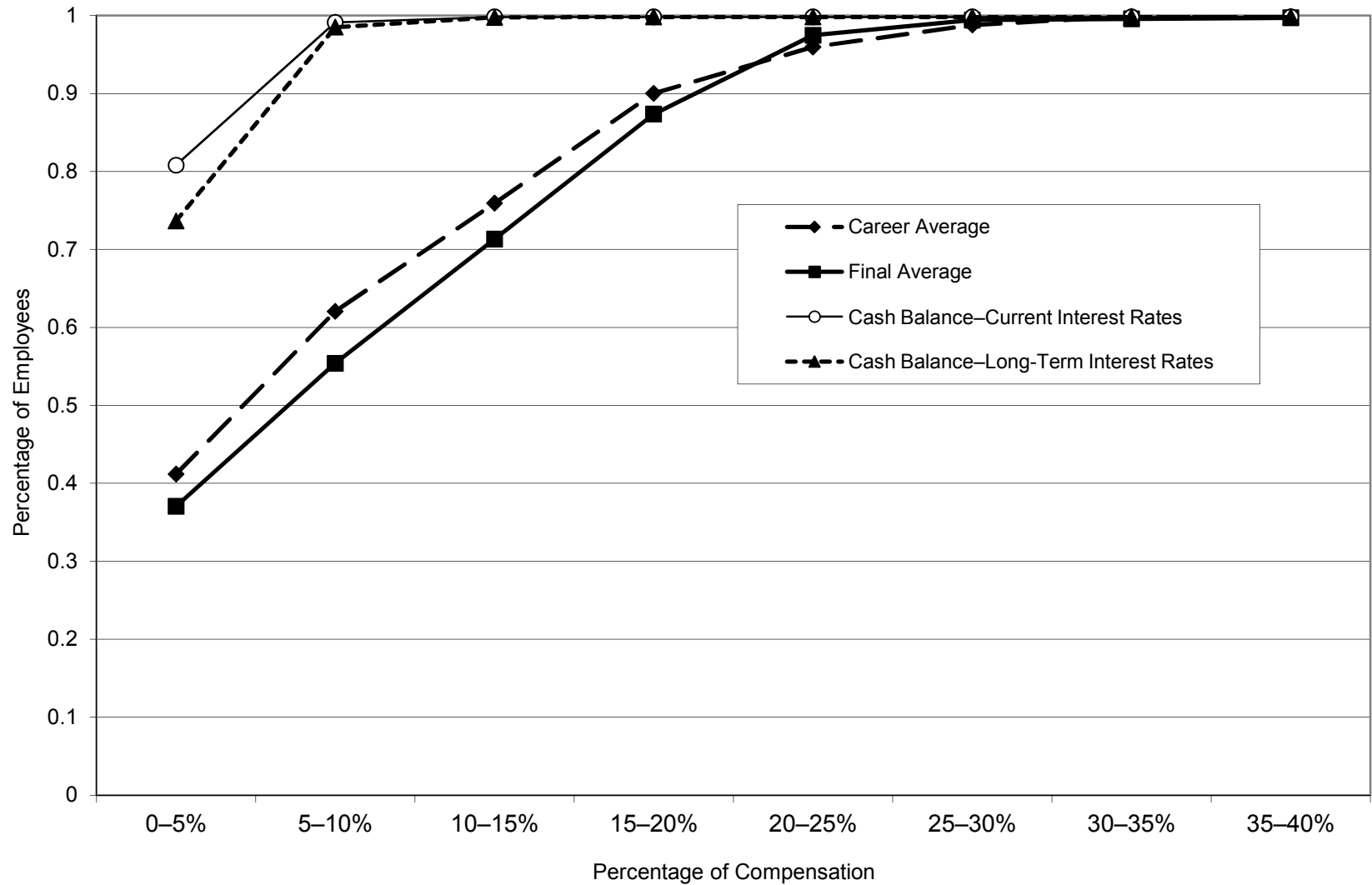


Figure 11  
**Cumulative Distribution Function of the Percentage  
of a Worker's Annual Pay Needed to Offset the Impact  
of a Pension Freeze in 2006, by Pension Plan Type**  
(assumes 4% annual rate of return)



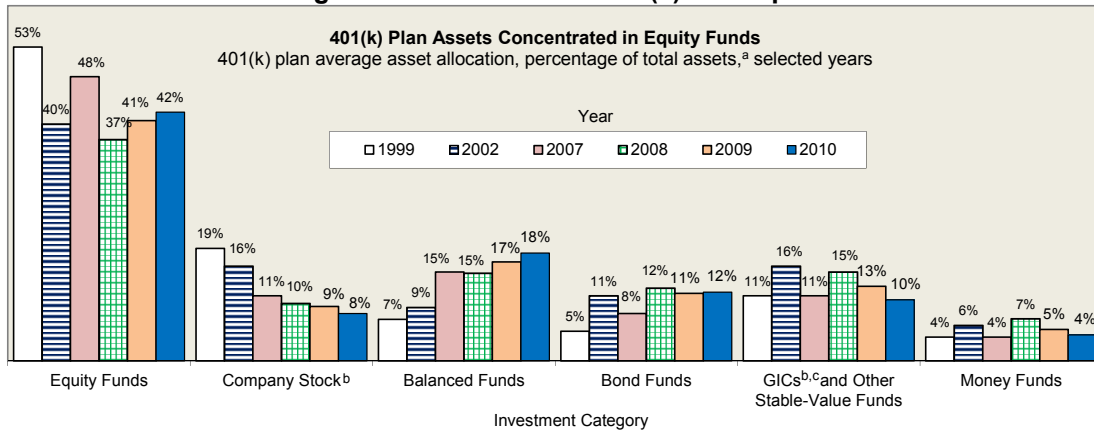
Source: Author's tabulations from the EBRI/ERF Retirement Income Projection Model.

Figure 12  
**Cumulative Distribution Function of the Percentage  
of a Worker's Annual Pay Needed to Offset the Impact  
of a Pension Freeze in 2006, by Pension Plan Type**  
(assumes 8% annual rate of return)



Source: Authors' tabulations from the EBRI/ERF Retirement Income Projection Model.

Figure 13  
**Average Asset Allocation of 401(k) Participants**



Source: Tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project.

<sup>a</sup> Minor investment options are not shown; therefore, percentages do not add to 100 percent. Percentages are dollar-weighted averages.

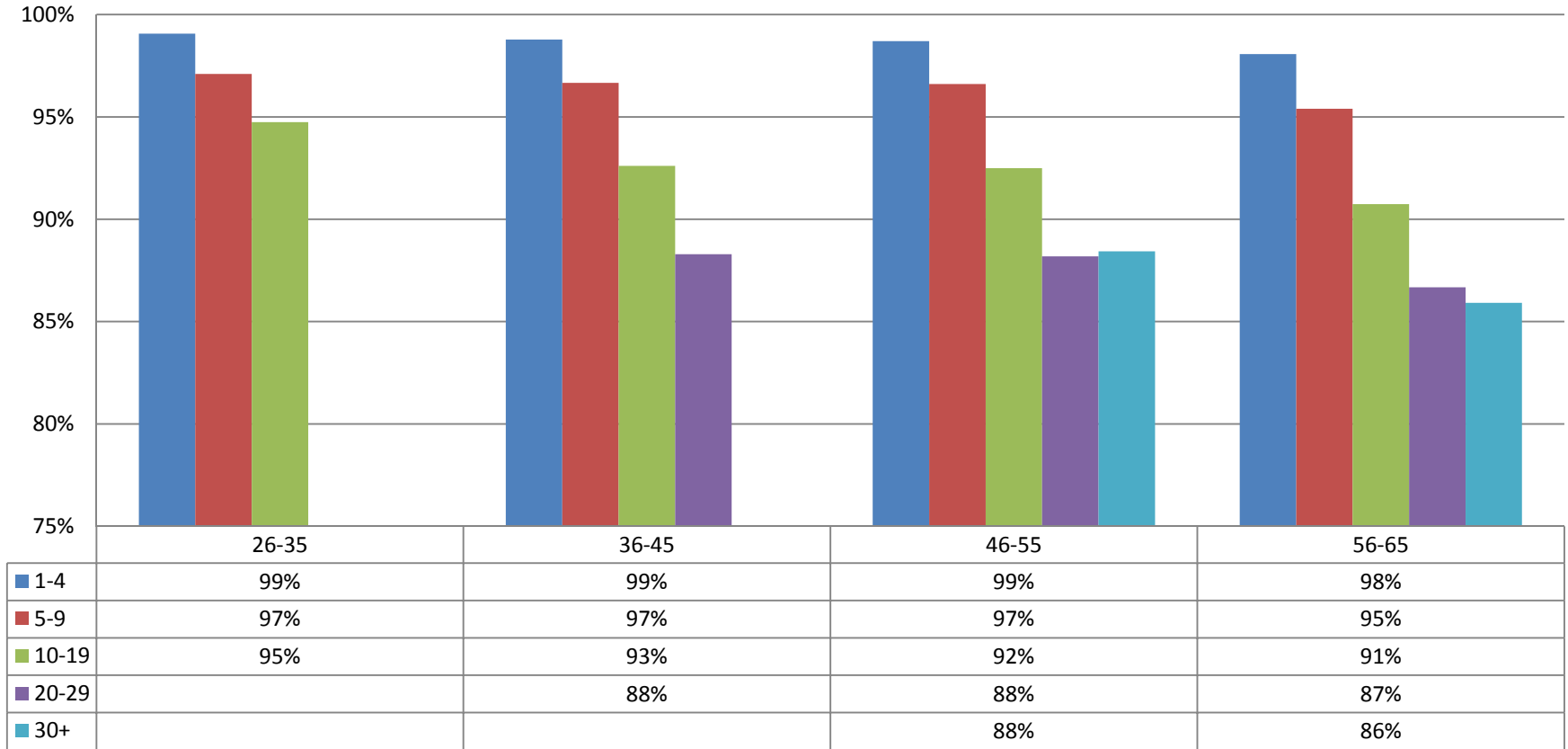
<sup>b</sup> Not all participants are offered this investment option.

<sup>c</sup> GICs are guaranteed investment contracts.

Note: "Funds" include mutual funds, bank collective trusts, life insurance separate accounts, and any pooled investment product primarily invested in the security indicated.

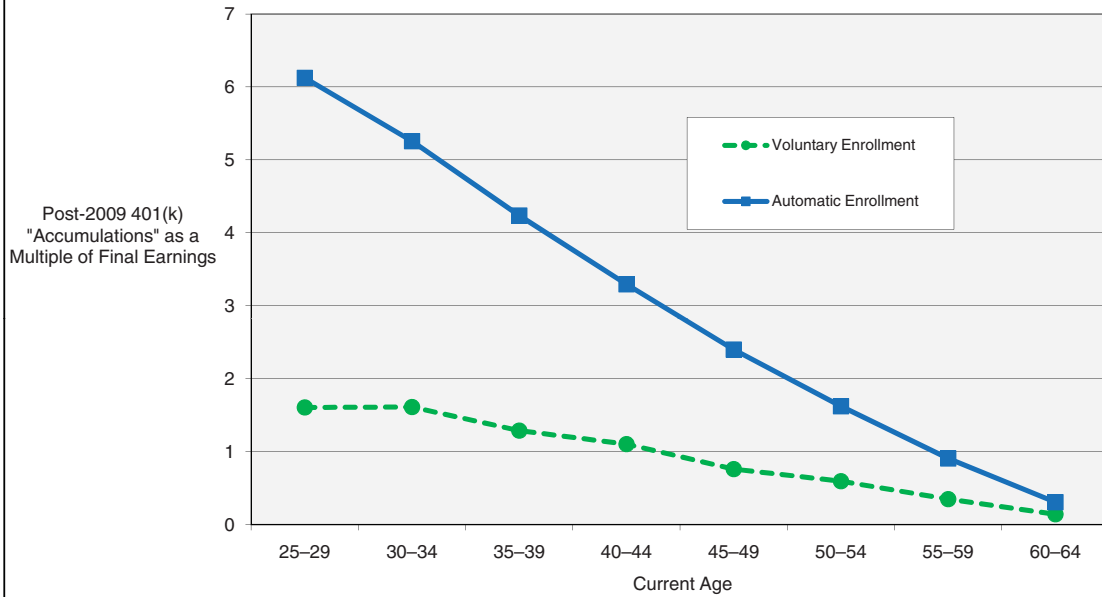
**Figure 14**

**Estimated percentage of consistent participants who have more money in their 401(k) accounts on 3/1/12 than at market high (10/9/07,) by age and tenure**



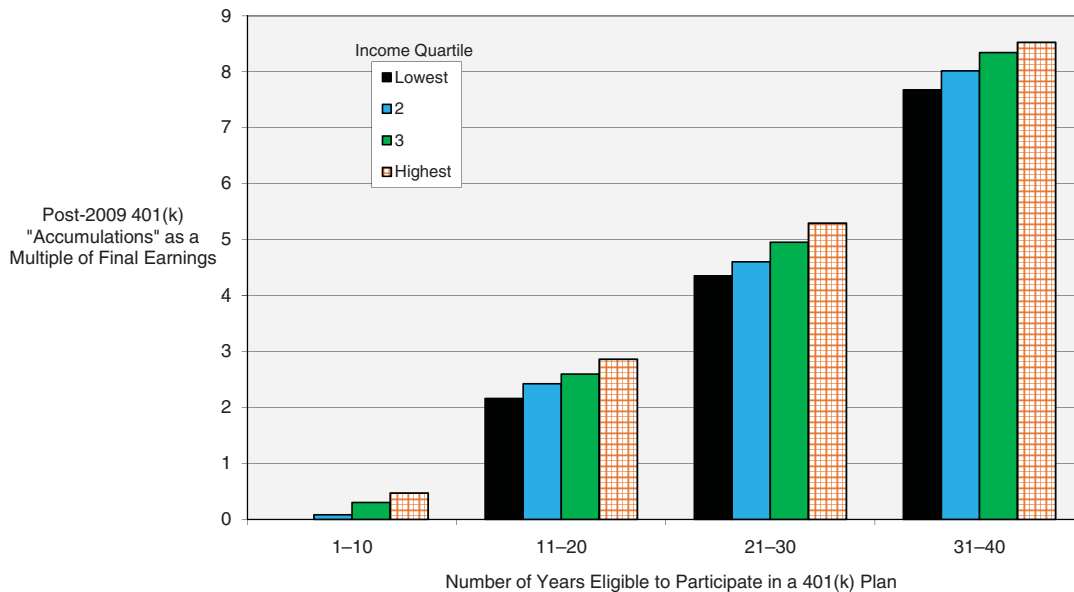
Sources: EBRI estimates based on tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project. The analysis is based on all participants with account balances at the end of 2007 and 2008 and contribution information for those years.

Figure 15  
**Auto-Enrollment (With 2009 Formulae)  
 vs. Voluntary Enrollment (With 2005 Formulae): 50th Percentiles**  
 (assuming future eligibility is a function of current eligibility)



Source: EBRI/ERF Retirement Security Projection Model,® versions 100205a1 and 100205b1. See text for explanations of models and assumptions.

Figure 16  
**Employees Currently Ages 25-29:  
 Median 401(k) Accumulation Multiples for Auto-Enrollment With 2009 Plan Formulae  
 as a Function of Salary Quartile and Number of Years Eligible for a 401(k) Plan**  
 (Total balances, baseline assumptions)

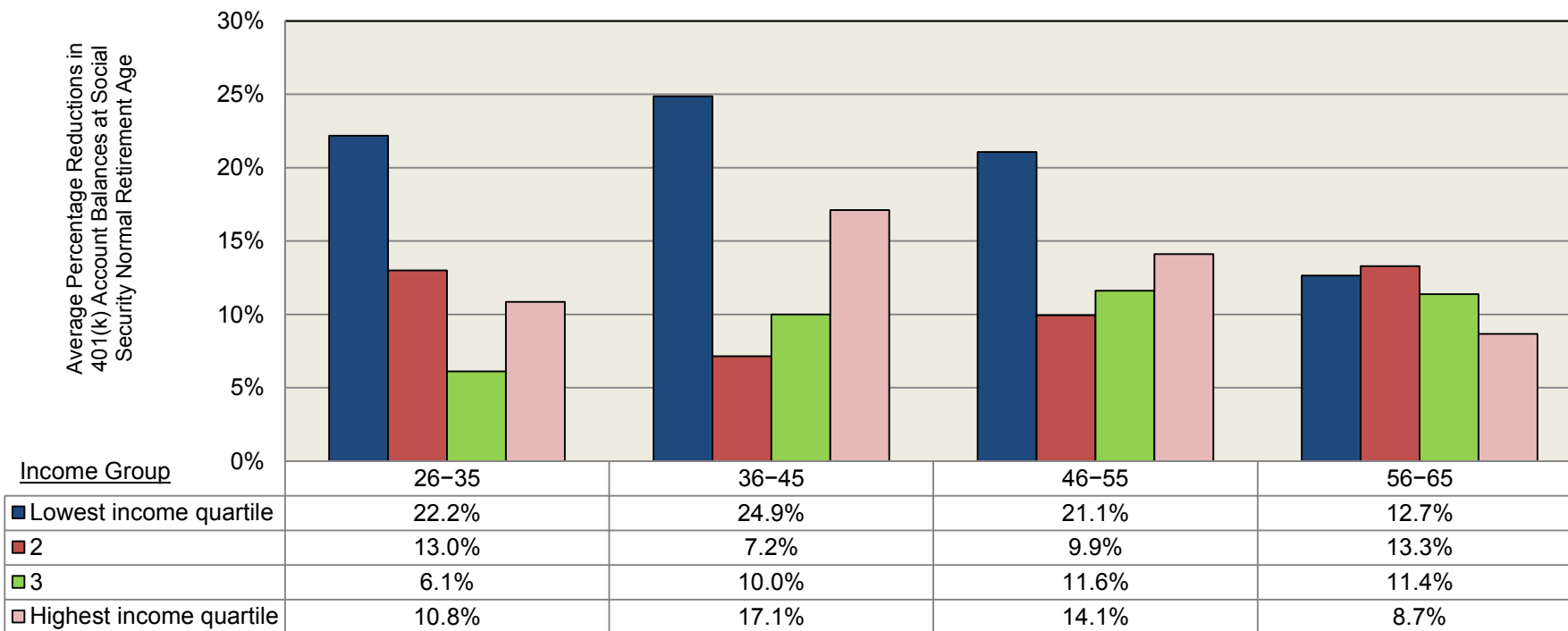


Source: Source: EBRI/ERF Retirement Security Projection Model,® version 100205a4. See text for explanations of models and assumptions.

Figure 17

**Simulated Impact of Proposal to Modify the Federal Tax Treatment of Employer and Employee Contributions for 401(k) Plans In Exchange for an 18% Match From the Federal Government, by Age and Age-specific Salary Quartiles: Midpoint estimates**

Assumption for this run: Employer increases or decreases to contributions are represented by the midpoint of the range denoted on the AllianceBernstein survey



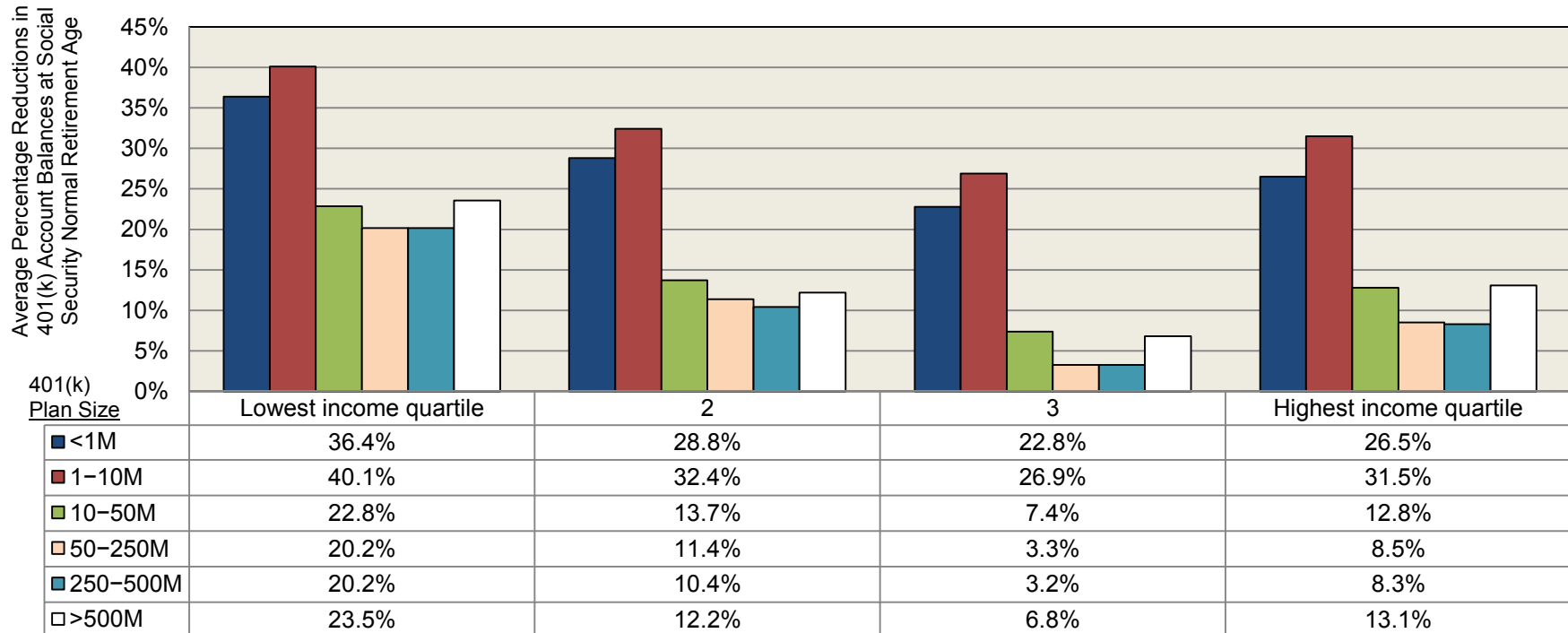
Source: Author's calculations based on results from EBRI Retirement Security Projection Model Version 1471, and responses to AllianceBernstein (2011) and Employee Benefit Research Institute and Mathew Greenwald & Associates, Inc., 2012 Retirement Confidence Survey.

Note: This simulation models only the financial impact of the expected reduction in 401(k) account balances for employees who are not automatically enrolled by modifying the behavior of plan sponsors and participants and does not attempt to assess behavioral modifications on the part of eligible nonparticipants. The simulated rates of return are the same as in VanDerhei and Copeland (July 2010). This version of the analysis assumes no job turnover, withdrawals or loan defaults. The full stochastic nature of the model will be included in a future analysis. Results for participants currently older than 35 are limited to high-tenure participants as explained in the text. Plan sponsor and participant reactions to the proposal are explained in the text. Employer increases or decreases to contributions are represented by the midpoint of the range denoted on the AllianceBernstein survey.

Figure 18

**Simulated Impact of Proposal to Modify the Federal Tax Treatment of Employer and Employee Contributions for 401(k) Plans In Exchange for an 18% Match From the Federal Government for Employees Currently 26–35, by Plan Size and Age-specific Salary Quartiles: Midpoint Estimates**

Assumption for this run: Employer increases or decreases to contributions are represented by the midpoint of the range denoted on the AllianceBernstein survey

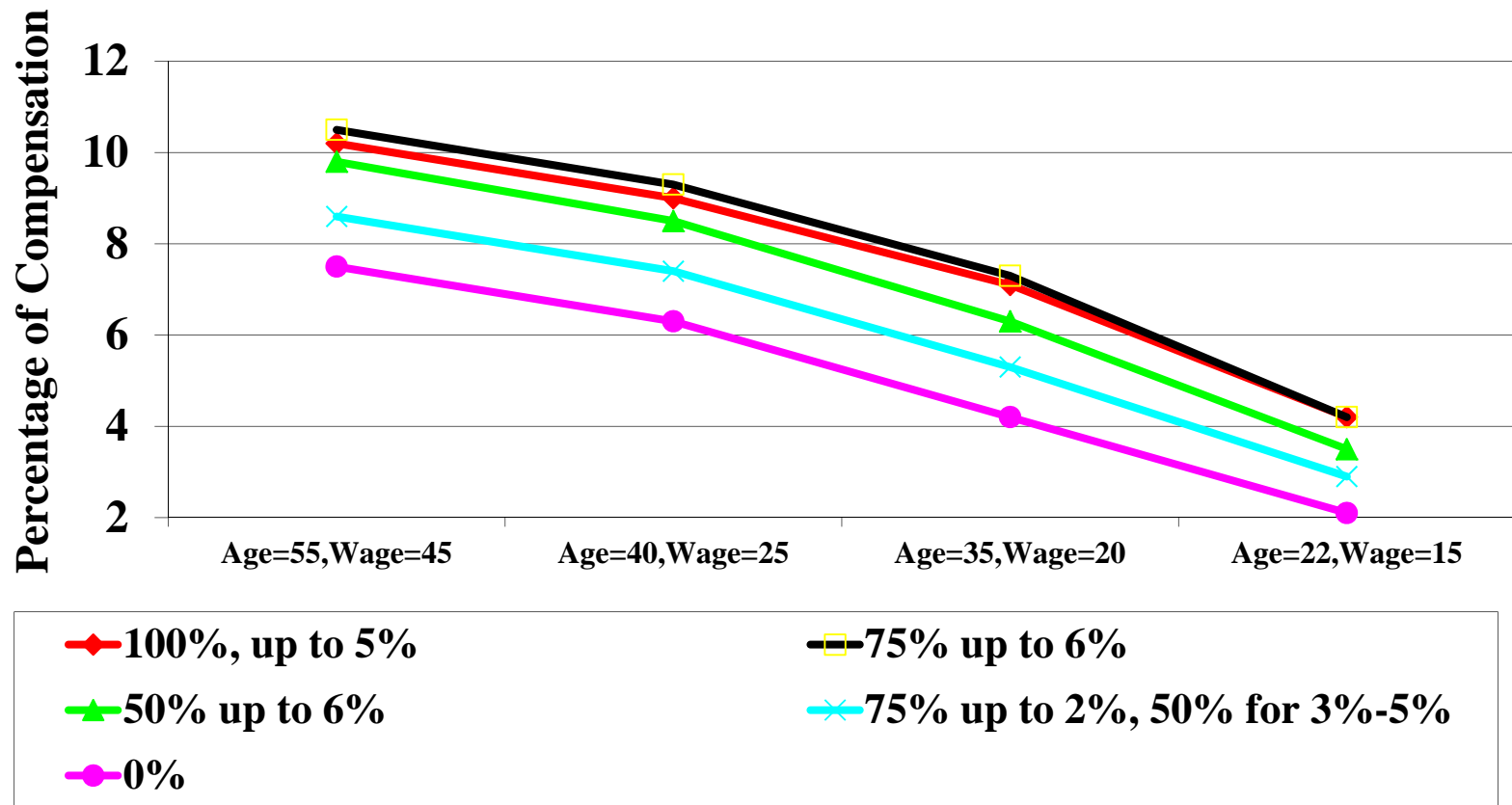


Source: Author's calculations based on results from EBRI Retirement Security Projection Model Version 1472, and responses to AllianceBernstein (2011) and Employee Benefit Research Institute and Mathew Greenwald & Associates, Inc., 2012 Retirement Confidence Survey.

Note: This simulation models only the financial impact of the expected reduction in 401(k) account balances for employees who are not automatically enrolled by modifying the behavior of plan sponsors and participants and does not attempt to assess behavioral modifications on the part of eligible nonparticipants. The simulated rates of return are the same as in VanDerhei and Copeland (July 2010). This version of the analysis assumes no job turnover, withdrawals or loan defaults. The full stochastic nature of the model will be included in a future analysis. Plan sponsor and participant reactions to the proposal are explained in the text. Employer increases or decreases to contributions are represented by the midpoint of the range denoted on the AllianceBernstein survey.

# Figure 19

Predicted Employee Contributions for Selected Persons and Plans



Source: VanDerhei and Copeland, "A behavioral model for predicting employee contributions to 401(k) plans." North American Actuarial Journal (First Quarter, 2001)