

















































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); Yakaboski (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 per-cent 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).

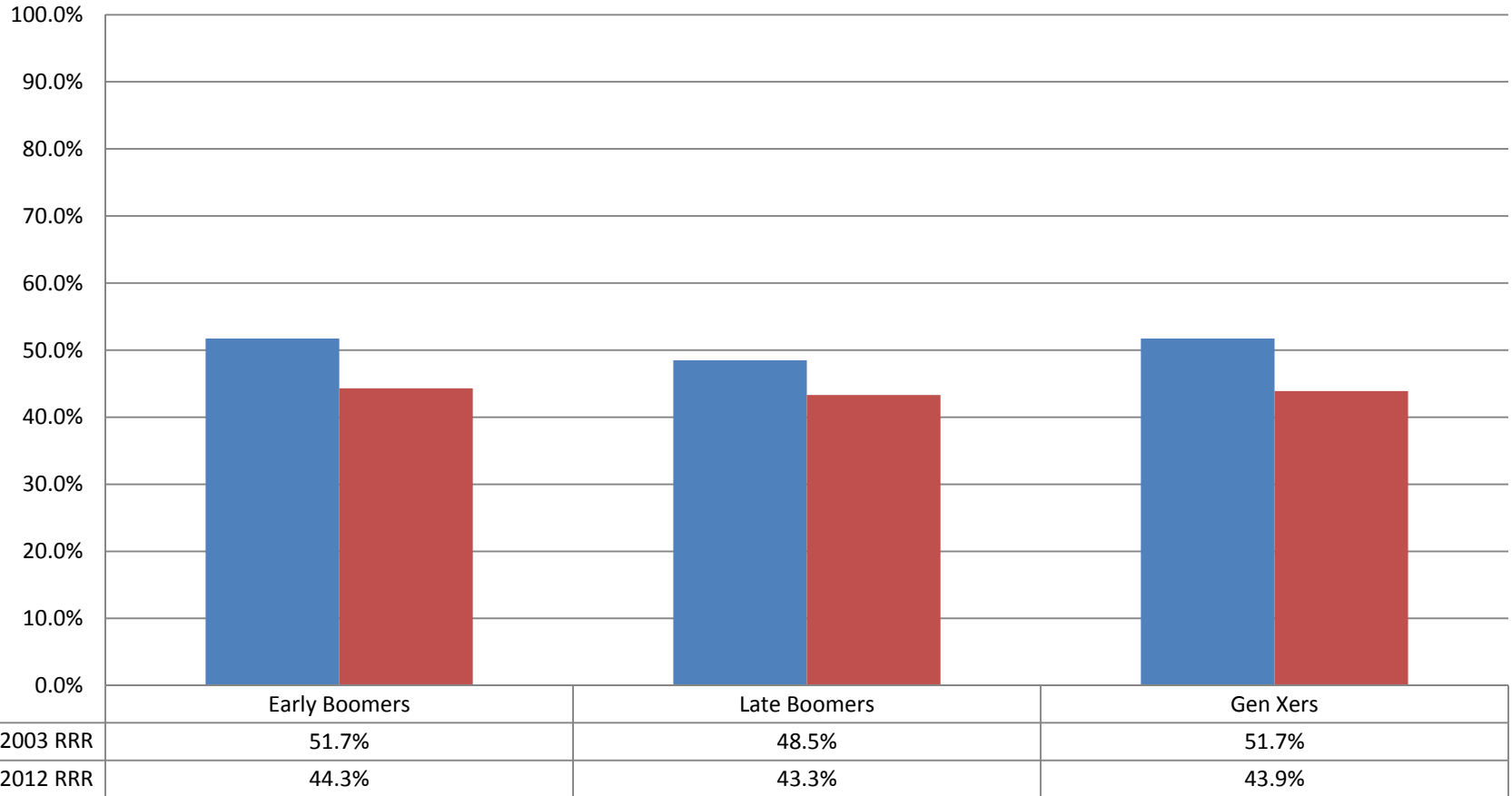
<sup>65</sup> VanDerhei and Copeland (2003)

<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)**

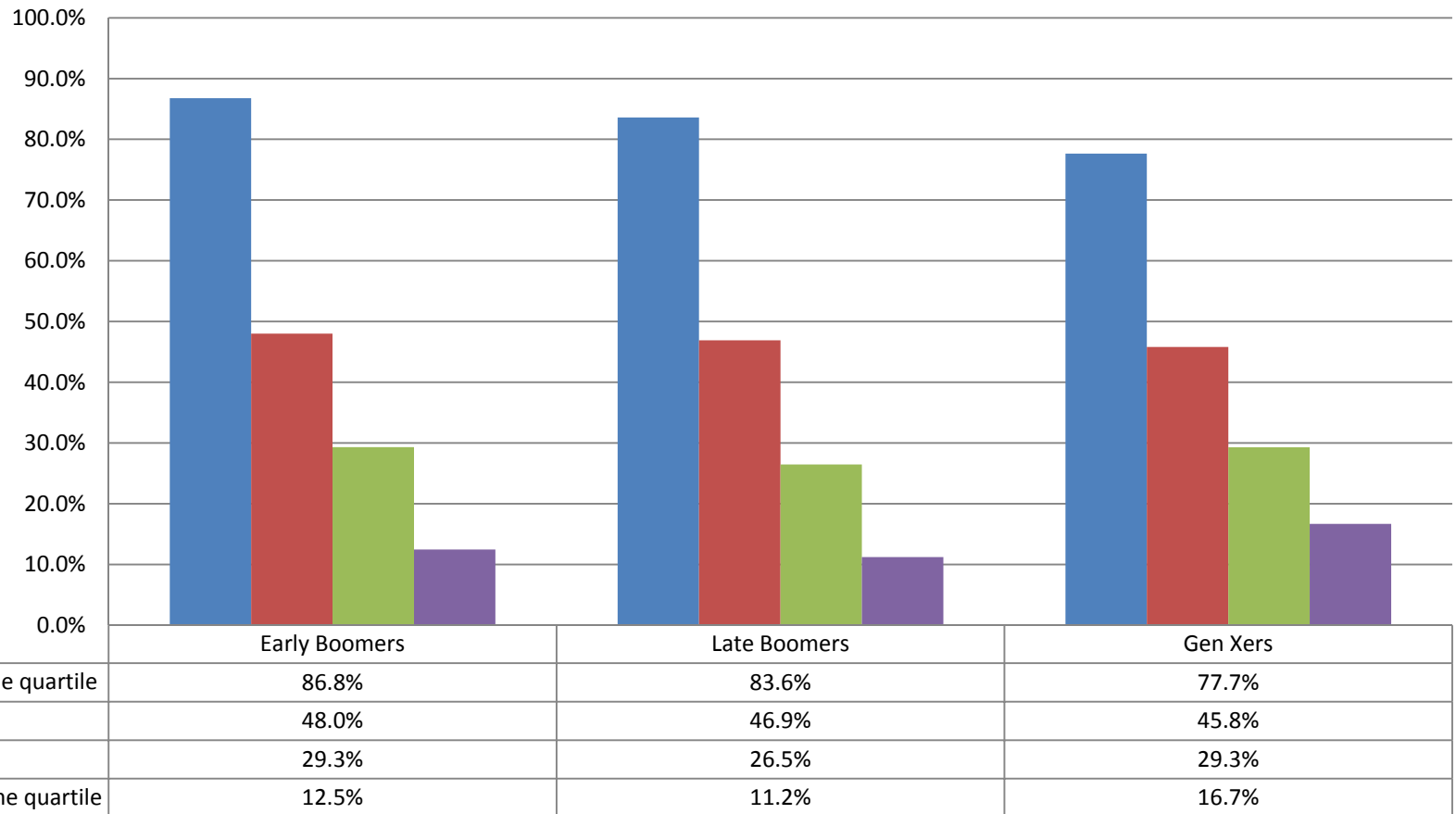


Sources: EBRI Retirement Security Projection Model™ versions 1501 and 1502.

\* 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)**



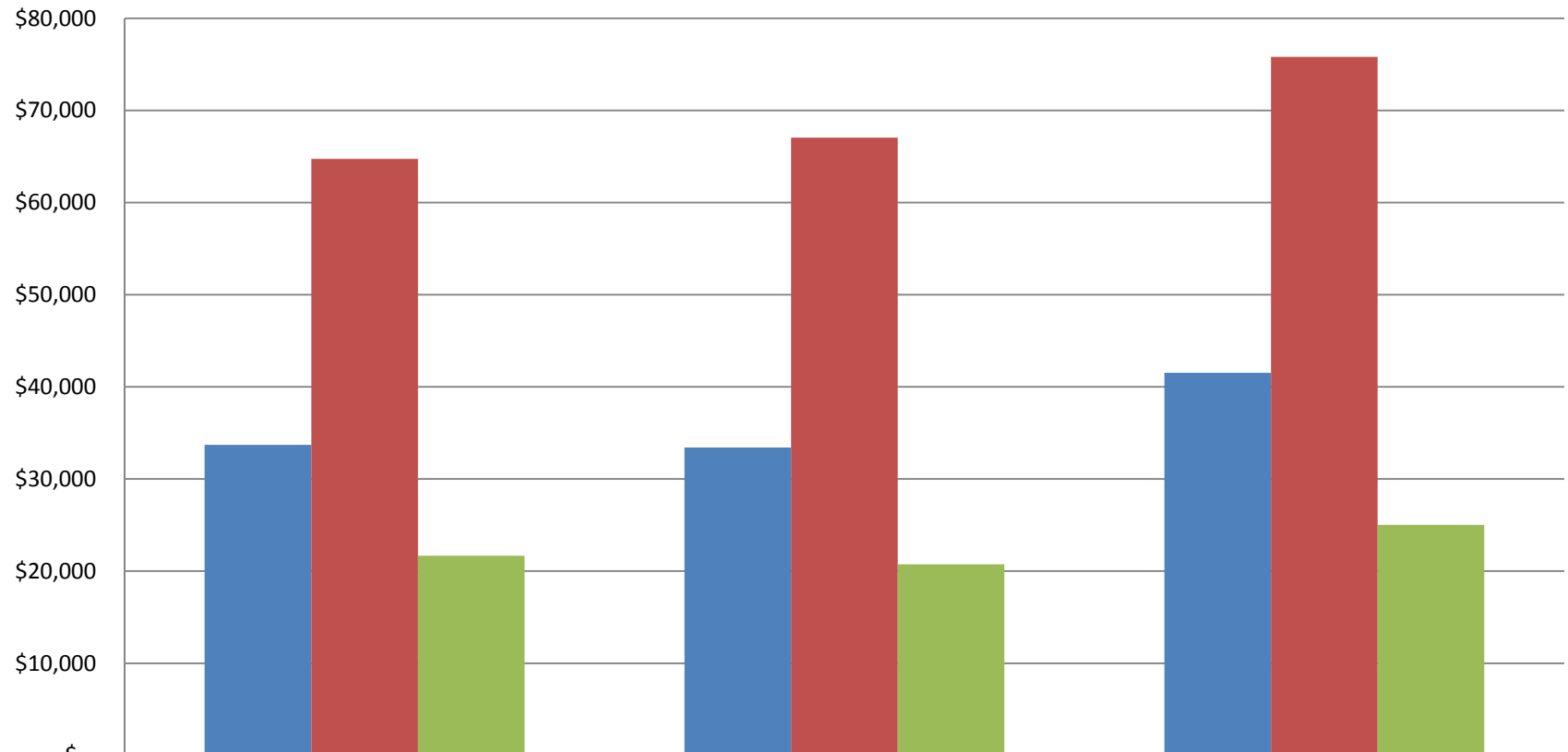
Sources: EBRI Retirement Security Projection Model® versions 1501 and 1502.

\* See text for definition of "at risk"



### Figure 3

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



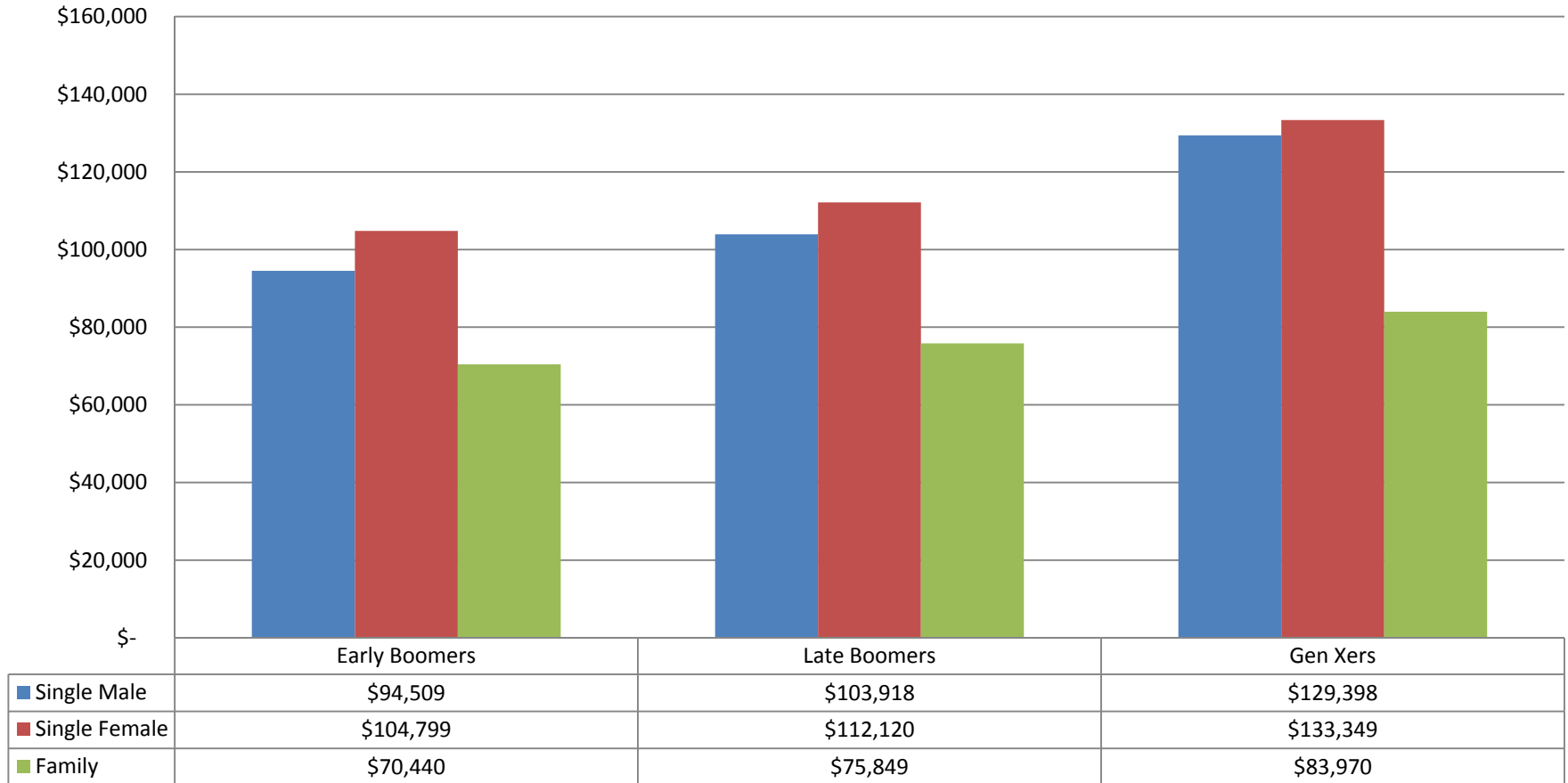
	Early Boomers	Late Boomers	Gen Xers
Single Male	\$33,704	\$33,420	\$41,529
Single Female	\$64,749	\$67,057	\$75,827
Married	\$21,672	\$20,738	\$25,018

\*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

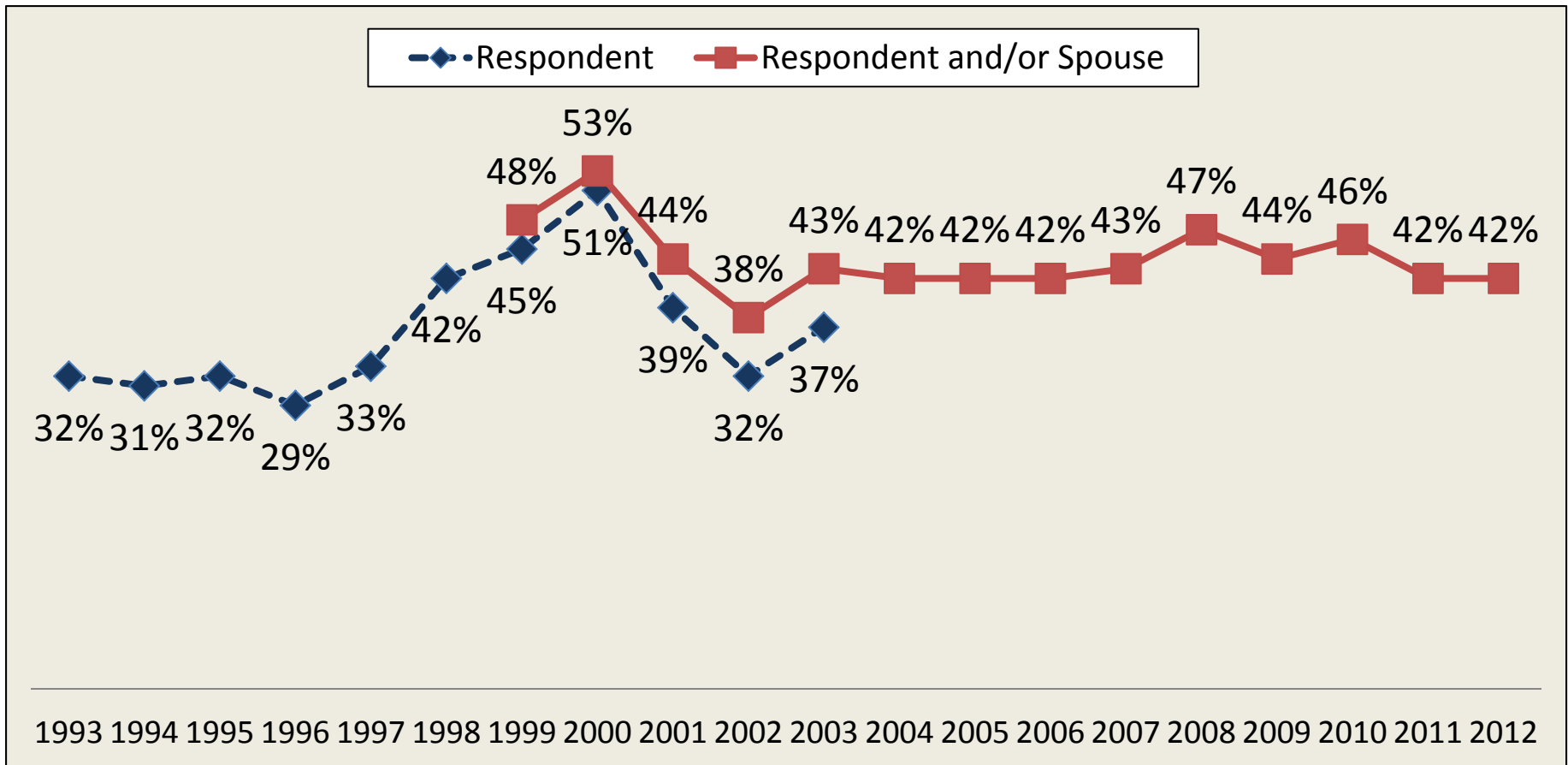
### 2012 Conditional Retirement Savings Shortfall\* numbers by age cohort, marital status and gender



\*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

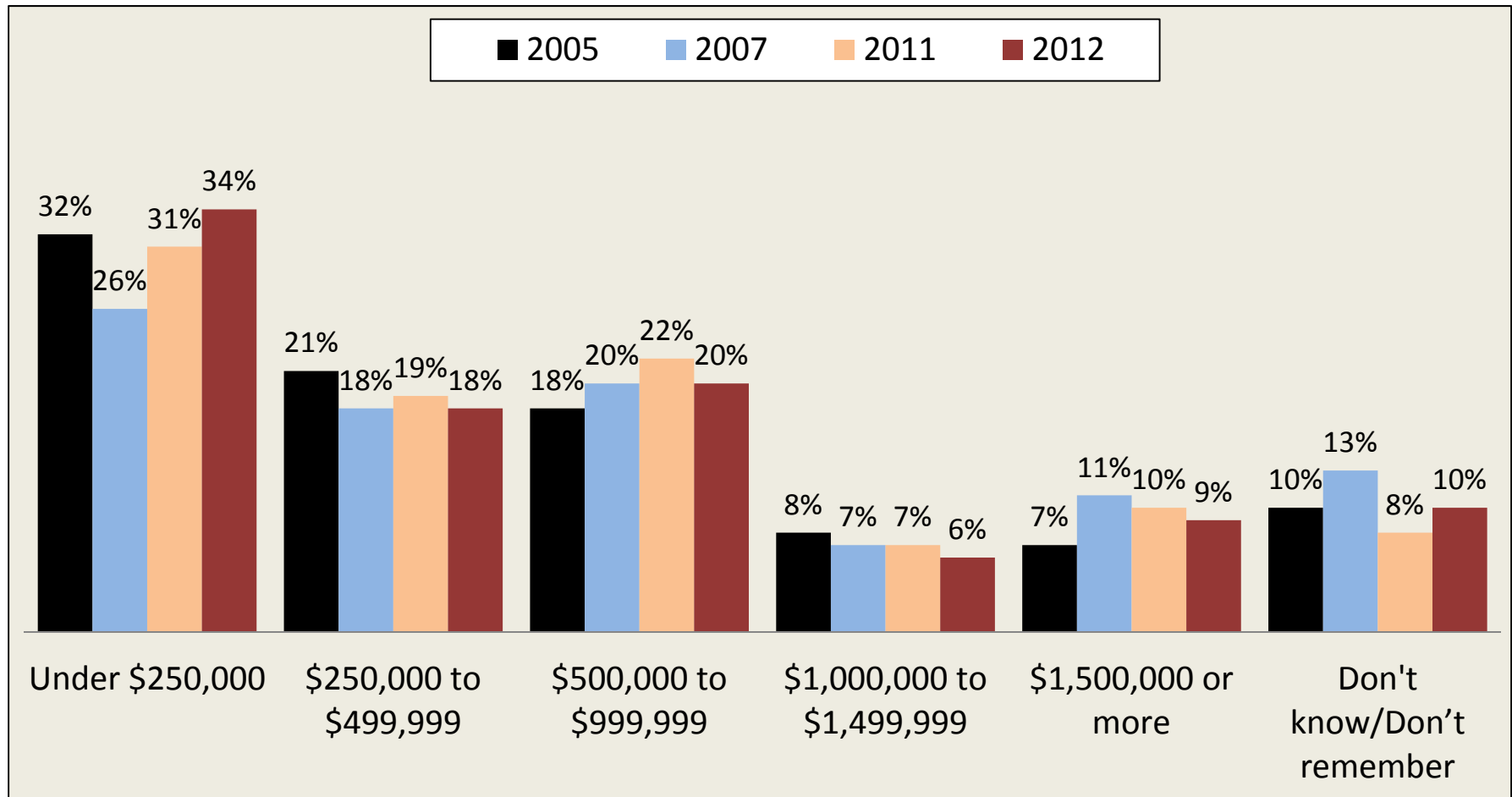
## Workers Having Tried to Calculate How Much Money They Need to Save for a Comfortable Retirement



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

# Figure 6

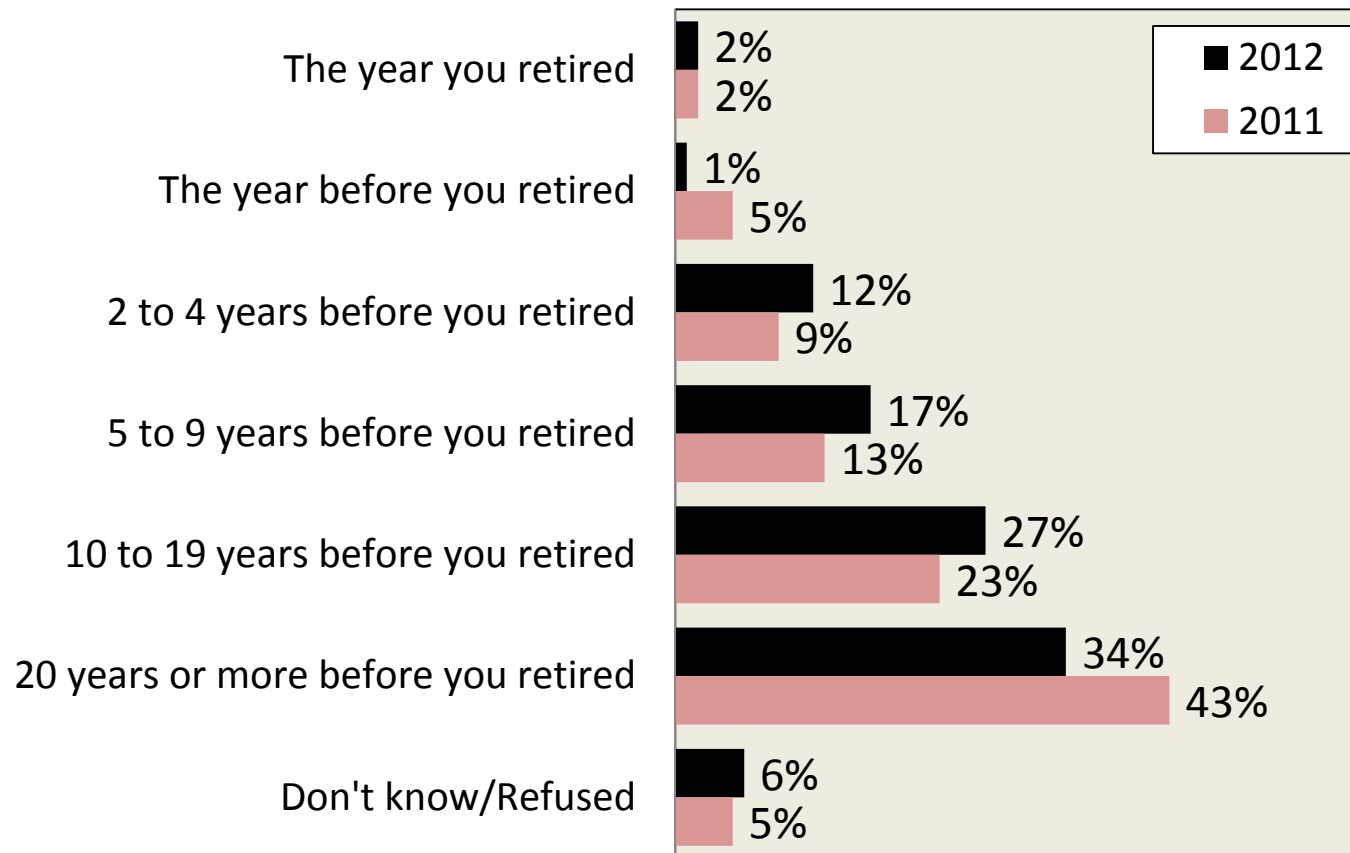
## Amount of Savings Workers Think They Need for Retirement



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

# Figure 7

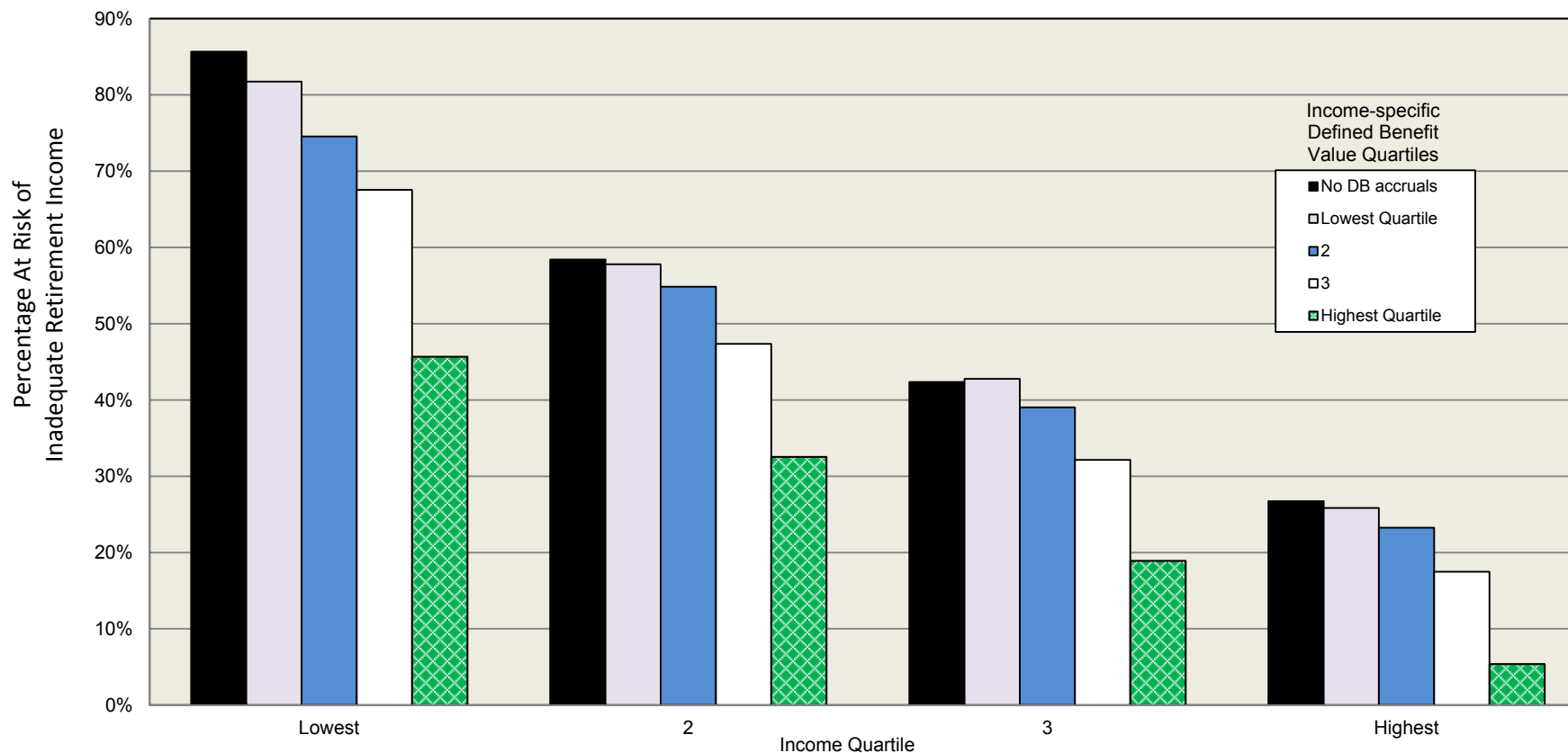
## Timeframe When Retirees Began to Plan Financially for Retirement, Among Retirees Who Planned for Retirement



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)

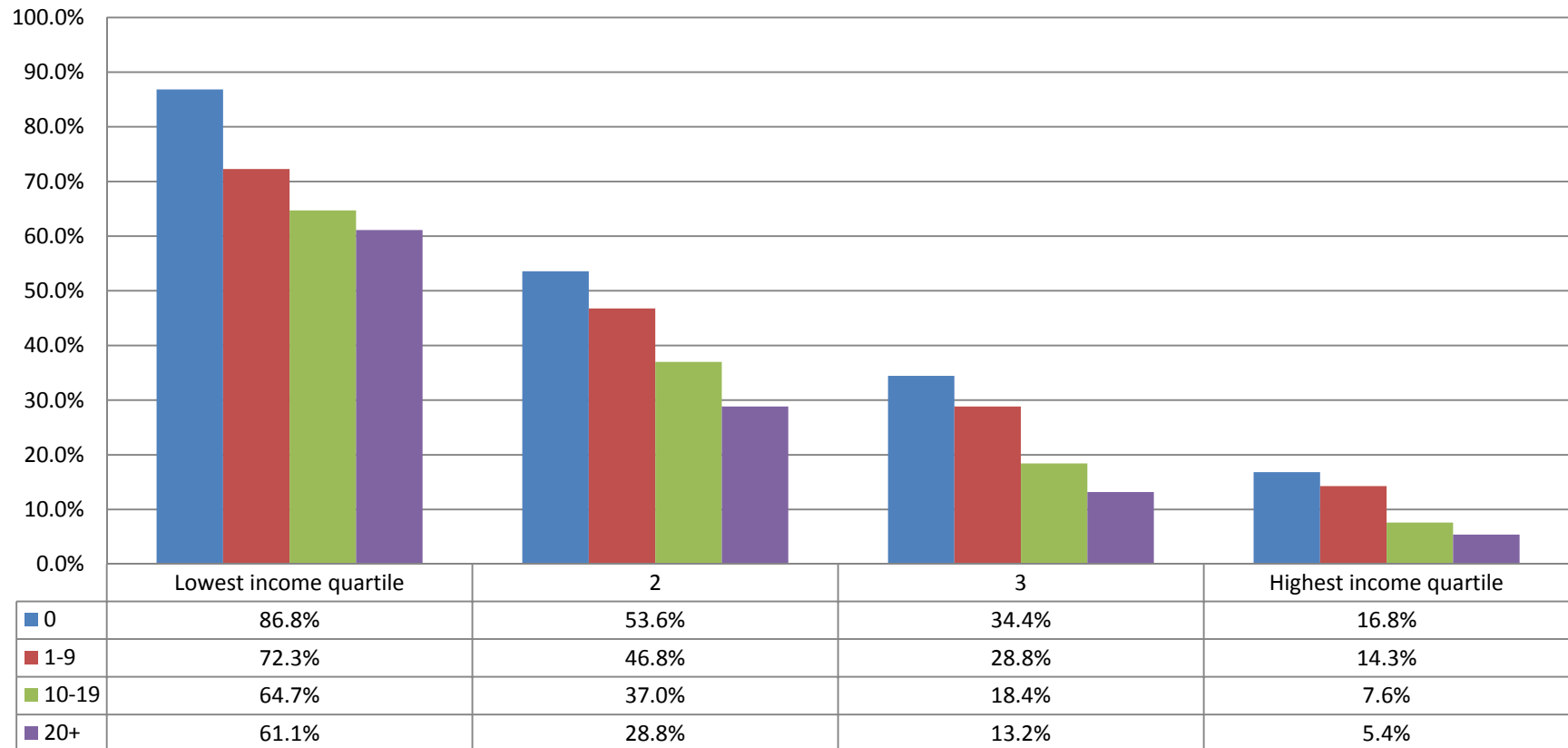


Source: EBRI/ERF Retirement Security Projection Model® version 110714e.

\* 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

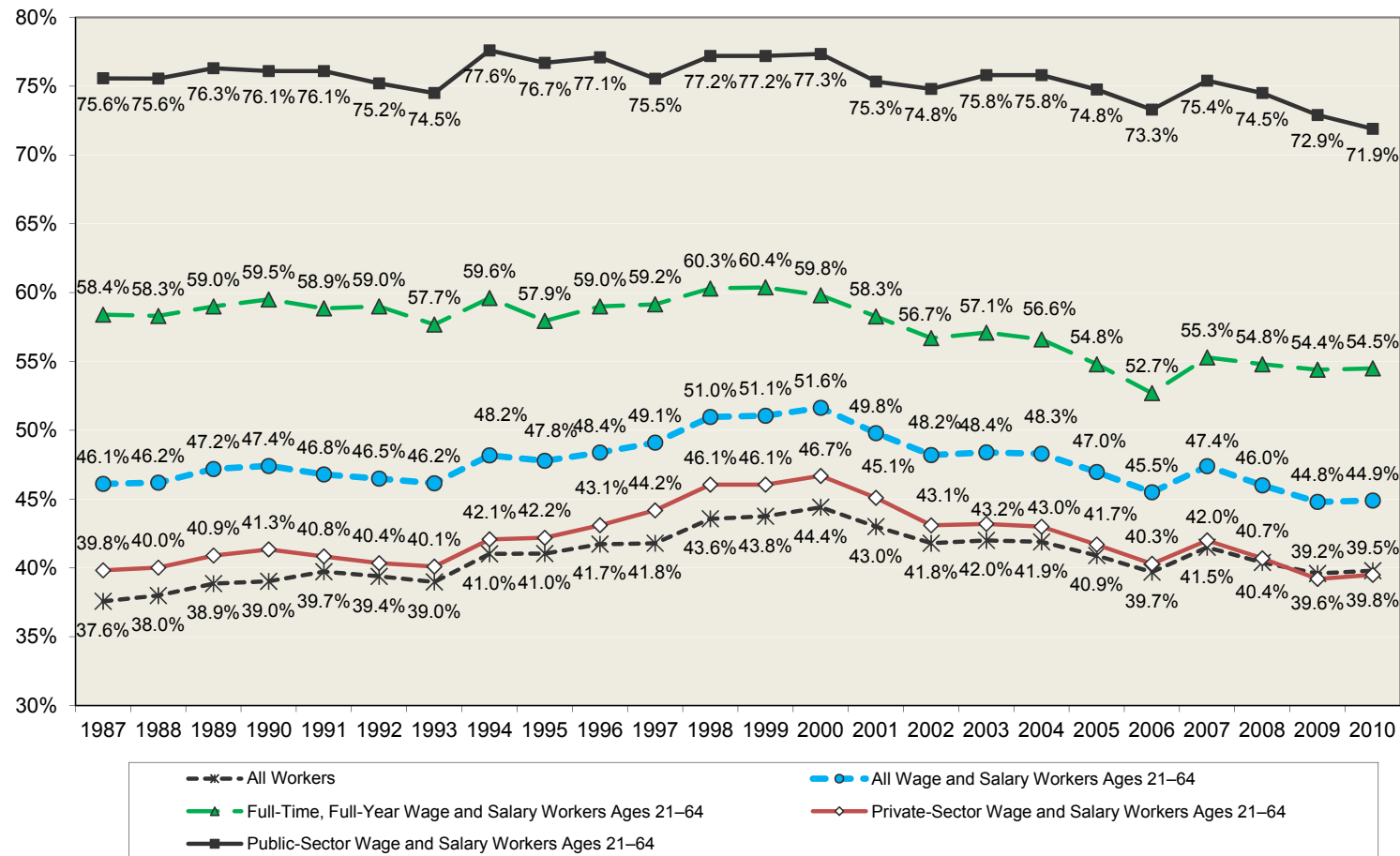
### Impact of future years of 401(k) eligibility on 2012 at-risk\* ratings for Gen Xers by income quartile



\*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.

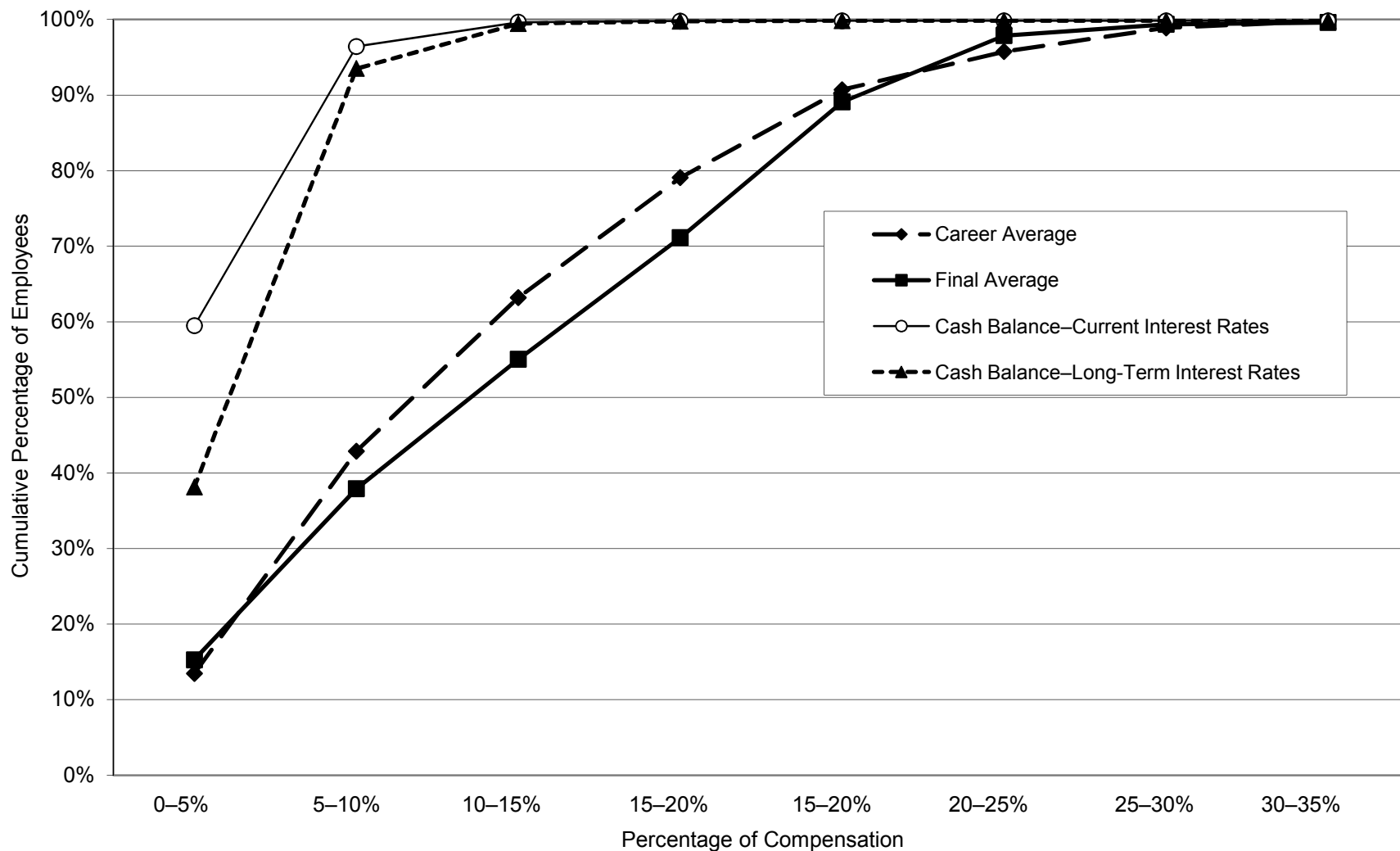
Figure 10  
**Percentage of Various Work Forces That Participated  
 in an Employment-Based Retirement Plan, 1987–2010**



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

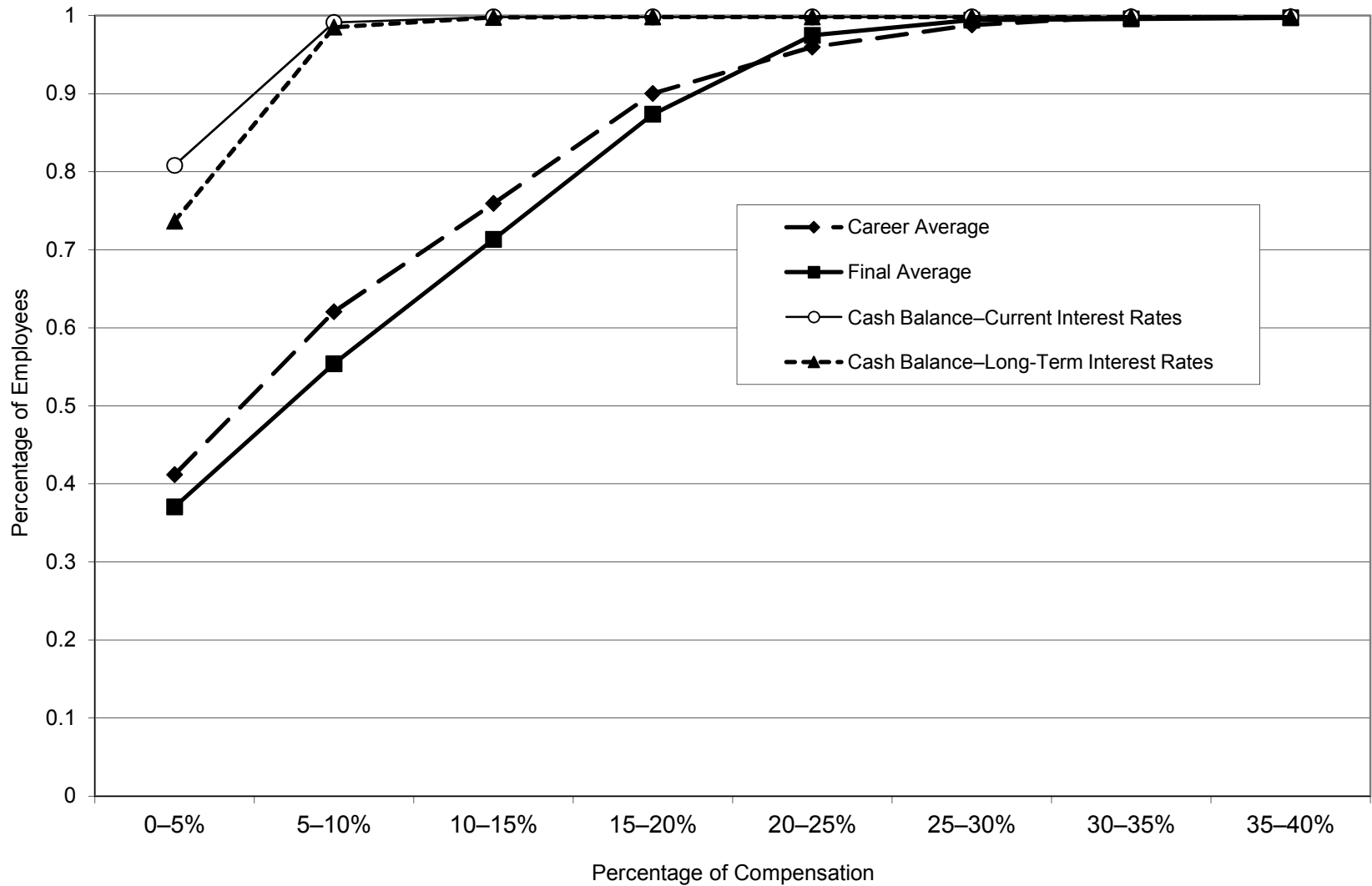


Figure 11  
**Cumulative Distribution Function of the Percentage  
of a Worker's Annual Pay Needed to Offset the Impact  
of a Pension Freeze in 2006, by Pension Plan Type**  
(assumes 4% annual rate of return)



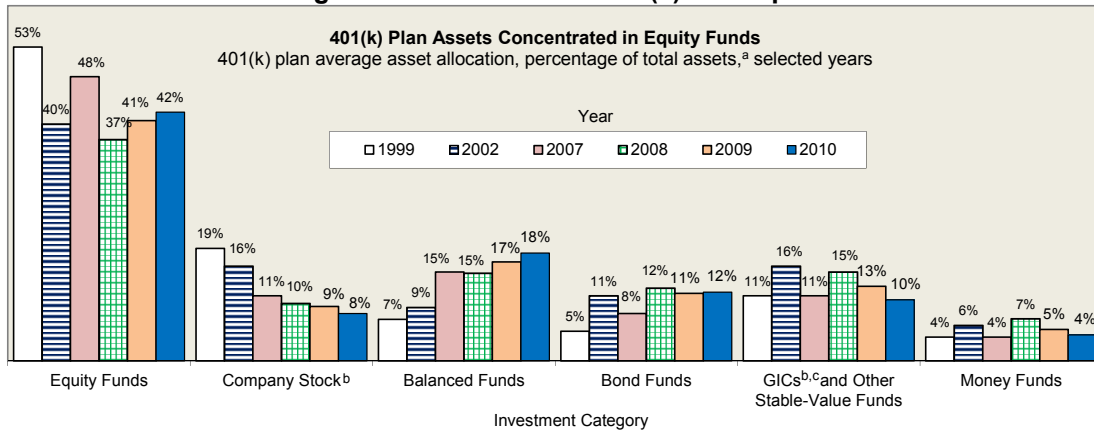
Source: Author's tabulations from the EBRI/ERF Retirement Income Projection Model.

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.

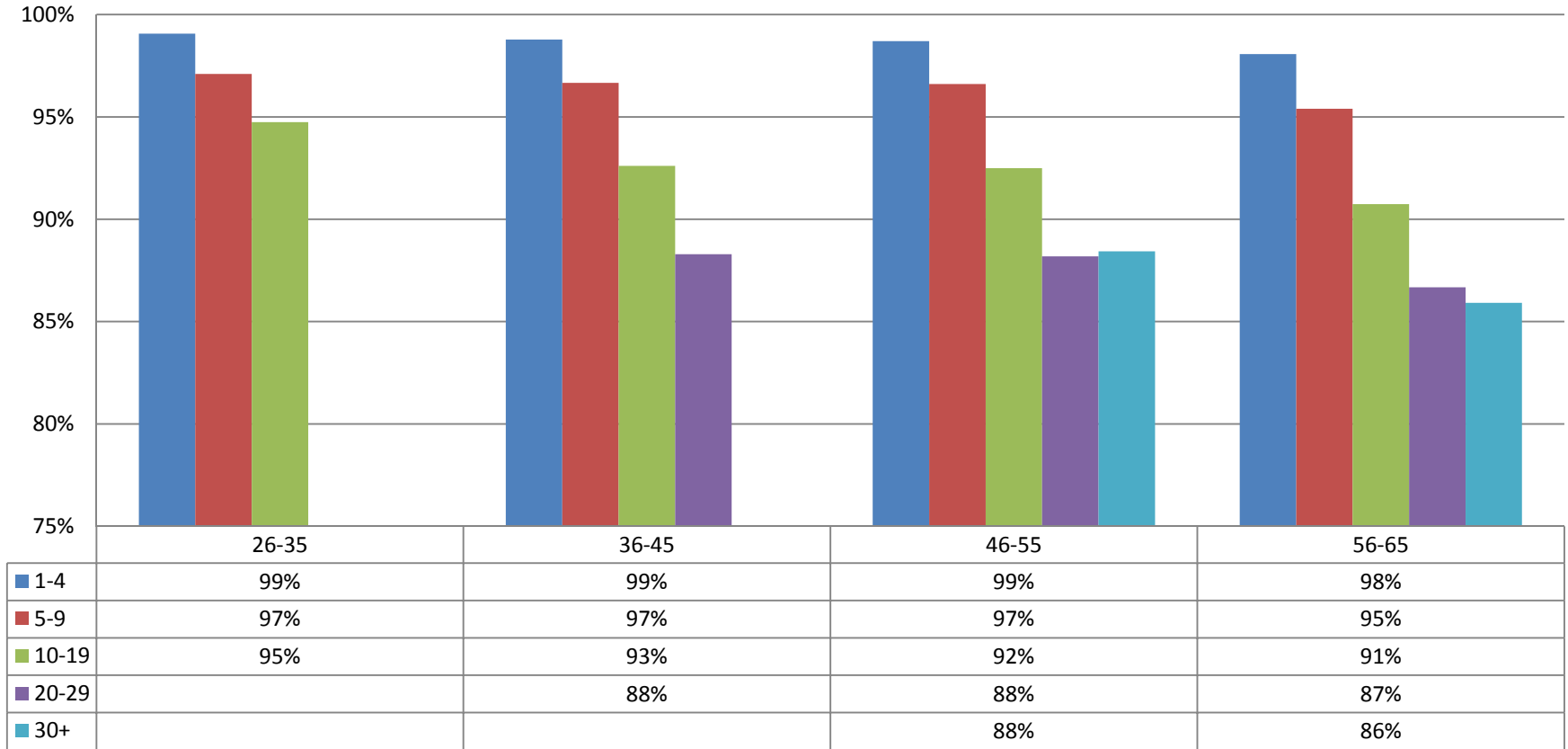
<sup>b</sup> Not all participants are offered this investment option.

<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.

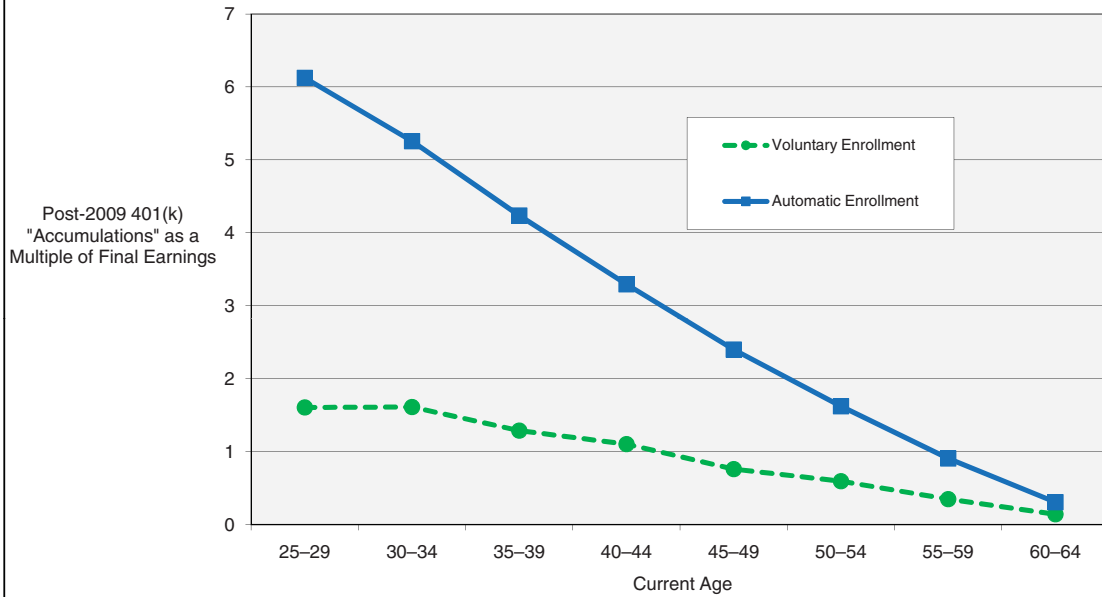
**Figure 14**

**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**



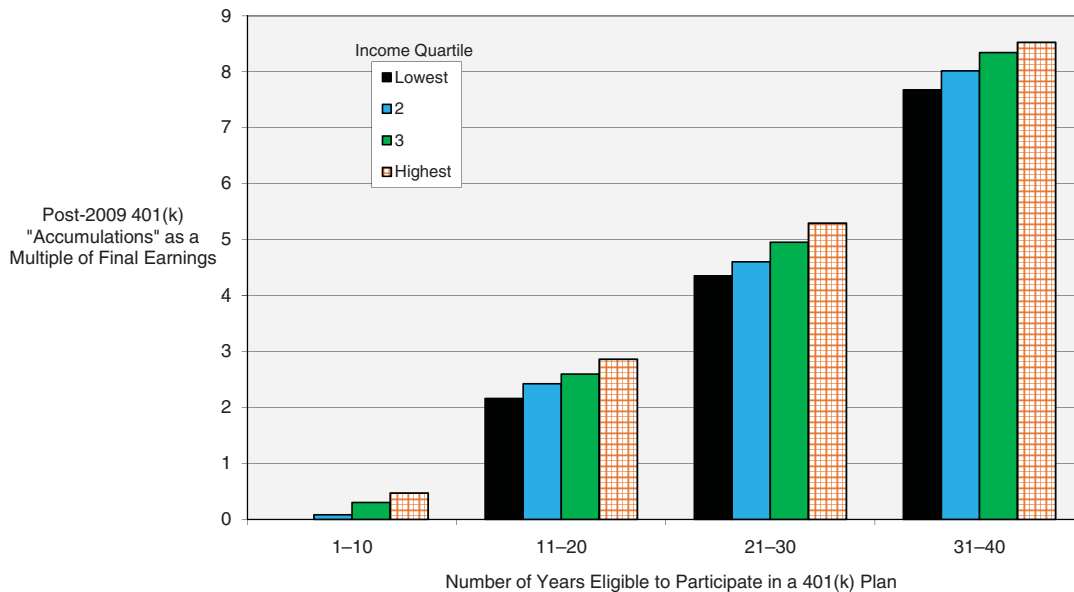
Sources: EBRI estimates based on tabulations from EBRI/ICI Participant-Directed Retirement Plan Data Collection Project. The analysis is based on all participants with account balances at the end of 2007 and 2008 and contribution information for those years.

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)

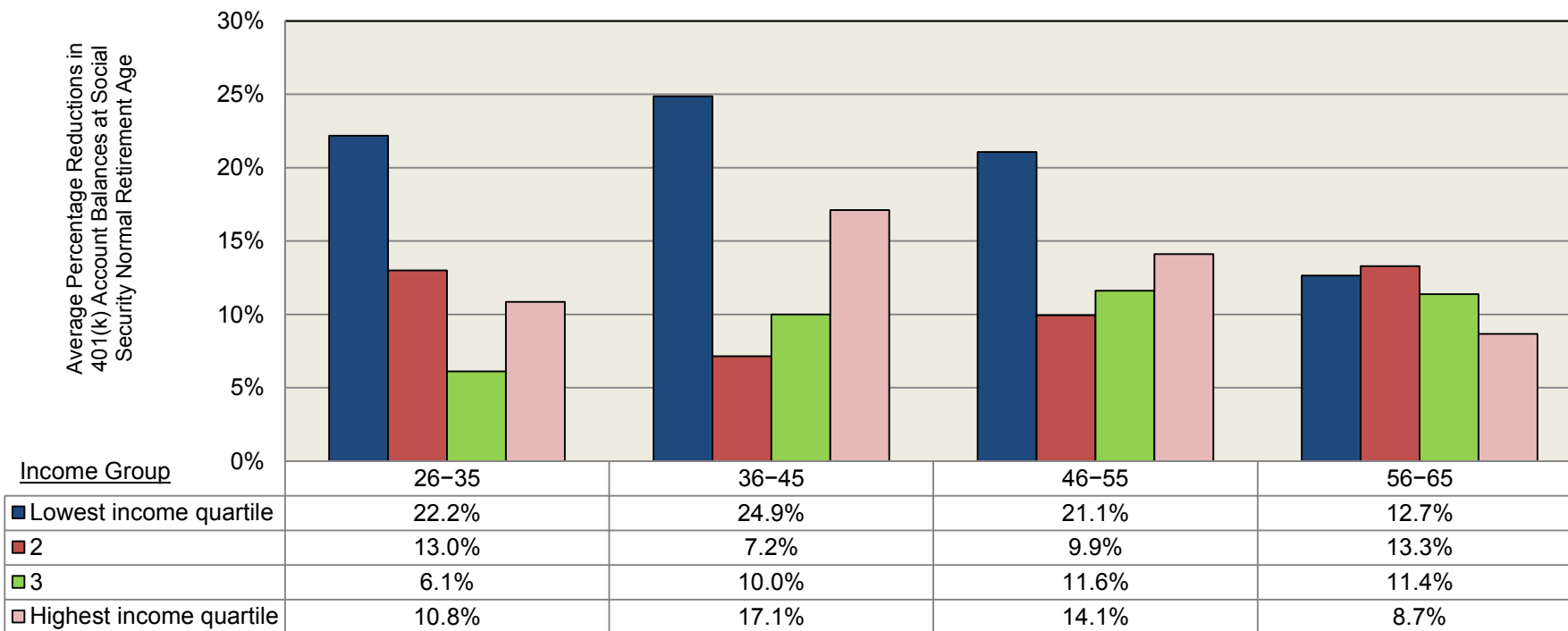


Source: Source: EBRI/ERF Retirement Security Projection Model,® version 100205a4. See text for explanations of models and assumptions.

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



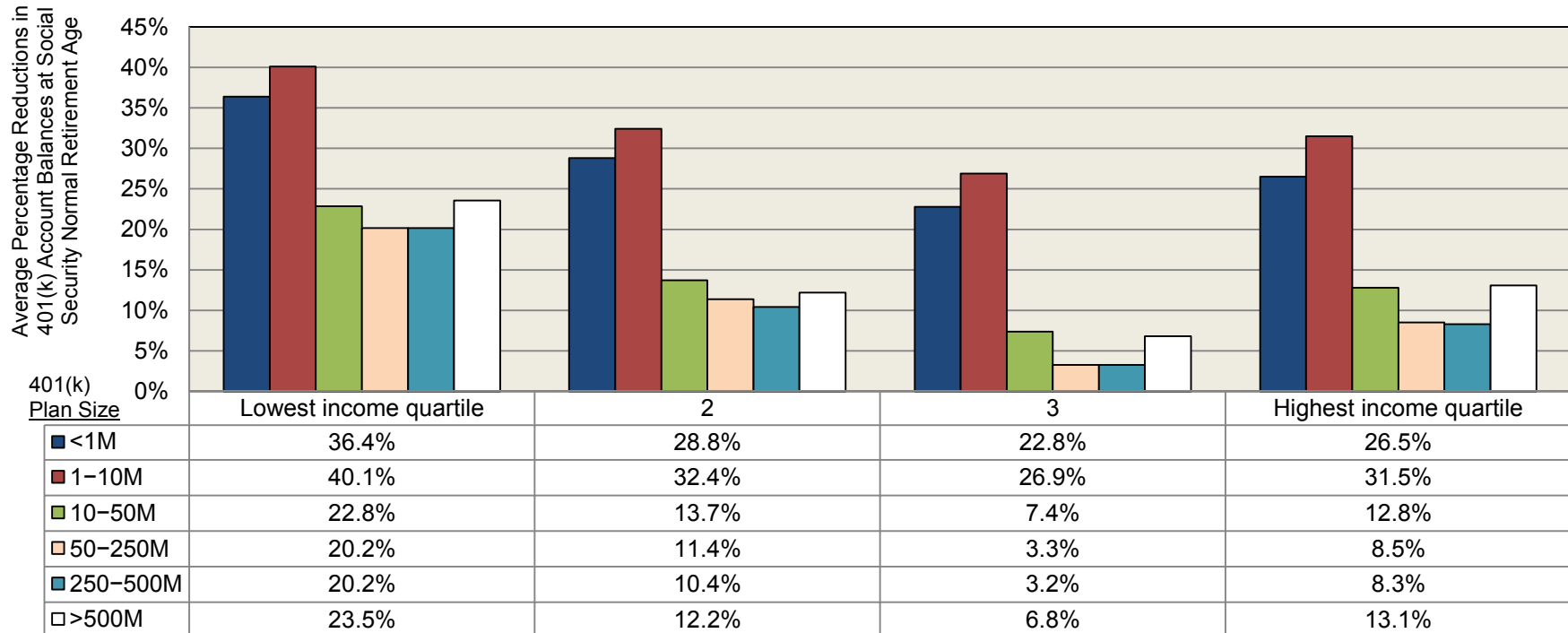
Source: Author's calculations based on results from EBRI Retirement Security Projection Model Version 1471, and responses to AllianceBernstein (2011) and Employee Benefit Research Institute and Mathew Greenwald & Associates, Inc., 2012 Retirement Confidence Survey.

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

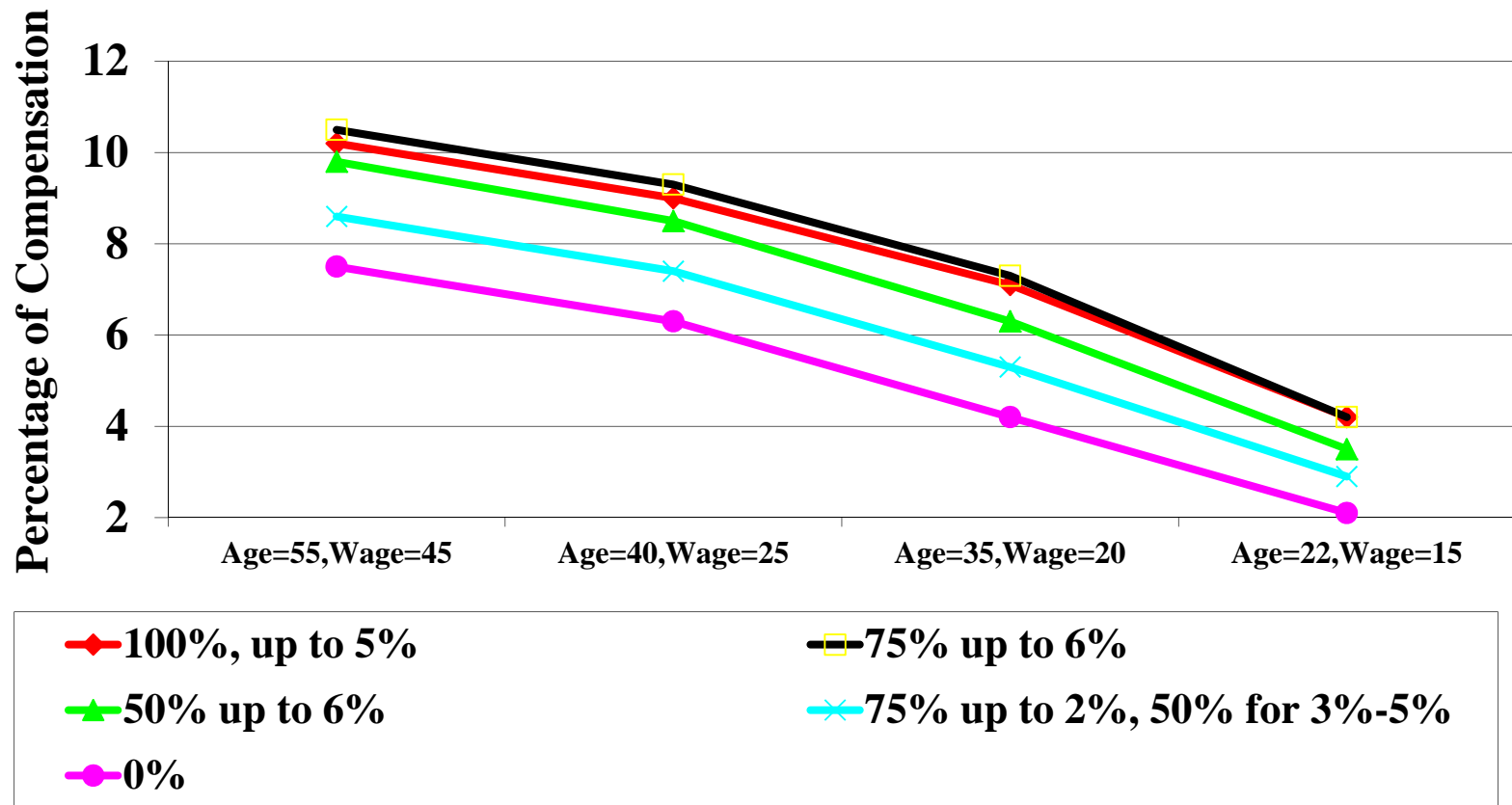


Source: Author's calculations based on results from EBRI Retirement Security Projection Model Version 1472, and responses to AllianceBernstein (2011) and Employee Benefit Research Institute and Mathew Greenwald & Associates, Inc., 2012 Retirement Confidence Survey.

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)