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Issue BRIEF

A Post-Crisis Assessment of Retirement Income Adequacy for Baby Boomers and Gen Xers

By Jack VanDerhei, Employee Benefit Research Institute

EXECUTIVE SUMMARY

DETERMINING THOSE "AT RISK" OF INSUFFICIENT RETIREMENT INCOME: The analysis in this paper 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 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?

The results are from the 2010 EBRI Retirement Security Projection Model® by the Employee Benefit Research Institute.

KEY FINDINGS:

- ***Range at risk:*** The percentage of households that would not have been "at risk" without the 2008–2009 crisis but that ended up "at risk" varies from a low of 3.8 percent to a high of 14.3 percent.
- ***50–50 chance of adequacy:*** Looking at all Early Boomer 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 these households 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.
- ***90 percent chance of adequacy:*** Looking at all Early Boomer 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 these households desiring a 90 percent probability of retirement income adequacy would be 4.3 percent of compensation.
- ***Range of adequacy:*** Looking only at Early Boomer households that would need to save an additional amount (over and above the savings already factored into the baseline model), that had account balances in defined contribution plans and IRAs as well as exposure to the real estate crisis in 2008 and 2009 shows a median percentage for of 5.6 percent for a 50 percent probability and 6.7 percent for a 90 percent probability of retirement income adequacy.

Jack VanDerhei is director of research at EBRI. This *Issue Brief* was written with assistance from the Institute's research and editorial staffs. Any views expressed in this report are those of the authors, and should not be ascribed to the officers, trustees, or other sponsors of EBRI, EBRI-ERF, or their staffs. Neither EBRI nor EBRI-ERF lobbies or takes positions on specific policy proposals. EBRI invites comment on this research.

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Introduction

There has been much speculation about the impact of the recent crisis in financial and housing markets on current workers and retirees.[1] Munnell, Webb and Golub-Sass (2009) suggest that the percentage of households "at risk" of having inadequate retirement income at age 65 increased from 44 percent in 2007 to 51 percent in 2009 largely as a result of the decline in the financial and housing markets.[2] While that analysis provides an interesting attempt to use aggregate trends in assessing the impact of the crisis on retirement income adequacy for future retirees, this report uses the EBRI Retirement Readiness Rating™ (RRR) as well as the 2010 version of the EBRI Retirement Security Project Model® (RSPM) to model not only the impact of the crisis on the percentage of households "at risk" for inadequate retirement income, but also the additional percentage of compensation those households will need to save each year until retirement age to have a 50, 70, or 90 percent probability of having sufficient retirement income to meet basic retirement expenditures and any uninsured health care costs for their full retirement.

The definition of being "at risk" of inadequate retirement income depends to a large extent on the type of model used to analyze the various contingencies. For example, some studies project retirement income and wealth to a particular age, and then simply compare the annuitized value of the various components with a threshold based on some type of replacement rate analysis.[3] While this is a useful metric to determine what percentage of the households being studied will achieve certain benchmarks, it is difficult (if not impossible) to accurately integrate the concepts of longevity risk, post-retirement investment risk, and uninsured post-retirement health care risk in such a formulation.

The RRR, as well as other results in this report, are based on an updated version of RSPM. As explained briefly below (and in much more detail in the appendix), this model was originally developed in 2003 to provide detailed micro-simulation projections of the percentage of preretirement households "at risk" of having inadequate retirement income to finance basic retirement expenditures, as well as uninsured retiree health care expenses (including nursing home care). This model benefits greatly from having access to administrative records on tens of millions of 401(k) participants,[4] dating back in some cases to 1996, to permit simulation of the accumulations under the most important component (but also the most complicated in terms of modeling) of future wealth generated by the employer-sponsored retirement system. These household projections are combined with the other components of retirement income/wealth (such as Social Security, defined benefit annuities and lump-sum distributions, individual retirement account (IRA) rollovers, non-rollover IRAs, and net housing equity) at retirement age, and run though 1,000 alternative retirement paths to see what percentage of the time the households "run short of money" in retirement. The present value of the deficits generated in retirement are also computed, and divided by the accumulated remaining wages of the household to provide a percentage of compensation that would need to be saved in each year (in addition to any employee contributions simulated to be made to defined contribution plans and/or IRAs) to provide a 50, 70, or 90 percent probability of adequate retirement income.

The resulting "at risk" percentages for households are reported by age cohort, relative levels of preretirement income, and percentage of future time in an employer-sponsored defined contribution plan.[5]

While knowing the percentage of households that are "at risk," as well as their composition by age, income levels, and level of participation in defined contribution plans is obviously valuable, it does nothing to inform policymakers, employers, or workers of how much *additional savings* are required to achieve the desired probability of success. Similar to the concepts applied in VanDerhei and Copeland (2003), this analysis also models how much additional savings would need to be contributed from 2010 until age 65 (the baseline retirement assumption) to achieve adequate retirement income 50, 70, and 90 percent of the time for each household. While this concept may be difficult to comprehend at first, it is important to understand that a retirement target based on averages (such as average life expectancy, average investment experience, average health care expenditures in retirement) would, in essence, provide the appropriate target only if one was willing to settle for a retirement planning procedure with approximately a 50 percent "failure" rate. Adding the 70 and 90 percent probabilities allows more realistic modeling of a worker's risk aversion.

Brief Description of RSPM

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.[6] 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,"[7] 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.

The appendix to VanDerhei and Copeland (2010) 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.[8]

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 in this report 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 exceeds the after-tax[9] 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,[10] the excess is assumed to be invested in a non-tax-advantaged account where the investment income is taxed as ordinary income.[11] 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.

Results for the 2010 Retirement Readiness Ratings

Baseline by Age Cohort

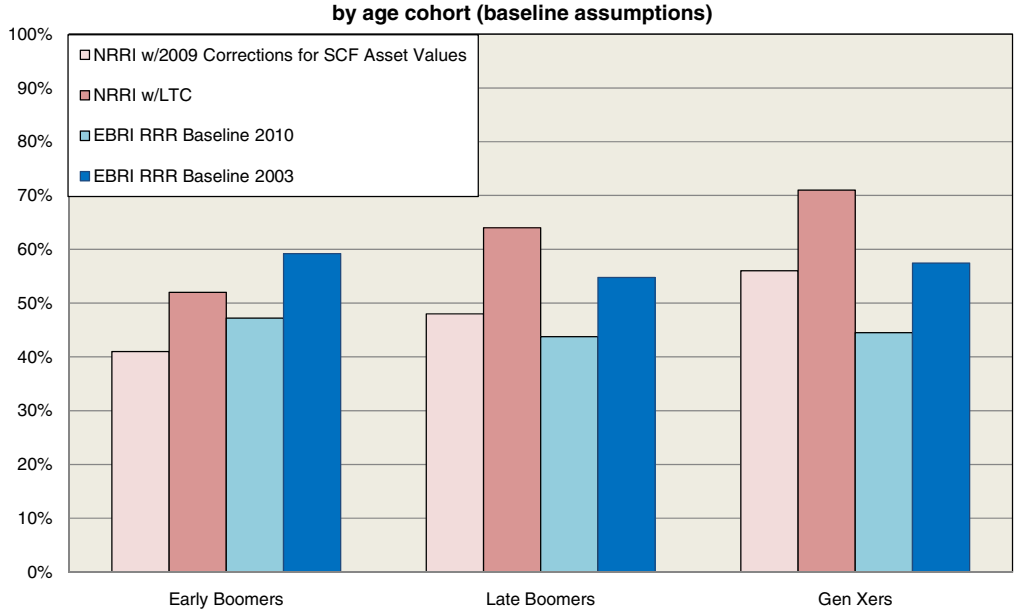
Figure 1 provides the baseline analysis for the 2010 Retirement Readiness Ratings in terms of the percentage of the population simulated to be "at risk" for three age cohorts:[12]

- Early Boomers (born between 1948–1954, now ages 56–62).
- Late Boomers (born between 1955–1964, now ages 46–55).
- Generation Xers (born between 1965–1974, now ages 36–45).

In 2010, nearly one-half (47.2 percent) of the oldest cohort (Early Boomers) are simulated to be at risk of not having sufficient retirement income to pay for "basic" retirement expenditures as well as uninsured health care costs.[13] The percentage at risk drops for the Late Boomers (to 43.7 percent) but then increases slightly for Generation Xers to 44.5 percent.

Figure 1
Baseline EBRI Retirement Readiness Rating™ (RRR) vs. National Retirement Risk Index (NRRI)

Percentage of population "at risk" for inadequate retirement income, by age cohort (baseline assumptions)



Sources: EBRI Retirement Security Projection Model™ versions 100504e and 100708e; "The National Retirement Risk Index: After the Crash," Center for Retirement Research at Boston College, October 2009; "Long-term Care Costs and the National Retirement Risk Index," Center for Retirement Research at Boston College, March 2009.

In contrast, the most recent National Retirement Risk Index (NRRI) shows significantly higher at-risk percentages for the younger cohorts (Munnell, Webb, and Golub-Sass, 2009).[14] They use 2007 Survey of Consumer Finances (SCF) information, with a modification for asset values based on broad market averages, and conclude that 41 percent of Early Boomer, 48 percent of Late Boomer, and 56 percent of Gen X households are "at risk" of not having enough to maintain their standard of living in retirement.

There are several reasons for the different trends between these two models.[15] However, the most likely difference is the treatment of defined contribution account balances with respect to future time periods. While NRRI projects financial assets in 401(k) plans and other accounts "based on wealth-to-income patterns by age group from the 1983–2004 SCF surveys,"[16] RSPM has been completely revamped since the original 2003 model to account for the trends toward automatic enrollment in 401(k) plans, automatic escalation of contributions, and the increased utilization of target-date funds (TDFs), whether through qualified default investment accounts (QDIAs) or through participant-directed investments. Holden and VanDerhei (2005) demonstrated the large impact auto-enrollment (AE) would likely have on employees eligible to participate in 401(k) plans, especially at the lower-income quartiles. VanDerhei (September 2007) used the Pension Protection Act (PPA) safe harbors to show how much larger balances in auto-enrolled 401(k) plans would likely be for eligible employees as a result of automatic escalation of employee contributions. VanDerhei and Copeland (2008) used a version of RSPM to model the impact of auto-enrollment (AE) and automatic escalation of employee contributions for all workers (whether or not they are currently 401(k) participants or eligible nonparticipants).

Finally, VanDerhei (2010) uses actual plan-specific data from sponsors that have converted from traditional types of 401(k) plans to auto-enrollment from 2005 (the year prior to the enactment of PPA) to 2009, inclusive. Previous EBRI research[17] has demonstrated the propensity of defined benefit plan sponsors that have either recently frozen their defined benefit pension plan or closed it to new employees, or planned to do so soon after the enactment of PPA in 2006, to adopt auto-enrollment provisions in their 401(k) plans. However, until recently there was little, if any, direct empirical evidence of whether the overall employer contribution rates to AE plans would be more or less generous than

as a multiple of final earnings for both VE plans (with the 2005 plan formulas) and AE plans (with the 2009 plan formulas) as a function of current age. For those currently ages 25–29, the difference in the median multiples would be approximately 4.52 times final salary in an AE plan relative to a VE plan.

Given the extremely large differences in simulated 401(k) balances (and IRA rollovers resulting from 401(k) balances), especially for younger cohorts, it is difficult to understand how a model based primarily on pre-PPA historical behaviors and trends in defined contribution plans would be able to accurately project what 401(k) and IRA balances would accumulate to in the future.

A second NRRI "at-risk" percentage is included for each age cohort in Figure 1. The original NRRI did not explicitly include health care costs; however, this was fixed in 2008 (Munnell et al., 2008), and the overall "at-risk" percentages for 2006 increased from 44 percent to 61 percent as a result. More recently (Munnell et al., March 2009), the NRRI model was modified to attempt to incorporate long-term care into the model with two alternative strategies:

- Purchasing long-term care insurance.
- Refraining from taking a reverse annuity mortgage, so that housing equity is potentially available to fund long-term care.

The implementation of these alternative strategies in NRRI produced very similar results, with the overall "at-risk" percentages for 2006 increasing to either 64 or 65 percent. In contrast, since its inception in 2003, RSPM has recognized that very few retirees actually have long-term care insurance, and it deals with this potentially catastrophic risk by stochastically generating both frequency and severity functions for each household in each of their 1,000 simulated lifepaths.[18]

For purposes of historical comparisons, the 2003 Retirement Readiness Ratings are also included in Figure 1. The Retirement Readiness Ratings show there has been a significant decrease in the "at-risk" levels for all three groups between 2003 and 2010, with the largest decrease (12.9 percentage points) experienced by the Gen Xers. The major reason for the large magnitude of these decreases is attributed to the projection of future defined contribution account balances (which would have the largest impact on the youngest group). As mentioned above, the 2010 Retirement Readiness Ratings fully reflect the trend to auto-enrollment, auto-escalation of contributions, and QDIAs as a result of PPA and subsequent regulations. While some plans had already adopted auto-escalation at the time of the 2003 model, the percentage of workers affected was minimal and hence not included in the simulations.

Baseline by Preretirement Income Groups

Although the 2010 Retirement Readiness Ratings show relatively little change in "at-risk" probability by age cohort, Figure 2 shows a significant impact of the relative level of preretirement income.[19] In this case, households in the lowest one-third when ranked by age-specific preretirement income are simulated to be "at risk" 70.3 percent of the time, while the middle-income group has an "at-risk" percentage of 41.6 percent. This figure drops to 23.3 percent for the highest-income group.

The 2010 Retirement Readiness Ratings show a much greater variation by income group than do similar results produced by NRRI (Munnell et al., October 2009). In their model, the "at-risk" percentages vary only from 60 percent for the lowest-income group to 42 percent for the highest-income group. Again, there are several reasons to expect significant differences in the results of the two models, but one of the major differences no doubt stems from the two approaches used to determine retirement wealth created by 401(k) and other defined contribution plans. RSPM provides annual micro-simulations for participation, contribution, asset allocation, and cash-out behavior, whereas as NRRI is based solely on point-in-time extrapolations of the wealth-to-income patterns by age group based on historical data from 1983–2004 (a time period prior to virtually all of the experience under auto-enrollment, auto-escalation of contributions, the creation of QDIAs, and the explosive trend in target-date funds).

Again for historical comparisons, the 2003 Retirement Readiness Ratings by income group are included in Figure 2. Both the middle- and high-income cohorts experience a 16 percentage point decrease, while the low-income cohort has a Retirement Readiness Rating that decreases by only 9 percentage points between 2003 and 2010. While this may appear counterintuitive at first, given the huge positive impact of auto-enrollment and auto-escalation of contributions on low-income cohorts, VanDerhei and Copeland (2010, Figure 8) demonstrate how far many of these lower-income cohorts are from the point where they will no longer be classified as "at risk."

Baseline by Age Cohort and Preretirement Income Quartile

Figure 3 shows the 2003 and 2010 baseline Retirement Readiness Ratings by both age cohort and preretirement income quartile simultaneously. Similar to Figure 1, there appears to be very little, if any, trend by age cohort for most preretirement income quartiles in 2010. The one exception is for the lowest-income quartile, where the "at-risk" level is 81 percent for the Early Boomers and then drops substantially to 74 percent for the younger cohorts. This is likely due to the impact of switching to AE 401(k) plans while the worker is young enough to benefit from the new plan design for several years prior to retirement.

Comparing the 2003 and 2010 Retirement Readiness Ratings shows at least a double-digit decrease in "at-risk" percentages for all groups except the lowest-income quartile for the Early Boomers (2 percentage point decrease) and the Late Boomers (6 percentage point decrease). Not only are many of the lowest-income quartile workers (regardless of age) often located too far from the "at-risk" threshold to have any real chance of having retirement income adequacy by retirement age, those closest to retirement age will have the least amount of time to benefit from the switch to programs that will produce a significant increase in participation rates for low-income workers.

Baseline by Future Years of Eligibility in a Defined Contribution Plan

One of the advantages of a national retirement income adequacy model based on micro-simulation data such as RSPM is the ability to correlate statistics such as the "at-risk" percentages with other outcomes for the simulated households.

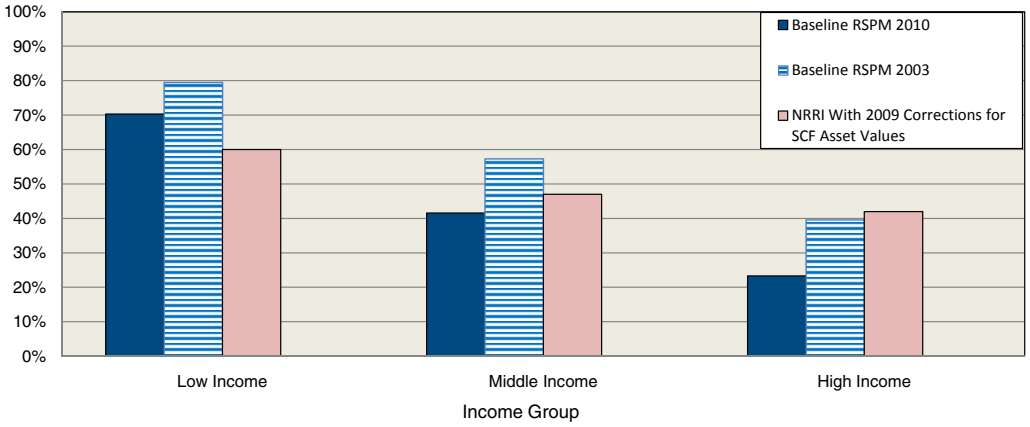
Figure 4 provides an example of the large extent to which "at-risk" percentages are associated with the years of future eligibility in defined contribution plans. The "at-risk" percentages are categorized for each of the three age cohorts into one of the following levels, based on years of future eligibility (whether or not the employee actually chose to participate in a VE plan or opted out of an AE plan):

- Zero years.
- 1–9 years.
- 10–19 years.
- 20 or more years.

Given their current ages and the assumption under the baseline runs that everyone retires at age 65, Early Boomers obviously can be in only one of the first two levels. When the results for this age cohort are bifurcated by future eligibility in a defined contribution plan, the difference in the "at-risk" percentages is quite large (16 percentage points), even after at most nine years of future eligibility. Late Boomers and Gen Xers are able to have significantly longer future periods of time eligible to participate in a defined contribution plan, and therefore the differences are much larger. Late Boomers with no future eligibility are simulated to have an "at-risk" level 26 percentage points larger than those with 10–19 future years of eligibility. Gen Xers obviously have the largest differential (40 percentage points): Those with no future years of eligibility have an "at-risk" level of 60 percent, compared with only 20 percent for those with 20 or more years of eligibility.

Figure 2
Impact of Income Group on At-Risk* Probability

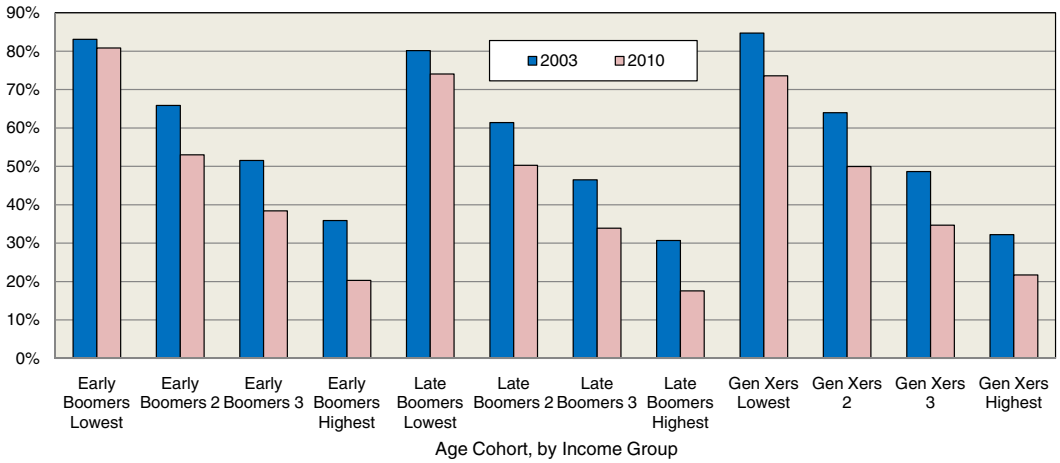
Percentage of population "at risk" for inadequate retirement income, by age-specific remaining career income group (baseline assumptions)



Source: EBRI Retirement Security Projection Model© versions 100504e and 100708e, and "The National Retirement Risk Index: After the Crash," Center for Retirement Research at Boston College, October 2009.
* 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 3
Impact of Age and Income Group on Retirement Readiness Rating

Percentage of population "at risk"* for inadequate retirement income, by age cohort and age-specific remaining career income groups (baseline assumptions)

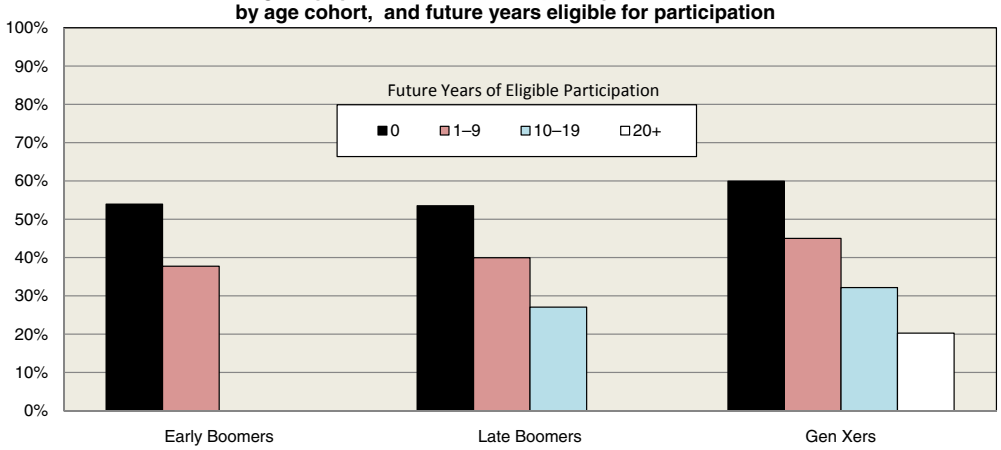


Source: EBRI Retirement Security Projection Model© versions 100504e and 100708e.
* An individual or family is considered to be "at risk" in this version of the model if their aggregate resources in retirement are not sufficient to meet aggregate minimum retirement expenditures defined as a combination 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 4

Impact of Age and Future Years Eligible for Participation in a Defined Contribution Plan on At-Risk* Probabilities

Percentage of population "at risk" for inadequate retirement income, by age cohort, and future years eligible for participation



Source: EBRI/ERF Retirement Security Projection Model® version 100504e.
* 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.
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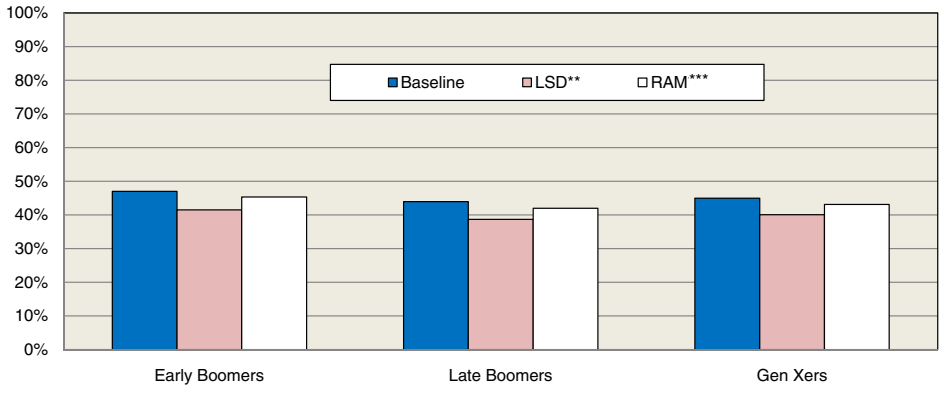
Figure 5

Impact of Net Housing Equity Utilization

Percentage of population "at risk"* for inadequate retirement income, by age cohort



Source: EBRI/ERF Retirement Security Projection Model® version 100504e vs. 100504e3 and 100504e4.
* 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.
** This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
*** This option assumes the net housing equity is annuitized at the time of retirement as a reverse annuity mortgage (RAM).

Net Housing Equity

The original version of RSPM in 2003 attempted to deal with the prospect of a household using net equity in the house (if any) as a means of supporting retirement expenditures by simulating whether households would be expected to have net housing equity at retirement and, if so, its expected value. Under the baseline scenario, it was assumed that retirees would not use their net housing equity to supplement their retirement income in any way (including home equity loans). The second scenario assumed any net housing equity is annuitized at retirement. Given the stochastic nature of the analysis, a third scenario was also able to be modeled where it is assumed housing equity is not liquidated until the time it is first needed to mitigate an annual deficit. At that point, it is assumed any residual value is invested in the same manner as an individual account retirement plan.

Figure 5 provides the simulated "at-risk" percentages by age cohort under the baseline assumptions and the two alternatives. Under the first alternative (assuming that the households purchase a reverse annuity mortgage at age 65), the results are relatively small: Early Boomers would experience the largest reduction in the "at-risk" level of 1.8 percentage points, decreasing to a reduction of 1.4 percentage points for Gen Xers. Similar to the results in VanDerhei and Copeland (2003), the benefit of using the net housing equity only when the household has insufficient financial resources has a larger impact (even though only approximately one-half of the households would actually sell the house under this option). In the second alternative, Early Boomers would experience the largest reduction in the "at-risk" level of 5.7 percentage points, decreasing to a reduction of 4.4 percentage points for Gen Xers.

Although VanDerhei and Copeland (2010) used the scenario in which net housing equity was not used to finance retirement expenditures as the baseline, in this report the so-called lump-sum distribution (LSD) option (in which net housing equity is liquidated when needed and used as an LSD distribution instead of being annuitized) is used as the baseline to allow an evaluation of how much the decline in the housing market has impacted retirement income adequacy.[20]

Impact of the Financial and Housing Market Crisis in 2008 and 2009 on Retirement Readiness Rating

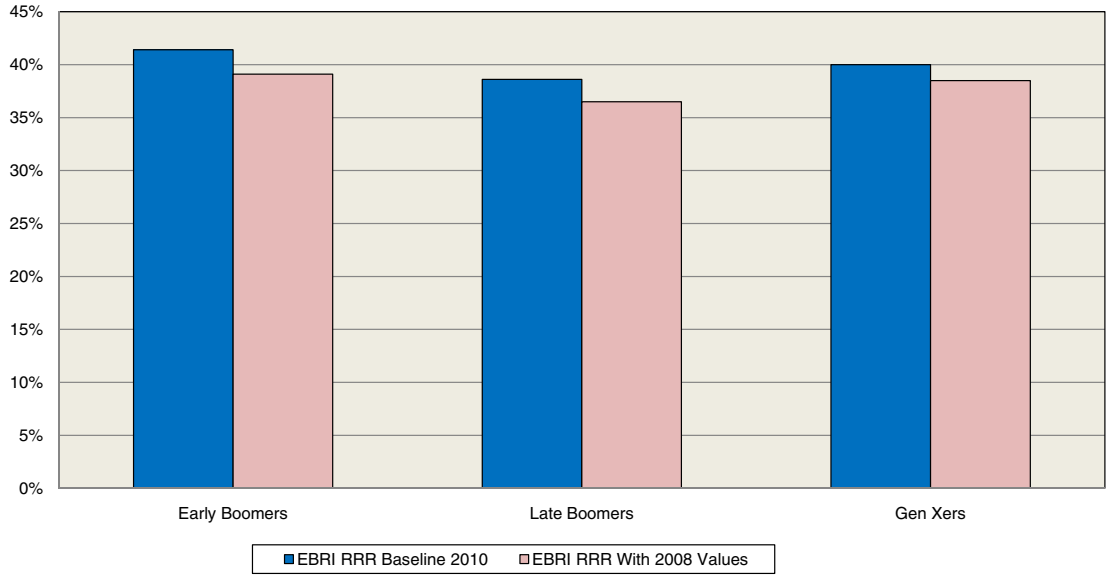
Figure 6 provides the new 2010 baseline RRR estimates for all households (assuming the LSD option for net housing equity utilization) compared with the same RRR estimates assuming that the January 1, 2010, financial market and housing equity values are replaced with the values they had on January 1, 2008. It is important to note that this is NOT the same as substituting the defined contribution plan and IRA values from two years earlier, as that would ignore two years worth of contribution, withdrawal and (in the case of defined contribution plans) loan activity. As expected, the 2008 modified RRR values decrease the most for the oldest cohort (Early Boomers) due to the larger account balances and home net equity values accumulated. Early Boomers would have had a lower RRR of 2.3 percentage points if the 2008 financial and housing market values were used. The Late Boomers would have had a reduction of 2.1 percentage points while the Gen Xers would have had a reduction of only 1.5 percentage points. As a result, the percentage of households no longer "at risk" when 2008 values are assumed ranges from 3.8 to 5.6 percent.

While a difference of at most 2.3 percentage points may seem relatively insignificant compared with a 2010 RRR rating of 41.4 percent (for the Early Boomers), one must keep in mind that this number applies to all households regardless of whether they were projected to have a defined contribution plan, IRA balance, or any net housing equity. Figure 7 provides the same analysis; however, in this case only households that had a positive defined contribution plan balance in 2010 were included. As expected, the RRR for this select group of households is much smaller than that for the all-household analysis in Figure 6, with levels ranging from as low as 27.6 percent for Late Boomers to 30.2 percent for Gen Xers. In this case, the differences in RRR levels range from 2.1 percentage points for Gen Xers to 2.7 percentage points for Early Boomers. The resulting percentage drop in households that are still "at risk" after the substitution of 2008 values ranges from 7.0 percent for the Gen Xers to 9.6 percent for the Early Boomers.

Figure 6

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity: All Households

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



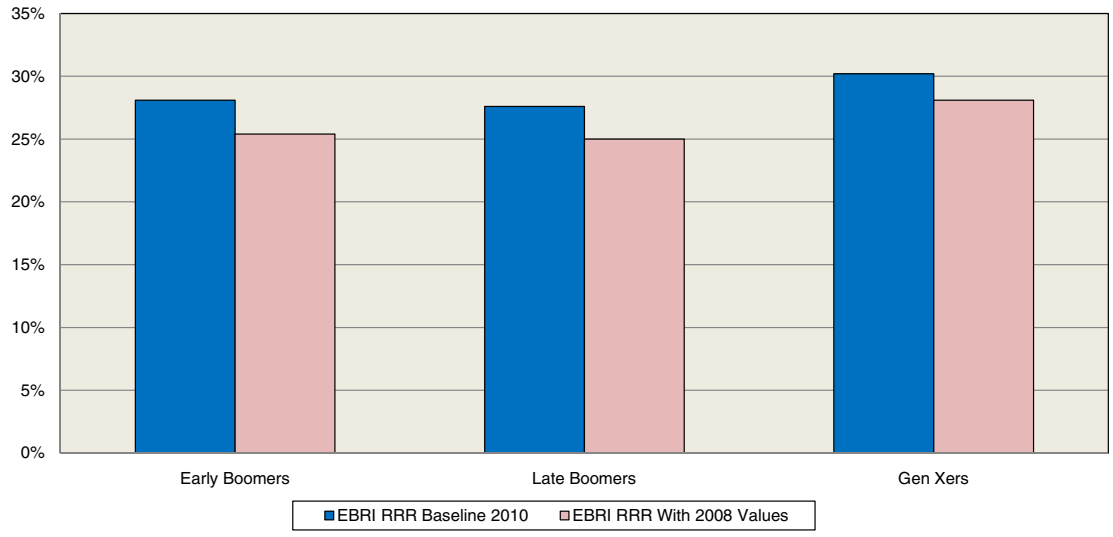
* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

Figure 7

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity

[This analysis is limited to households that had positive values for all of the following on 1/1/08: **Defined contribution plan balance**]

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

Figure 8 provides a similar analysis of households that had positive IRA balances in 2010, and Figure 9 provides results for households with positive net housing equity in 2010. The results are similar to those seen in Figure 7.

Figure 10 provides a similar analysis of households that had both a positive defined contribution plan balance and a positive IRA balance in 2010. As expected, the RRR levels are even lower for this group of households (ranging from 24.3 percent to 25.7 percent), and the percentage differences are of approximately the same magnitude as in Figure 7. This results in a slightly larger percentage of households no longer being "at risk" when 2008 values are assumed: 7.4 to 10.2 percent.

Figure 11 analyzes households with both positive defined contribution plan balances and positive net housing equity in 2010. Given the high correlation between defined contribution plan balances and IRAs (often due to rollovers), one would expect this group to experience a larger proportional impact than the households analyzed in Figure 10. Indeed, the percentage of households no longer being "at risk" when 2008 values are assumed increases to a range of 9.8 to 13.0 percent. Figure 12 provides similar results for households with both positive IRA balances and positive net housing equity in 2010.

Finally, Figure 13 analyzes households vulnerable to impact on all three fronts (defined contribution plans, IRAs, and net housing equity). In this case the 2010 baseline RRR levels fall to 18.2 percent for Early Boomers and 20.7 percent for Gen Xers. The percentage of households no longer being "at risk" when 2008 values are assumed increases from 10.6 to 14.3 percent.

Based on this analysis, the answer to what percentage of households became "at risk" due to the market value and home value changes between 2008 and 2010 would vary depending on the definition of the population studied by both age cohort and whether they had positive balances in defined contribution plans, IRAs, or positive net housing equity. The resulting percentages of those at risk because of these changes vary from a low of 3.8 percent to a high of 14.3 percent.

Results for Additional Compensation Needed to Eliminate Deficits

Informing policymakers of the percentage of various demographic groups that are likely to be at risk for inadequate retirement income is an extremely valuable exercise. However, when RSPM was constructed in 2003, it was considered to be equally important to structure the simulation model so as to allow assessment of whether those at risk would be able to save additional amounts while they are still working to mitigate these risks—and, if so, how much would be needed.

This portion of the analysis combines simulated retirement income and wealth with simulated retiree expenditures to determine how much each household would need to save today (as percentage of current wages) to maintain a pre-specified "comfort level" (i.e., probability level) that they will be able to afford the simulated expenses for the remainder of the lifetime of the family unit (i.e., death of second spouse in a family).

It is important to note that within each of the groups modeled there will undoubtedly be significant percentages in the zero category[21] (no additional savings needed) as well as those at levels beyond which anyone could reasonably assume more than a minimal number of individuals could possibly save. These situations are accounted for in two ways:

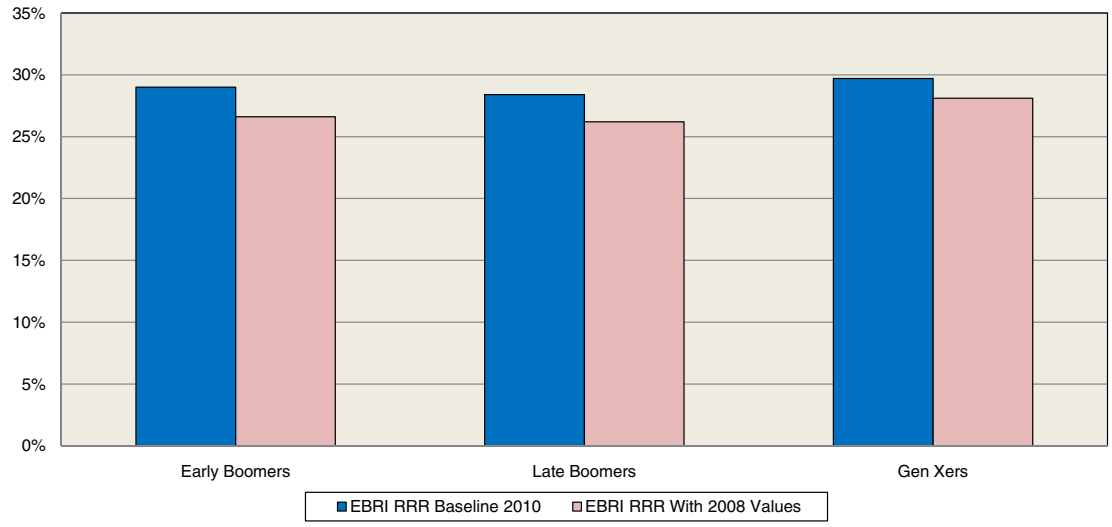
- First, medians and 75th percentiles are reported for each of the groups. In other words, the numbers presented in Figures 14–15 provide a number representing the estimate for the 50th and 75th percentiles when ranked by percentage of compensation.
- Second, the reported values of additional savings are limited to 25 percent of compensation, assuming that few (if any) households would be able to contribute in excess of this percentage on a continuous basis until retirement age.

Figure 8

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity

[This analysis is limited to households that had positive values for all of the following on 1/1/08: **IRA balance**]

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



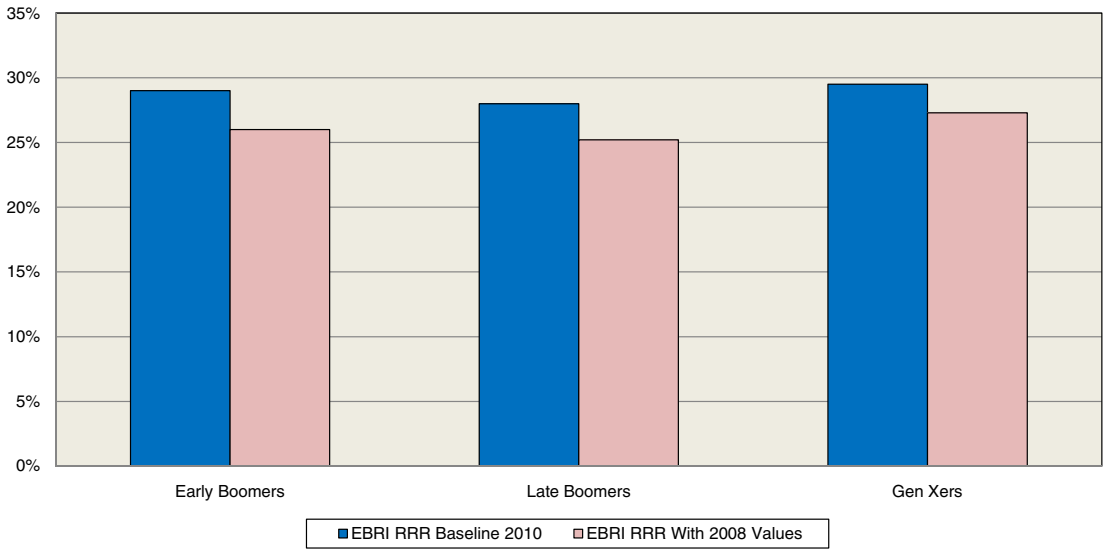
* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

Figure 9

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity

[This analysis is limited to households that had positive values for all of the following on 1/1/08: **Housing equity**]

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



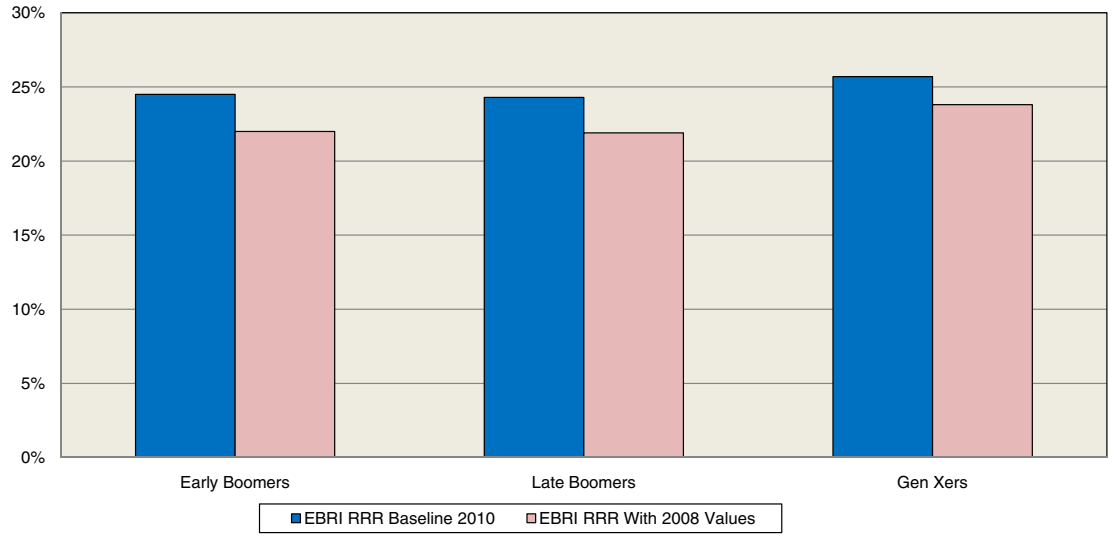
* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

Figure 10

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity

[This analysis is limited to households that had positive values for all of the following on 1/1/08: **Defined contribution plan balance and IRA balance**]

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



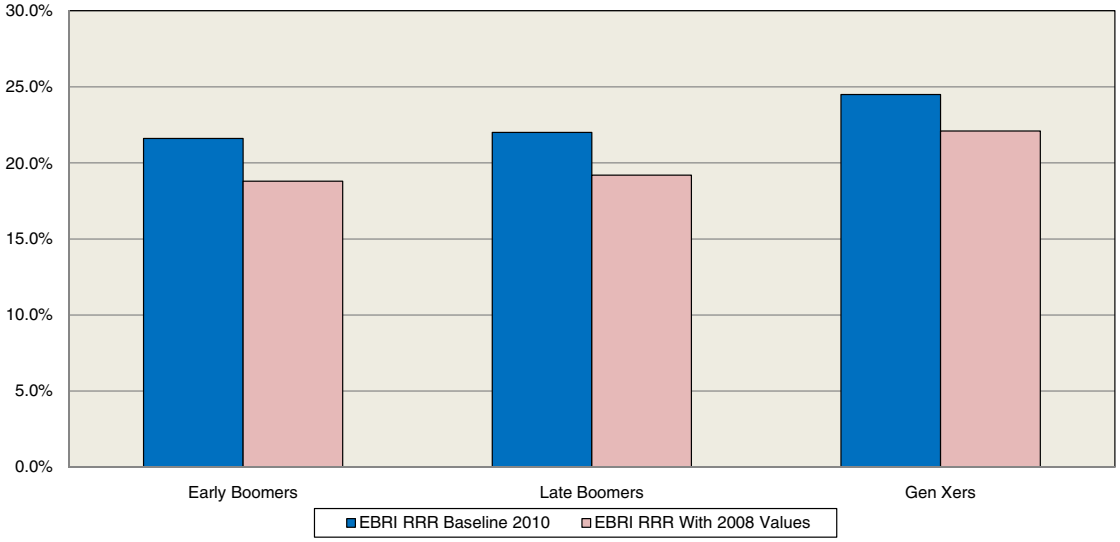
* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

Figure 11

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity

[This analysis is limited to households that had positive values for all of the following on 1/1/08: **Defined contribution plan balance and housing equity**]

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



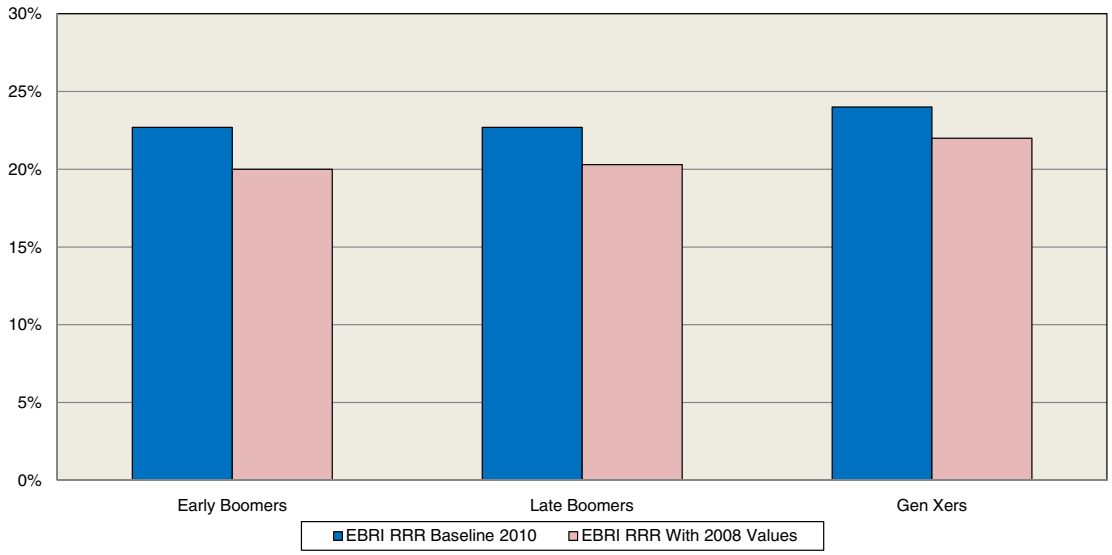
* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

Figure 12

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity

[This analysis is limited to households that had positive values for all of the following on 1/1/08: **IRA balance and housing equity**]

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



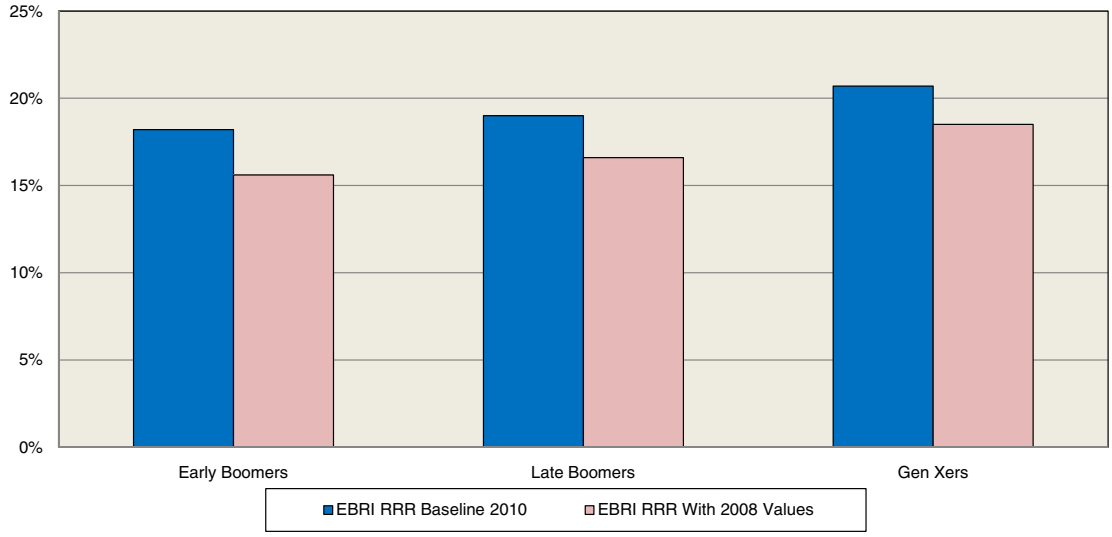
* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

Figure 13

Baseline 2010 EBRI Retirement Readiness Rating™ (RRR) vs. Baseline With 1/1/08 Market Values and Home Equity

[This analysis is limited to households that had positive values for all of the following on 1/1/08: **Defined contribution plan balance, IRA balance and housing equity**]

Percentage of population "at risk" for inadequate retirement income, by age cohort. Baseline assumptions used for all factors with the exception of housing utilization*



* This option assumes the net housing equity is used when other financial resources are exhausted and used as a lump-sum distribution (LSD).
Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

It is also important to note that these percentages merely represent savings that need to be generated *in addition to* what retirement income and/or wealth is simulated by the model. Therefore, if the household is already generating savings for retirement that are not included in defined benefit or defined contribution plans, IRAs, Social Security and/or net housing equity, that value needs to be deducted from the estimated percentages.

After the retirement income and wealth are simulated for each household 1,000 observations are simulated (from retirement age until death of the individual for single males and single females, or the second person to die for families) and the present value of the aggregated deficits is computed at retirement age. Next, the future simulated retirement income accumulated to retirement age is determined, and this information is used to determine the percentage of compensation that would need to be saved to have sufficient additional income to offset the present value of accumulated deficits. At that point, the observations are rank-ordered in terms of the percentages of compensation, and the 50,th 70,th and 90th percentiles of the distribution are determined.

Figure 14 identifies the percentage of additional compensation that must be saved each year until retirement age for a 50, 70, and 90 percent probability of adequate retirement income for all households in the three age cohorts analyzed. Panel A provides the 2010 baselines, while Panel B assumes that January 1, 2008, financial market and housing values are substituted for the January 1, 2010 values. The differences between the two panels are presented in Panel C. Although the median and 75th percentiles in Panel C provide valuable information with respect to how much more households would need to save each year as a result of the financial and housing market declines, the analysis is limited by the large number of groups at various probability levels that are either at the 25-percent-of-compensation cap or need no additional savings. Therefore, Panel D provides similar information for each group after filtering out all households with zero percentages.

Panel D in Figure 14 shows that for those households that would need to save an additional amount (over and above 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, to account for the financial and housing market crisis in 2008 and 2009. This decreases to 0.9 percent for Late Boomers and 0.3 percent for Gen Xers, since they have a longer time to save these additional amounts.

If a 70 percent probability of retirement income adequacy is desired, these numbers will increase correspondingly, and the largest impact will be on those closest to retirement age: The median percentage of additional compensation for Early Boomers desiring a 70 percent probability of retirement income adequacy would be 3.8 percent to account for the financial and housing market crisis in 2008 and 2009. Similar numbers for 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.

The medians presented in Panel D provide a useful way of summarizing the distribution of additional savings required to immunize the households for the financial and housing market crisis in 2008 and 2009. However, by definition, one-half of the households would require even more that that number (the median being the mid-point, half above and half below). The last column of numbers in Panel D provides additional information by showing what additional percentage of compensation would need to be saved each year to ensure that 3 out of 4 households in that age cohort (after filtering out those households with a zero percentage) would be able to achieve the same probability of retirement income adequacy. In virtually all cases, the additional percentage of compensation at least doubles.

Figure 15 provides the same analysis as Figure 14 although limited to only those households that have exposure to the market crisis in 2008 and 2009 from all three fronts (defined contribution plans, IRAs, and net housing equity). Comparing Panel D of Figure 15 with Panel D of Figure 14 shows that both the median and 75th percentiles of the percentages of additional compensation required (after filtering out those households with a zero percentage) increase significantly when the analysis is confined to these groups. In this case, the median percentages for Early Boomers are 5.6 percent of additional compensation for a 50 percent probability, 6.5 percent for a 70 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 of Figure 14 to the more select group in Figure 15.

Summary

The analysis in this report 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 are possible), 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.

Figure 14

Percentage of Additional Compensation That Must Be Saved Each Year Until Retirement Age for a Specified Probability of "Adequate" Retirement Income, by Age Cohort and Age-Specific Salary Quartiles

All Households

Panel A: Baseline*

		Lowest Income		Second Lowest		Third Lowest		Highest Income		Combined	
Probability	Age Cohort	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl
50%	Early Boomers	cap	cap	0.0%	15.9%	0.0%	0.0%	0.0%	0.0%	0.0%	3.5%
50%	Late Boomers	9.0%	cap	0.0%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
50%	Gen Xers	5.1%	16.5%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Early Boomers	cap	cap	12.7%	cap	0.0%	13.7%	0.0%	0.0%	0.0%	27.7%
70%	Late Boomers	cap	cap	3.4%	13.4%	0.0%	2.4%	0.0%	0.0%	0.0%	8.0%
70%	Gen Xers	16.9%	cap	1.7%	5.4%	0.0%	1.1%	0.0%	0.0%	0.0%	2.9%
90%	Early Boomers	cap	cap	cap	cap	10.6%	cap	0.0%	2.8%	13.3%	cap
90%	Late Boomers	cap	cap	13.2%	24.0%	2.2%	7.8%	0.0%	0.6%	3.7%	17.8%
90%	Gen Xers	cap	cap	5.6%	9.4%	1.3%	2.9%	0.0%	0.7%	1.6%	6.7%

Panel B: Baseline* Assuming 1/1/08 Market Values and Home Equity

		Lowest Income		Second Lowest		Third Lowest		Highest Inome		Combined	
Probability	Age Cohort	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl
50%	Early Boomers	cap	cap	0.0%	12.3%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%
50%	Late Boomers	7.3%	cap	0.0%	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50%	Gen Xers	4.4%	16.3%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Early Boomers	cap	cap	7.2%	cap	0.0%	9.6%	0.0%	0.0%	0.0%	23.5%
70%	Late Boomers	cap	cap	1.5%	12.3%	0.0%	1.1%	0.0%	0.0%	0.0%	6.6%
70%	Gen Xers	16.7%	cap	1.2%	5.2%	0.0%	0.8%	0.0%	0.0%	0.0%	2.5%
90%	Early Boomers	cap	cap	cap	78.0%	5.8%	cap	0.0%	0.0%	9.0%	cap
90%	Late Boomers	cap	cap	12.0%	22.7%	0.6%	7.0%	0.0%	0.0%	2.6%	16.5%
90%	Gen Xers	cap	cap	5.2%	9.1%	1.0%	2.7%	0.0%	0.5%	1.4%	6.3%

Panel C: Differences Between Panel A and Panel B

		Lowest Income		Second Lowest		Third Lowest		Highest Inome		Combined	
Probability	Age Cohort	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl
50%	Early Boomers	cap	cap	0.0%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%
50%	Late Boomers	1.7%	cap	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%
50%	Gen Xers	0.7%	0.2%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Early Boomers	cap	cap	5.5%	cap	0.0%	4.1%	0.0%	0.0%	0.0%	4.2%
70%	Late Boomers	cap	cap	1.9%	1.1%	0.0%	1.3%	0.0%	0.0%	0.0%	1.4%
70%	Gen Xers	0.2%	cap	0.6%	0.3%	0.0%	0.3%	0.0%	0.0%	0.0%	0.4%
90%	Early Boomers	cap	cap	cap	cap	4.8%	cap	0.0%	2.8%	4.3%	cap
90%	Late Boomers	cap	cap	1.2%	1.3%	1.6%	0.9%	0.0%	0.6%	1.1%	1.3%
90%	Gen Xers	cap	cap	0.3%	0.3%	0.3%	0.2%	0.0%	0.1%	0.2%	0.4%

Panel D: Additional Amount Needed to be Saved Each Year as a Result of the Decline in Market and Home Values

		Conditional Percentiles*	
Probability	Age Cohort	Median	75th Pctl
50%	Early Boomers	3.0%	6.8%
50%	Late Boomers	0.9%	2.2%
50%	Gen Xers	0.3%	0.6%
70%	Early Boomers	3.8%	7.8%
70%	Late Boomers	1.1%	2.5%
70%	Gen Xers	0.3%	0.7%
90%	Early Boomers	4.3%	8.5%
90%	Late Boomers	1.2%	2.7%
90%	Gen Xers	0.3%	0.7%

Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.

* The conditional percentiles represent the median or 75th percentile from the distribution of pairwise differences in simulated additional percentages of compensation required after filtering out all households with zero percentages.

Figure 15

Percentage of Additional Compensation That Must Be Saved Each Year Until Retirement Age for a Specified Probability of "Adequate" Retirement Income, by Age Cohort and Age-Specific Salary Quartiles

Households That Had Positive Values for II of the Following on 1/1/08:
Defined Contribution Plan Balance, IRA Balance and Housing Equity

Panel A: Baseline*

		Lowest Income		Second Lowest		Third Lowest		Highest Inome		Combined	
Probability	Age Cohort	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl
50%	Early Boomers	0.0%	cap	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50%	Late Boomers	0.3%	cap	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50%	Gen Xers	0.9%	10.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Early Boomers	cap	cap	0.0%	19.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Late Boomers	22.5%	cap	0.0%	5.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Gen Xers	13.3%	23.5%	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
90%	Early Boomers	cap	cap	20.0%	cap	0.0%	11.7%	0.0%	0.0%	0.0%	21.4%
90%	Late Boomers	cap	cap	7.6%	17.7%	0.0%	3.2%	0.0%	0.0%	0.0%	8.5%
90%	Gen Xers	21.6%	cap	4.0%	7.0%	0.0%	1.8%	0.0%	0.0%	0.0%	3.0%

Panel B: Baseline* Assuming 1/1/08 Market Values and Home Equity

		Lowest Income		Second Lowest		Third Lowest		Highest Inome		Combined	
Probability	Age Cohort	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl
50%	Early Boomers	0.0%	cap	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50%	Late Boomers	0.0%	22.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50%	Gen Xers	0.6%	10.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Early Boomers	cap	cap	0.0%	9.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Late Boomers	22.0%	cap	0.0%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Gen Xers	13.0%	22.2%	0.0%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
90%	Early Boomers	cap	cap	10.8%	cap	0.0%	5.6%	0.0%	0.0%	0.0%	13.9%
90%	Late Boomers	cap	cap	5.6%	15.6%	0.0%	1.0%	0.0%	0.0%	0.0%	6.4%
90%	Gen Xers	21.3%	cap	3.5%	6.5%	0.0%	1.6%	0.0%	0.0%	0.0%	2.5%

Panel C: Differences Between Panel A and Panel B

		Lowest Income		Second Lowest		Third Lowest		Highest Inome		Combined	
Probability	Age Cohort	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl	Median	75th Pctl
50%	Early Boomers	0.0%	cap	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50%	Late Boomers	0.3%	cap	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
50%	Gen Xers	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Early Boomers	cap	cap	0.0%	9.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Late Boomers	0.5%	cap	0.0%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
70%	Gen Xers	0.3%	1.3%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
90%	Early Boomers	cap	cap	9.2%	cap	0.0%	6.1%	0.0%	0.0%	0.0%	7.5%
90%	Late Boomers	cap	cap	2.0%	2.1%	0.0%	2.2%	0.0%	0.0%	0.0%	2.1%
90%	Gen Xers	0.3%	cap	0.5%	0.6%	0.0%	0.3%	0.0%	0.0%	0.0%	0.5%

Panel D: Additional Amount Needed to Be Saved Each Year as a Result of the Decline in Market and Home Values

		Conditional Percentiles*	
Probability	Age Cohort	Median	75th Pctl
50%	Early Boomers	5.6%	10.6%
50%	Late Boomers	2.1%	4.2%
50%	Gen Xers	0.5%	1.0%
70%	Early Boomers	6.5%	11.5%
70%	Late Boomers	2.0%	4.0%
70%	Gen Xers	0.6%	1.1%
90%	Early Boomers	6.7%	12.3%
90%	Late Boomers	2.0%	4.1%
90%	Gen Xers	0.5%	0.9%

Source: EBRI Retirement Security Projection Model™ versions 100825e and 100824e.
* The conditional percentiles represents the median or 75th percentile from the distribution of pairwise differences in simulated additional percentages of compensation required after filtering out all households with zero percentages.

Appendix[22]

Brief Chronology of RSPM

The original version of Retirement Security Projection Model® (RSPM) was used to analyze the future economic well-being of the retired population at the state level. The Employee Benefit Research Institute and the Milbank Memorial Fund, working with the governor of Oregon, set out to see if this situation could be addressed for Oregon. The analysis[23] 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 is to have adequate resources in retirement.

Subsequent to the release of the Oregon study, it was decided that the approach could be carried 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,[24] and the results of the Massachusetts study were presented on Dec. 1, 2002.[25] 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, as well as the Retirement Readiness Ratings produced by it, 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.[26] The basic model was then modified for Senate Aging testimony in 2004 to quantify the beneficial impact of a mandatory contribution of 5 percent of compensation.[27]

The first major modification of the model occurred for 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.[28]

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.[29] Later that year, an updated version of the model was developed to enhance the EBRI interactive Ballpark E$timate® worksheet by providing Monte Carlo simulations of the necessary replacement rates needed for specific probabilities of retirement income adequacy under alternative risk management treatments.[30]

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.[31] 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 defined contribution employer contributions provided as a quid pro quo.[32]

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.[33] Most recently, the model was completely reparameterized with 401(k) plan design parameters for sponsors that have adopted automatic enrollment provisions.[34]

RSPM was completely updated for the May 2010 EBRI policy forum. This included an update of all assumptions for financial and housing markets as well as a major revision with respect to retirement plan design, especially with respect to automatic enrollment features for 401(k) plans. The July 2010 *EBRI Issue Brief*[35] added several new analyses suggested by discussants during the policy forum, including sensitivity of the "at-risk" percentages to the threshold chosen for adequacy and the number of years until those simulated to be "at risk" would run short of money.

References

AARP*, Retirement Security or Insecurity? The Experience of Workers Aged 45 and Older* (October 2008).

Copeland, Craig, and Jack VanDerhei. "The Declining Role of Private Defined Benefit Pension Plans: Who Is Affected, and How." Restructuring Retirement Risk Management in a Defined Contribution World. Oxford University Press (forthcoming).

Helman, Ruth, Craig Copeland, and Jack VanDerhei. "The 2010 Retirement Confidence Survey: Confidence Stabilizing but Preparations Continue to Erode." *EBRI Issue Brief,* no. 340 (Employee Benefit Research Institute, March 2010).

_____. "The 2009 Retirement Confidence Survey: Economy Drives Confidence to Record Lows; Many Looking to Work Longer." *EBRI Issue Brief,* no. 328 (Employee Benefit Research Institute, April 2009).

Holden, Sarah, and Jack VanDerhei. "The Influence of Automatic Enrollment, Catch-Up, and IRA Contributions on 401(k) Accumulations at Retirement." *EBRI Issue Brief,* no. 283 (Employee Benefits Research Institute, July 2005).

Ippolito, Richard A. *Pension Plans and Employee Performance: Evidence, Analysis, and Policy.* Chicago: University of Chicago, 1997.

McDonnell, Ken. "Income of the Elderly Population Age 65 and Over, 2008." *EBRI Notes***,** no. 6 (Employee Benefit Research Institute, June 2010): 2–7.

Munnell, Alicia H., Anthony Webb, and Francesca Golub-Sass. "The National Retirement Risk Index: After The Crash." *Issue In Brief,* 9–22. Chestnut Hill, MA: Center for Retirement Research at Boston College, October 2009.

Munnell, Alicia H., Mauricio Soto, Anthony Webb, Francesca Golub-Sass, and Dan Muldoon. "Health Care Costs Drive up the National Retirement Risk Index." *Issue in Brief,* 8–3. Chestnut Hill, MA: Center for Retirement Research at Boston College, February 2008.

Munnell, Alicia H., Anthony Webb, Francesca Golub-Sass, and Dan Muldoon. "Long-Term Care Costs and the National Retirement Risk Index." *Issue In Brief,* 9–7. Chestnut Hill, MA: Center for Retirement Research at Boston College, March 2009.

Park, Youngkyun. "Plan Demographics, Participants' Saving Behavior, and Target-Date Fund Investments." *EBRI Issue Brief,* no. 329 (Employee Benefit Research Institute, May 2009).

Ryan, Paul D. *A Roadmap for America's Future, Version 2.0, A Plan to Solve America's Long-Term Economic and Fiscal Crisis.* Committee on the Budget, January 2010.

VanDerhei, Jack. Testimony for the U.S. Senate Special Committee on Aging Hearing on Retirement Planning: "Do We Have a Crisis in America? Results From the EBRI-ERF Retirement Security Projection Model." Jan. 27, 2004 (T-141).

_____. "Measuring Retirement Income Adequacy, Part One: Traditional Replacement Ratios and Results for Workers at Large Companies." *EBRI Notes*, no. 9 (Employee Benefit Research Institute, September 2004): 2–12.

_____. *Projections of Future Retirement Income Security: Impact of Long- Term Care Insurance.* American Society on Aging/National Council on Aging joint conference, March 2005.

_____. "Defined Benefit Plan Freezes: Who's Affected, How Much, and Replacing Lost Accruals." *EBRI Issue Brief,* no. 291 (Employee Benefit Research Institute, March 2006).

_____. "Measuring Retirement Income Adequacy: Calculating Realistic Income Replacement Rates." *EBRI Issue Brief,* no. 297 (Employee Benefit Research Institute, September 2006).

_____. "Retirement Income Adequacy After PPA and FAS 158: Part One: Plan Sponsors' Reactions." *EBRI Issue Brief,* no. 307 (Employee Benefit Research Institute, July 2007).

_____. "The Expected Impact of Automatic Escalation of 401(k) Contributions on Retirement Income." *EBRI Notes,* no. 9 (Employee Benefit Research Institute, September 2007): 1–8.

_____. *How Would Target-Date Funds Likely Impact Future 401(k) Contributions.* Testimony before the joint DOL/SEC Hearing, Target Date Fund Public Hearing. June 2009.

_____. "The Impact of Automatic Enrollment in 401(k) Plans on Future Retirement Accumulations: A Simulation Study Based on Plan Design Modifications of Large Plan Sponsors." *EBRI Issue Brief,* no. 341 (Employee Benefit Research Institute, April 2010).

VanDerhei, Jack, and Craig Copeland. *Oregon Future Retirement Income Assessment Project. A project of the EBRI Education and Research Fund and the Milbank Memorial Fund, 2001.*

_____. *Kansas Future Retirement Income Assessment Project. A project of the EBRI Education and Research Fund and the Milbank Memorial Fund,* July 16, 2002.

_____. *Massachusetts Future Retirement Income Assessment Project. A project of the EBRI Education and Research Fund and the Milbank Memorial Fund,* December 1, 2002.

_____. "Can America Afford Tomorrow's Retirees: Results From the EBRI-ERF Retirement Security Projection Model." *EBRI Issue Brief,* no. 263 (Employee Benefit Research Institute, November 2003).

_____. "ERISA At 30: The Decline of Private-Sector Defined Benefit Promises and Annuity Payments: What Will It Mean?" *EBRI Issue Brief,* no. 269 (Employee Benefit Research Institute, May 2004).

_____. "The Impact of PPA on Retirement Income for 401(k) Participants." *EBRI Issue Brief,* no. 318 (Employee Benefit Research Institute, June 2008).

_____. "The EBRI Retirement Readiness Rating:™ Retirement Income Preparation and Future Prospects." *EBRI Issue Brief, no. 344* (July 2010).

VanDerhei, Jack, Sarah Holden, and Louis Alonso. "401(k) Plan Asset Allocation, Account Balances, and Loan Activity in 2008." *EBRI Issue Brief,* no. 335, and *ICI Perspective,* Vol. 15, no. 2 (Employee Benefit Research Institute and Investment Company Institute, October 2009).

Vanguard. *The Aftermath: Investor Attitudes in the Wake of the 2008-2009 Market Decline* (October 2009).

Endnotes

[1] Helman, Copeland, and VanDerhei (2010) show the percentage of workers reporting they postponed their expected retirement age in past 12 months (the poor economy and the need to make up for losses in the stock market among the reasons given). Helman, Copeland and VanDerhei (2009) analyzes the percentage of workers reporting a financial occurrence contributed to their loss of confidence and finds almost two-thirds of workers delaying their retirement age (63 percent) say that this change occurred after September 2008. AARP (2008) conducted a survey in September 2008 to understand how recent changes in the economy have affected the financial security of workers who are at least 45 years old, including their preparations for retirement. Vanguard (2009) conducted a survey in May/June 2009 and found that one-third of respondents strongly or somewhat agreed with the statement that their retirement had been impaired by the market decline. These are individuals who are within 10 years of retirement, who have experienced job loss or mortgage/foreclosure troubles, or who have experienced a combination of these factors. But low-wealth households and high-wealth households are less likely to feel their retirement has been impaired compared with less affluent respondents.

[2] The authors estimate a total increase in the "at risk" percentage of households from 2007 to 2009 of 6.7 percentage points. They decompose that into a 4.9 percentage point increase from "housing decline," a 1.7 percentage point increase from "stock decline," and the remainder attributable to lower annuity rates, rising full retirement age and, reverse mortgages.

[3] See VanDerhei (September 2004) for a description of the various approaches to benchmarking retirement income needs.

[4] For a description of the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project, see VanDerhei, Holden, and Alonso (2009).

[5] The coding of the RSPM model also allows analysis of a wide variety of potential policy changes. That capacity is illustrated in VanDerhei and Copeland (2010) by analyzing generic proposals to:

- Reduce Social Security benefits in 2037.
- Reduce the value of Medicare benefits for retirees with incomes above stipulated thresholds.
- Impose a mandatory individual account add-on to Social Security, amounting to 3 percent of compensation.

[6] The nominal cost of these expenditures increases with component-specific inflation assumptions. See the appendix to VanDerhei and Copeland (2010) for more details.

[7] See VanDerhei and Copeland (2010) for more detail.

[8] Net housing equity is introduced into the model in three different mechanisms (explained below).

[9] 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.

[10] Roth IRA and 401(k) accounts are not used in this version of the model, but will be incorporated in a forthcoming EBRI publication.

[11] Capital gains treatment is not used in this version of the model.

[12] This allows simulations for those currently ages 36–62 in 2010. In previous work with this model (VanDerhei and Copeland, 2003), workers between the ages of 38 and 62 in 2003 were simulated.

[13] The nominal cost of these expenditures increases with component-specific inflation assumptions. See the appendix to VanDerhei and Copeland (2010) for more details.

[14] The NRRI projects replacement rates for each member of the SCF sample of households and compares the projection with a target replacement rate that would allow the household to "maintain its preretirement standard of living in retirement." Households whose projected replacement rates fall more than 10 percent below the target are denoted as being "at risk" of having insufficient income to meet this standard.

[15] One likely difference deals with the asset allocation of investments in defined contribution plans. VanDerhei (June 2009) conducts simulations using RSPM showing the improvement in terms of risk and return for large cohorts of 401(k) participants when target-date fund (TDF) asset allocations (simulations are run for average, conservative, and aggressive TDF asset allocations) are substituted for participant-directed investments. In contrast, the NRRI methodology is based on historical data over a time period that largely excludes any potential beneficial impact from this trend. Another difference that remains to be quantified is the assessment of defined benefit accruals. Whereas NRRI is based on SCF data that have the survey respondents assess what their eventual defined benefit payouts will be, RSPM bases the defined benefit accruals on a time series of defined benefit plan type and generosity parameters coded from, inter alia, summary plan description-type information on more than 1,000 large salaried defined benefit plans per year.

[16] Munnell, Webb, and Golub-Sass (2009).

[17] See VanDerhei (July 2007) for details on the EBRI/Mercer survey of defined benefit sponsors to gauge their recent activity as well as planned modifications with respect to both defined benefit and defined contribution plan design.

[18] EBRI has modeled the likely cost/benefit impact of purchasing long-term care insurance on retirement income adequacy. VanDerhei (2005) demonstrated that this purchase appears to be quite favorable for those in the second and third income quartile who desire more than a 50 percent chance of adequacy, whereas those in the lowest-income quartile often have the ability to satisfy the financial thresholds necessary to be covered by Medicaid and those in the fourth quartile will sometimes find self-insurance a more efficient method of dealing with this risk.

[19] Preretirement income in RSPM is determined in a manner similar to the average indexed monthly earnings computation for Social Security with the following modifications:

- All earned income is included up to the age of retirement (i.e., there is no maximum taxable wage base constraint and the calculation terminates at retirement age).
- Instead of indexing for changes in average national wages, the model indexes are based on assumed after-tax rate of return based on asset allocations that are a function of the individual's age in each year.
- Percentile distributions are then established based on population statistics for each five-year age cohort. Whereas households are split into three income groups in Figure 2 to allow a direct comparison with the NRRI results, the remainder of this report presents these results as quartiles to provide more useful results.

[20] The analysis in this report can be viewed as a worst-case scenario given this baseline. If either of the other two scenarios were modeled (the previous baseline in which case no utilization of net housing equity is assumed or the so-called RAM option in which all households are assumed to liquidate the net housing equity at retirement age and annuitize it), the impact of the housing market decline would be either zero or a reduced value.

[21] This does not mean they have already saved enough for retirement income adequacy at the specified level. Instead, it means that their current resources PLUS the additional retirement wealth that will be accumulated under the expected benefits from employee savings, employer-provided benefits, Social Security, and (in some cases) net housing equity would be sufficient.

[22] For a detailed discussion of the assumptions used in the model, see the appendix of VanDerhei and Copeland (2010).

[23] VanDerhei and Copeland (2001).

[24] VanDerhei and Copeland (July 2002).

[25] VanDerhei and Copeland (December 2002).

[26] VanDerhei and Copeland (2003).

[27] VanDerhei (January 2004).

[28] VanDerhei (2005).

[29] VanDerhei (March 2006).

[30] VanDerhei (September 2006)

[31] VanDerhei and Copeland (2008).

[32] Copeland and VanDerhei (forthcoming).

[33] VanDerhei (2009).

[34] VanDerhei (2010).

[35] VanDerhei and Copeland (2010).

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