

## **ERISA At 30: The Decline of Private-Sector Defined Benefit Promises and Annuity Payments? What Will It Mean?**

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- This analysis uses variants of the EBRI-ERF Retirement Income Projection Model (RIPM) and Retirement Security Projection Model® (RSPM®) to provide quantitative assessments of the future financial security implications of a move away from defined benefit promises and from annuity payments (“traditional” employer-provided pensions).
- The analysis provides preliminary results on the impact of benefit accrual freezes for pension plans, modifications to cash balance plans, lump-sum distributions of retirement benefits, and payment of retirement accumulations as life annuities. Major findings include:
  - ▶ *Freezing benefit accruals* for all private defined benefit plans beginning in 2005 would have a larger impact (as measured in terms of average real dollar decrease in first year surplus) on younger cohorts. The average annual decrease for those in the youngest cohort modeled (born between 1961 and 1965, inclusive, or those currently between ages 39 and 43) would be \$4,886 for families, \$2,752 for single males, and \$1,686 for single females (Figure 3).
  - ▶ *Terminating* all cash balance plans without a replacement plan in 2005 has a smaller impact than the benefit accruals freeze, since a much smaller percentage of participants would be affected (Figure 6).
  - ▶ The last two sensitivity analyses tested the value of annuitization and therefore needed to simulate a significant number of future life-paths to capture the longevity risk experienced by retirees. The output metric used was the median percentage of additional compensation that must be saved annually until retirement for a 75 percent chance of covering simulated expenses.
  - ▶ If one assumes that all defined benefit participants take lump-sum distributions at retirement, the average annual increase in needed savings is 14.9 percent (Figure 7), whereas assuming that all individual accounts are annuitized at retirement has an impact twice as large—but in the opposite direction (a 30.0 percent decrease in additional annual savings, Figure 8).
- Policymakers should take action sooner rather than later in order to create greater regulatory certainty for plan sponsors. Decisions are needed on the status of cash balance pension plans, permanent funding rules, and interest rates to be used in plan calculations, accounting treatment related to using smoothing versus mark-to-market for investment returns and interest rates, and rules and premiums under Title IV of ERISA and the Pension Benefit Guaranty Corporation. Until these kinds of policy decisions are made, further erosion of the defined benefit system can be expected to continue. While the decisions made could either slow or speed that erosion, they would at least create an environment in which individuals could better assess what they are likely to have as retirement assets and income, and plan to continue working, or to exit the work force, accordingly. A demographic time bomb is ticking, and the time to act is now.

Jack VanDerhei, Temple University and EBRI Fellow, and Craig Copeland of EBRI wrote this *Issue Brief* 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

Between 1975, when ERISA became effective, and 2003, the number of private defined benefit pension plans, as reported by the Pension Benefit Guaranty Corporation (PBGC), has declined from more than 100,000 to less than 31,000 (the most recent Form 5500 data from the U.S. Department of Labor and the Internal Revenue Service, which are for 1998, show 56,405 defined benefit plans). PBGC has announced many plan terminations thus far in 2004, and several consulting firm surveys have reported a high number of employer decisions to freeze their defined benefit plans so that added benefits are not earned under the plans. These surveys also indicate other actions that close plans to new entrants, change benefit formulas, or otherwise reduce the scope and cost of the plans. There has recently been considerable concern that the large plan market may be susceptible to a number of external changes that threaten to seriously further diminish the number of future retirees who will have private-sector defined benefit promises as well as defined benefit participants who will receive those benefits in the form of annuities.

In March of this year, the Committee on Investment of Employee Benefit Assets (CIEBA) released *The U.S. Pension Crisis: Evaluation and Analysis of Emerging Defined Benefit Pension Issues*. It identifies several “missiles” that appear to be aimed at the private defined benefit system, including, inter alia:<sup>1</sup>

- A reversal of previous Financial Accounting Standards Board (FASB) accounting treatment (discussed below) allowing realized and unrealized capital gains to be “smoothed” over time and therefore providing at least partial insulation to the income statements of plan sponsors.
- A modification of the current variable-rate premium system for PBGC that emphasizes (perhaps exclusively) the equity exposure in the pension asset portfolio.
- Broad adoption of S&P’s redefinition of core earnings.

In addition, the publication includes a frightening survey finding: Approximately one-half of corporations are likely to seriously consider reducing pension benefits if these initiatives are adopted.<sup>2</sup> Similar results were released in April in a large-employer survey by Deloitte Consulting LLP, which found that 52 percent of the companies polled either are considering changes or have already made changes to their defined benefit plans in the past year. The Deloitte report said: “Buffeted by increased costs due to falling interest rates and investment returns and by continued pressure from financial analysts to limit future risk, more companies are opting to move away from defined benefit plans.”<sup>3</sup>

The primary purpose of this *Issue Brief* is to use variants of the EBRI-ERF Retirement Income Projection Model (RIPM) and the Retirement Security Projection Model<sup>®</sup> (RSPM<sup>®</sup>) to provide quantitative assessments of the future financial security implications of various types of moves away from defined benefit promises and from annuity payments (“traditional” employer-provided pensions). The analysis provides preliminary results on the following modifications to the plan system and to public policy on the use of the assets in tax-favored savings arrangements:

- Benefit accrual freezes for defined benefit plans.
- Modification to cash balance plans (both increases in conversions of traditional final average plans and elimination of existing plans).
- Lump-sum distributions (assuming that they are offered to all defined benefit plan participants at retirement and that they are always chosen).
- Payment of all accumulations as life annuities from all qualified plans and individual retirement accounts (IRAs).

This *Issue Brief* begins with an overview of the private defined benefit plan system, with an emphasis on the various types of retirement income risk that exist and whether they are addressed (and if so, how effectively) by various plan designs. The focus then turns to issues concerning sponsoring, funding, and providing benefits to participants under the private defined benefit system. Pension accounting and its potential impact on the plan sponsor's income statement is described first, followed by the minimum funding requirements for qualified defined benefit plans. Cash balance plans are treated next and the available empirical evidence regarding their potential impact on plan participants is reviewed. This is followed by the sensitivity analysis using the EBRI-ERF models and some concluding remarks.

## *An Overview of the Private Defined Benefit Pension Plan System*<sup>4</sup>

### **Introduction**

A defined benefit (DB) plan is a retirement plan in which benefits are calculated according to a formula or rule. Formulas are more common and are usually based on either years of service and a percentage of pay or a negotiated flat-dollar amount (Allen et al., 1997). Benefit levels, as determined by the formula used, are guaranteed as a stated retirement income commencing at a specified age. Although retirement benefits are usually expressed as a life annuity,<sup>5</sup> lump-sum distributions are increasingly available. While DB plans are always designed as retirement vehicles, certain defined contribution (DC) plan types (such as 401(k)s) and designs have features that resemble capital accumulation plans (i.e., plans used for savings, not necessarily for retirement). Traditionally, DB and DC plans have different features associated with each. For example, DB plans usually pay benefits in the form of life annuities, whereas DC plans typically pay lump sums. However, one fundamental difference between DB and DC plans exists: Under a DB plan, a formula guarantees the *final benefit level* provided by the employer; in a DC plan, a formula stipulates how *funds are allocated* to individual accounts, and does not guarantee any final benefit.<sup>6</sup> Employers have significant leeway to design individual plans tailored to their specific objectives. Recently, an increasing number of employers have used this leeway to combine traditional DB plan features with features usually associated with traditional DC plans, and vice versa (many of these arrangements, called "hybrid plans," include so-called "cash balance" plans, which are discussed later). As a result, the difference between DB and DC plans is becoming more nebulous.

### *Benefit Calculation and Plan Funding*

When establishing a DB plan, employers usually choose between flat benefits and pay-related benefits. A *flat benefit formula* bases benefits on a flat-dollar amount for each year of service recognized under the plan (e.g., \$400 in annual retirement multiplied by years of service).<sup>7</sup> Pay-related benefits can be divided into two variations, based on the definition of pay. *Career-average formulas* define pay as all earnings during plan participation in order to calculate benefits. *Final-average formulas* define pay as only those earnings received during an averaging period just prior to retirement. *Career-average formulas* have two variations. Final retirement benefits can equal either: (a) the sum of a percentage of salary earned each year recognized by the plan (e.g., the sum of 2 percent of annual pay for each year of service) or (b) the average of all annual salaries recognized by the plan, multiplied by a percentage (e.g., \$30,000 in average pay multiplied by 50 percent).<sup>8</sup> DB plans typically retain an actuary to annually assess plan obligations based on the plan's specified formula and to determine the amounts the plan sponsor should place in the pension fund in order to comply with funding requirements (these amounts are based on the selected actuarial valuation method and appropriate actuarial assumptions). The plan sponsor is then ultimately responsible for making required contributions as well as ensuring that the fund's assets are invested and benefits are

paid; however, these responsibilities are often delegated to third parties. Although it is uncommon, private-sector workers may have the option of contributing to the DB plan as well, but their contributions are not given tax-favored status.<sup>9</sup>

#### Retirement Income Risk

There are many risks associated with participants' assets in retirement savings vehicles:<sup>10</sup>

1. Replacement rate inadequacy.
2. Longevity.
3. Investment risk.
4. Inflation risk.
5. Private plan sponsor bankruptcy risk (for DB plan benefits in excess of PBGC-covered maximums).

**Replacement rate inadequacy risk** deals with the possibility that the combination of Social Security, employment-based retirement income, and individual savings will be insufficient to maintain the same standard of living a preretiree enjoyed when he or she retires. While in the past this risk could be caused by financial instability of an employer sponsoring a private pension plan, today PBGC will pay benefits (subject to prescribed limits) for most private DB plans<sup>11</sup> whose sponsors are unable to meet plan obligations due to bankruptcy. As a result, plan sponsor bankruptcy risk among private plans today is limited to the risk of losing benefits above the amounts guaranteed by the PBGC, should the employer go bankrupt.

The second risk—**longevity risk**—can be defined in several ways. One definition (Bodie, 1990) defines it as the risk that the retiree will outlive the amount saved for retirement. A primary rationale for paying retirement plan benefits in the form of life annuities is to insure against this risk. Hence, this risk can be insured against through either the DB or DC approach only if benefits are paid in the form of an annuity or if participants effectively self-annuitize.<sup>12</sup>

The third risk—**investment risk**—is a relatively straightforward (albeit often misunderstood) concept. While many equate this term with variation in retirement benefits resulting from fluctuations in the financial markets, investment risk may also refer to the risk that investments will underperform the rate of return needed for sufficient retirement income. Indeed, underperformance may arise from downside fluctuations in financial markets, but it also stems from investing in low-risk assets that do not earn adequate return rates. While a DB plan offers no direct investment risk to participants,<sup>13</sup> the amount of this risk participants are exposed to under a DC approach is often misunderstood. Many assume that DC investments are risky because asset allocation choices may be subject to wide market fluctuations. However, many DC plan sponsors provide guaranteed investment contracts (GICs) and/or stable value funds as investment options, which provide some degree of assurance that participants' investments will not decline in value. While many might assume that these options entail no investment risk for participants because the principal will typically not decline by more than a de minimis amount, choosing such investments may entail investment risk if the rate of return on these investments is lower than that needed to grow a sufficient retirement nest egg.

The fourth risk—**inflation risk**—can typically be directly addressed only by the plan sponsor in DB plans, and is perhaps the most difficult to deal with in the private sector. Social Security and many of the public DB pension plans have the perceived resources to commit to some type of guarantee that inflation's impact on the purchasing power of this component of retirement income will be mitigated.<sup>14</sup> However, private sponsors generally have not been able to cope with this problem other than to hold out the possibility of providing ad hoc increases in pension payments on a somewhat periodic basis.<sup>15</sup>

## Issues Concerning Sponsoring, Funding, and Providing Benefits to Participants and Beneficiaries Under This System

### Employers' Accounting For Pensions

Employers must recognize the economic value of future promises in their financial statements. Income statement accounting affects reported earnings, and this affects profitability and the value of the company. Balance sheet accounting affects the employer's liability and assets, thus the net worth of the enterprise and its ability to borrow money. In short, accounting for benefit promises as they are earned, rather than only when they are paid (or when the contributions are made), has significant economic implications and implications for an employer's decision on whether or not to provide defined benefit plans.

Accounting procedures for pension plans consist of three components, each of which is controlled by a separate Financial Accounting Standards Board (FASB) Statement. FASB Statement No. 35, *Accounting and Reporting by Defined Benefit Pension Plans*, establishes financial accounting and reporting standards for the annual financial statement of a defined benefit pension plan. FASB Statement No. 87, *Employers' Accounting for Pensions* (FAS 87) establishes financial reporting and accounting standards for an employer that offers pension benefits to its employees. Closely related to FAS 87, FASB Statement No. 88, *Employer's Accounting for Settlements and Curtailment of Defined Benefit Pension Plans and for Termination Benefits*, establishes standards for an employer's accounting for settlement of defined benefit pension obligations (such as purchasing annuities for retirees), for curtailment of a defined benefit pension plan (e.g., closing of a plant), and for termination benefits.

While the impact of the statements has come under considerable criticism in the financial press recently as the bear market caused increasing skepticism with respect to the reported numbers, it is important to realize that FASB's objectives when the rules were designed in the 1980s was to inject into pension accounting a way to more meaningfully measure pension expense and to introduce balance sheet items (including footnotes) helpful to financial statement readers.<sup>16</sup> The overall impact of the rules varied among employers depending on plan design, the age of the work force, actuarial assumptions, and the plan's financial status at the time of transition to the new rules. Nevertheless, it is safe to say that the latitude for management discretion in pension accounting was greatly reduced by the FASB rules. The sponsor is no longer able to choose an actuarial cost method that provides the desired stream of pension expense over time<sup>17</sup> and the range of acceptable discount rates for determining the present value of pension obligations was implicitly narrowed.

It appears that a current concern with respect to FAS 87 is its lack of transparency for at least some investors.<sup>18</sup> In an attempt to improve investor understanding of corporate earnings reports, Standard & Poor's (S&P) released a set of definitions in 2003 to be used in generating core earnings figures. The definitions include pension costs but exclude pension gains. S&P's rationale for this asymmetric treatment was:

Some may be concerned that pension income is excluded from Core Earnings, while pension costs are included. This apparent conflict is in reality no conflict at all. The two are not parallel because they arise in different places from different activities. Pension costs are part of employee compensation and arise because people are hired to work and, hopefully, produce revenues and Core Earnings. Pension gains, in contrast, have nothing to do with the corporation's core business or the creation of Core Earnings. The size and timing of pension gains reflect the skill of the portfolio managers engaged to manage the pension plan and the foresight of the pension plan sponsor in establishing the investment policy and hiring the portfolio managers. Both the gains and the costs are related to the pension, but the similarity ends there (Blitzer, Friedman, and Silverblatt, 2002).

In addition to FASB actions, which apply to U.S. corporations, the future of U.S. pension accounting and its impact on plan sponsorship may be influenced by international standards adopted by the International Accounting Standards Board (IASB). In 2001, the United Kingdom adopted FRS 17, a standard that will put the market value of pension plan assets and liabilities on the corporate balance sheet. Under this standard, gains and losses are recognized *as they occur*, rather than held off the balance sheet and amortized over time, as they are under FAS 87.<sup>19</sup>

Although a certain amount of experience gains and losses are allowed to be deferred under a combination of a “corridor approach”<sup>20</sup> as well as gradual amortization of amounts outside of the corridor under FAS 87, some companies are said to have attempted to control this volatility by shifting asset allocation away from stocks to more stable investments that would allow some degree of immunization<sup>21</sup> against movements in interest rates. A disadvantage of this strategy is that the sponsor gives up the opportunity to produce additional investment income (assuming a positive equity premium) for the plan that can help reduce future pension contribution and/or provide for increased pension benefits.

If all smoothing devices for pension accounting were eliminated, the relative advantage of sponsoring defined benefit plans would likely decrease for some sponsors as they would either be fearful of the increased volatility in the pension expense and/or need to increase expected contributions in the future if they assume a less risky asset allocation.

#### Funding Requirements

Qualified defined benefit plans must satisfy a complex set of minimum funding requirements that have been adopted by Congress in an attempt to assure that the vast majority of plans will have sufficient assets to pay the promised benefits when they become due.<sup>22</sup> A detailed description of these requirements is beyond the scope of this analysis, but several recent papers provide excellent background on funding requirements (Joint Committee on Taxation, 2003), the financial condition of the Pension Benefit Guaranty Corporation and possible reforms (Kandarian, 2003), and problems in pension funding rules due to Treasury bond rates becoming inordinately low (U.S. Senate Committee on Finance, 2003a, 2003b, 2003d).

Still, it is important to understand that, unlike many of their defined contribution plan counterparts,<sup>23</sup> defined benefit plans may not allow plan sponsors to reduce or even eliminate contributions in a specific year.<sup>24</sup> Moreover, the ability of plan sponsors to terminate underfunded plans was drastically limited as a result of the Single Employer Pension Plan Amendments Act of 1986. As a result, plan sponsors with underfunded defined benefit plans seeking to significantly reduce pension contributions may find themselves in a situation where a freezing of benefit accruals may at least provide a reduction of the normal cost portion of the minimum required contribution.

### **Cash Balance Plans**

The recent trend among large employers toward conversion of traditional final-average and career-average defined benefit plans to cash balances has raised a controversial and complex set of issues. A cash balance plan is a “hybrid” type of pension plan<sup>25</sup>—i.e., one that takes on the characteristics of both a defined benefit plan and a defined contribution plan. Legally, a cash balance plan is a defined benefit plan. A cash balance plan offers some of the popular advantages of a defined benefit plan but is designed to look more like a defined contribution plan, with an individual “hypothetical” account that appears to accumulate assets for each participant. Cash balance plan accounts are a record-keeping feature only, as these plans are funded on an actuarial basis, in the same way that defined benefit pension plans are funded. Therefore, at any point in time, the benefits promised to a participant are based on the plan formulae and not on the assets in his or her “account.”<sup>26</sup>



In recent years, there has been a flurry of press accounts, court cases, and legal and regulatory activities with respect to cash balance plans, specifically as they relate to conversions from existing final-average plans. This section attempts to provide some insight into each of these in an attempt to clarify some of their more complex and controversial concepts.

*Do Cash Balance Plans Result in Cost Savings to the Sponsor and/or Benefit Reductions to the Participants?*

It is certainly possible for conversion to a cash balance plan to result in lower *long-term* pension expense to the plan sponsor, depending on the generosity of the new plan relative to the existing plan. In essence, this is no different than switching from a defined benefit to a defined contribution plan, and similar projections would need to be applied to determine if this were the case (VanDerhei, 1985). However, even if such a calculation were performed on two retirement plans, it would not necessarily indicate the extent of cash balance savings, if any, since any savings due to cash balance plan conversion may be offset by other increases in benefits or compensation.<sup>27</sup>

Assuming such a calculation was performed, the cash balance plan may also prove to be more expensive than originally calculated if turnover is higher than assumed. This would result from plan assets being reduced below expected levels, and the spread between the accrual in the plan and the actual fund performance may be a factor in increased costs.<sup>28</sup> Turnover could increase due to future labor patterns that impact all employers, but it might also increase as a direct consequence of providing a more level benefit accrual over time that decreases the “job lock” attributes of the existing plan.

However, there may also be *short-term* abnormalities in the pension cost and/or expense structure resulting from the conversion. In essence, the claims of cost savings from a conversion to a cash balance plan may be at least partially due to a timing issue under the accounting and/or funding rules required for all defined benefit plans (including cash balance plans). Although the calculations are complex, one of the driving forces behind this short-term cost reduction involves the computation of the cost of accruing a benefit based on career-average pay (the cash balance plan) for one based on final-average pay under the previous plan (Demby, June 1999).<sup>29</sup>

Brown et al. (2000) classified employers that shifted from traditional pensions to hybrid plans into three groups: cost reducers, cost-neutral shifters, and cost increasers. When looking at the changes made only to defined benefit plans, they found that 56.4 percent of the plans they studied fell into the cost-reducing class; 20.5 percent adopted changes that were cost-neutral; and 23.1 percent increased their pension cost in the shift to hybrid plans. Next, they considered changes made to plan sponsors' defined contribution plans adopted in conjunction with the shift to a hybrid plan. Adding in these changes, they found that 44.9 percent of sponsors reduced costs in the shift to their new pension package, 17.9 percent adopted changes that were cost-neutral, and 37.2 percent adopted changes that increased costs. On average, they found pension costs were reduced by an average of only 1.4 percent in the shift to the new package. Clark and Schieber (2000) demonstrate that a significant portion of benefit reductions that do occur result directly from eliminating early retirement subsidies.<sup>30</sup>

*Transition/Grandfathering*

Several transition methods are available to a sponsor that chooses to mitigate the financial impact that may result in a switch from a traditional final-average plan to a cash balance plan (Rappaport, Young, Levell, and Blalock, 1997):

- Pay the greater of the benefit that would have been paid under the old plan and the benefit due under the new formula for a subset of the employees (either for a limited time period or until termination or retirement).
- Provide extra account balances at transition to make up for the greater benefit that would have been available at early retirement.

- Provide extra account balances to make up for the fact that final-average earnings will not be directly used in the formula.
- Provide a supplemental additional benefit.

A PricewaterhouseCoopers survey of about 75 cash balance conversions reveals that in almost all cases the employer provided transition provisions beyond the legally required minimums (Sher, 1999). In 88 percent of the plans examined in Clark and Schieber (2000), the plan sponsor provided some form of transition benefit for some workers affected.

#### Wear-away

If a final-average plan is converted to a cash balance plan, the initial value of a participant's cash balance account *may* be set at less than the value of benefits accrued under the previous plan. However, it is important to note that this may not reduce or take away previously earned benefits. It may mean, though, that *initially* some workers won't accrue any new benefits until the pay and interest credits to their hypothetical accounts bring the account balances up to the value of the old protected benefits (it is this period of waiting for the hypothetical account balances to reach the value of the old accounts that is known as "wear-away").

While most press coverage of wear-away has focused on its potential duration, Clark and Schieber (2000) point out that the rate of wear-away is also important, and they compute the potential cumulative wear-away as a percentage of pay at base age for a stylized individual under two scenarios: (1) a transition to a hybrid plan at age 54 and (2) that which inherently exists in a traditional plan age 55. In nearly half the cases, employers structured the new plans to make the wear-away issue moot. In the remaining plans, the cumulative wear-away that workers faced was generally not as great as it was in the prior plans being replaced.

As pointed out in testimony to the ERISA Advisory Council Working Group studying hybrid plans, benefit formulae that end up resulting in periods with no new accruals for some employees have been a practice approved by the Internal Revenue Service for many years (Chambers, 1999). Often plan changes, such as updating plan mortality assumptions, the resultant standardization of disparate pension plans as a result of mergers and acquisitions, or even revising a plan to meet new statutory requirements (such as legislative changes to the Sec. 401(a)(17) limits earlier this decade) can result in periods without new accruals.

### **Defined Benefit Plan Incidence**

Even before many of these issues became "hot" topics, a long-term trend away from defined benefit plans was already present and had been since the early 1980s. According to the most recent tabulations of Form 5500 data by the Department of Labor, the percentage of the private-sector wage and salary work force in a defined benefit retirement plan decreased from 37 percent in 1979 to 21 percent in 1998 (U.S. Department of Labor, 2002). In other data, the percentage of all wage and salary workers (public and private) who considered a defined benefit plan as their primary plan declined from 56.7 percent in 1988 to 35.1 percent in 1998 (Copeland, 2002). Furthermore, on a family basis, the percentage of families that had an employment-based pension or retirement plan participant who had only a defined benefit plan decreased from 40.0 percent in 1992 to 19.5 percent in 2001, while the percentage of families with both a defined benefit and a defined contribution plan remained unchanged at about 23.0 percent (Copeland, 2003). Consequently, regardless of any environmental or plan changes to defined benefit plans, fewer future retirees will have benefits from traditional defined benefit pension plans.

To compound this issue, more defined benefit plans are allowing lump-sum distributions as an option at retirement. As recently as 1995, 85 percent of full-time workers in medium and large establishments who participated in a defined benefit were *not* offered a lump sum distribution at retirement, but by 2000, 43 of percent of all full-time employees in a defined benefit plan *were*

offered this option (U.S. Department of Labor, 1998; 2003). Thus, a twofold effect is working against the presence of defined benefit plan payments in retirement—fewer DB plans are being offered, and there increasingly is the option available that allows participants to take all the money at once rather than receive monthly payments for life.

The effect of this trend away from defined benefit plans is currently reflected in the decline of the incidence of Americans between the ages of 50 and 70 with income from a defined benefit plan or an annuity. Data from the Current Population Survey (CPS) show this percentage declining for those between the ages of 50 and 67 from 1988 to 2002, and for those ages 68 to 70 from 1998 to 2002 (McDonnell, 2003). Even for those Americans who do have this type of income, it is not what many would consider a large sum, as the median (mid-point) amount was \$13,200 for those ages 61–64 in 2002, up from \$10,300 in 1988. Furthermore, DB benefits from many private-sector companies are not adjusted for inflation—ultimately leading to an erosion of the value of the benefit.

An important factor to keep in mind in the analyses contained in this *Issue Brief* is that the baseline is taking the current situation as the status quo throughout the simulation period. Therefore, if any further decline in defined benefit plan coverage or increase in lump-sum distributions to defined benefit plan participants occurs, the results of the modeled changes may be nearer the future reality than the results of the baseline.

## **Baseline Results**

Given the disparate nature of the types of analyses we are performing in this paper, it is necessary to construct two sets of baseline results:

- The first focuses on accumulations at Social Security normal retirement age relative to a deterministic threshold.
- The second focuses on sufficiency of retirement income and wealth throughout the simulated life paths.

### **EBRI-ERF Retirement Income Projection Model**

In the first analysis, the EBRI-ERF Retirement Income Projection Model (RIPM) is used to compare individual/family's retirement benefits to their assumed total expenses in their first year of retirement. Figure 1 shows the average real first-year surplus that single males, single females, and families would be estimated to have under the following assumptions:

- The individual (or primary wage earner for a family) works until Social Security normal retirement age.
- All account balances for individual accounts (defined contribution, IRA, and cash balance plans) are immediately annuitized at current rates (families are assumed to purchase a 100 percent joint and survivor option).

The EBRI-ERF Retirement Income Projection Model is based on a six-year time series of administrative data from more than 10 million 401(k) participants and more than 30,000 plans, as well as a time series of several hundred plan descriptions used to provide a sample of the various defined benefit and defined contribution plan provisions applicable to plan participants. In addition, several public surveys based on participants' self-reported answers (the Survey of Consumer Finances [SCF], the Current Population Survey [CPS], and the Survey of Income and Program Participation [SIPP]) were used to model participation, wages, and initial account balance information.

This information is combined with U.S. Department of Labor Form 5500 data to model participation and initial account balance information for all defined contribution participants, as well as contribution behavior for non-401(k) defined contribution plans. Asset allocation information is

based on previously published results of the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project, and employee contribution behavior to 401(k) plans is provided by an expansion of a method based on both employee demographic information and plan matching provisions.

A combination of Form 5500 data and self-reported results was also used to estimate defined benefit participation models; however, it appears information in the latter is rather unreliable with respect to estimating current and/or future accrued benefits. Therefore, a database of defined benefit plan provisions for salary-related plans was constructed to estimate benefit accruals.

Combinations of self-reported results were used to initialize IRA accounts. Future IRA contributions were modeled from SIPP data, while future rollover activity was assumed to flow from future separation from employment in those cases in which the employee was participating in a defined contribution plan sponsored by the previous employer. Industry data are used to estimate the relative likelihood that the balances are rolled over to an IRA, left with the previous employer, transferred to a new employer, or used for other purposes.

#### Defined Benefit Plans

A stochastic job duration algorithm was estimated and applied to each individual in the EBRI-ERF model to predict the number of jobs held and age at each job change. Each time the individual starts a new job, the EBRI-ERF model simulates whether or not it will result in coverage in a defined benefit plan, a defined contribution plan, both, or neither. If coverage in a defined benefit plan is predicted, time series information from the Bureau of Labor Statistics (BLS) is used to predict what type of plan it will be.<sup>31</sup>

While the BLS information provides significant detail on the generosity parameters for defined benefit plans, preliminary analysis indicated that several of these provisions were likely to be highly correlated (especially for integrated plans). Therefore, a time series of several hundred defined benefit plans per year were coded to allow for assignment to the individuals in the EBRI-ERF model.<sup>32</sup>

Although the Tax Reform Act of 1986 at least partially modified the constraints on integrated pension plans by adding Sec. 401(l) to the Internal Revenue Code, it would appear that a significant percentage of defined benefit sponsors have retained Primary Insurance Amount (PIA)-offset plans. In order to estimate the offset provided under the plan formulae, the EBRI-ERF model computes the employee's Average Indexed Monthly Earnings, Primary Insurance Amount, and covered compensation values for the birth cohort.

#### Defined Contribution Plans

*Initial account balances*—Previous studies on the EBRI/ICI Participant-Directed Retirement Plan Data Collection Project have analyzed the average account balances for 401(k) participants by age and tenure. Recently published results<sup>33</sup> show that the year-end 1999 average balance ranged from \$4,479 for participants in their 20s with less than three years of tenure with their current employer to \$198,595 for participants in their 60s who have been with the current employer for at least 30 years (thereby effectively eliminating any capability for IRA rollovers).

Unfortunately, the EBRI/ICI database does not currently provide detailed information on other types of defined contribution plans nor does it allow analysis of defined contribution balances that may have been left with previous employers. The EBRI-ERF model uses self-reported responses for whether an individual has a defined contribution balance to estimate a participation model and the reported value is modeled as a function of age and tenure.

#### Contribution Behavior

Previous research on employee contribution behavior with respect to 401(k) plans has often been limited by lack of adequate data. This is primarily due to the types of matching formulae utilized by sponsors. While these formulae are often complicated due to the desire of sponsors to provide

sufficient incentives to nonhighly compensated employees to contribute in order to comply with technical nondiscrimination testing, this complexity makes it virtually impossible to appropriately analyze the employee's behavior if one is forced to observe either aggregate plan data or use information on the plan contribution formulae provided by the participant.

With the exception of studies based on administrative data, employee contribution behavior is typically assumed to be a function of employee demographic data and perhaps an employee's estimate of the employer matching rate or a proxy based on Form 5500 data. However, a significant portion of the employee contribution behavior appears to be determined by plan-specific provisions. For example, the percentage of employees contributing up to either the maximum amount of compensation matched, the 402(g) limit, or the plan maximum was studied by EBRI in 1996. It would appear that well over 50 percent of the employee contribution is explained by these "corner points" that would not be picked up in the data described above.

Recently, EBRI provided preliminary findings<sup>34</sup> introducing new methodology to expand the usefulness of modeling these data, as well as a better understanding of contribution behavior by 401(k) plan participants. We utilize a sequential response regression model to allow for the differing incentives faced by the employees at various levels of contributions. Based on findings from 137 distinct matching formulae, we have estimated a behavioral model that is able to control for the tendency of employers to substitute between the amount they match per dollar of employee contribution and the maximum percentage of compensation they are willing to match. We decompose employee contribution behavior into a series of 1 percent of compensation intervals and therefore are able to model not only the marginal incentives to contribute at that interval but also the "option value" that making the contribution at that interval provides for the employee.

Contribution behavior for defined contribution plans other than 401(k) plans is estimated from self-reported responses to public survey data.

#### Investment Returns

Although the EBRI-ERF model was designed to generate investment rates of return on a stochastic basis, for purposes of this analysis we are presenting the results obtained from running it in a deterministic mode. We adopt the same asset-specific rates of return that were used in the Social Security Administration's Model of Income in the Near Term (MINT) model.<sup>35</sup>

#### Projecting Social Security Benefits

The estimates are generated from the SSASIM policy simulation model. This model is able to replicate actuarial balance and benefit estimates of the Social Security actuaries' model. In addition, SSASIM allows for the changing of numerous policy parameters, including the normal retirement age, the PIA factors, and the Old-Age and Survivors Insurance (OASI) and Disability Insurance (DI) tax rates.

#### Expenses

The total expenses include two parts: general expenses and health care expenses. The general expenses are the average nonhealth care expenses for individuals and families, respectively, for households headed by an individual 65 years old or older that were found in the 2000 Consumer Expenditure Survey (CES), conducted by the Bureau of Labor Statistics, U.S. Department of Labor. Specifically, these general expenses include housing, food, apparel and services, transportation, reading and education, and entertainment.

The health care expenses contain three aspects: 1) other health care expenses, expenses not covered by Medicare or supplemental insurance, 2) health insurance premiums for a supplemental plan to Medicare, and 3) Medicare Part B premiums. Again, the 2000 CES was used to find the average other health care expenses for elderly individuals or families from all households of each size. In contrast, the health insurance premiums were the average supplemental health insurance

premiums for those who purchased supplemental insurance for the households of each size, as this model assumes all elderly individuals and families purchase supplemental insurance and Medicare Part B.

The expenses were broken down into two categories to allow the model to reflect the differences in the inflation growth of the two components. The general expenses are assumed to grow by the inflation rate assumed in the 2001 Annual Report of the Board of Trustees of the OASDI Trust Funds (3.3 percent), while the health care expenses were assumed to grow at the approximate 2003 medical care inflation rate (4.0 percent).

### Results

Figure 1 shows the results of this comparison. With the exception of single women earning less than the median born between 1936 and 1940, all the cohorts all have sufficient aggregate income to afford the predicted first-year expenses.<sup>36</sup> Within each income quartile/birth cohort, families have the largest average real first-year surplus followed by single males. Single females have the lowest average, often by a significant amount.

### **EBRI-ERF Retirement Security Projection Model<sup>®</sup>**

The EBRI-ERF Retirement Security Projection Model<sup>®</sup> (RSPM) uses the accumulations generated from the Retirement Income Projection Model but then simulates 1,000 life paths for each individual or family unit. It does not assume that individual accounts are annuitized, instead it assumes that these amounts are invested until spent down in accordance with the expenditure assumptions below. The present value of deficits accumulated during each simulated life-path is rank ordered for each individual or family unit and the 75<sup>th</sup> percentile is selected. A variant of a temporary employment-based life annuity is accumulated until retirement age and used to convert the present value figure to a percentage of compensation that would need to be saved each year until retirement in order to offset the expected deficit.

### Expenditure Assumptions

The expenditures used in the model for the elderly consist of two components—deterministic and stochastic expenses. The deterministic expenses include those expenses that the elderly incur from a basic need or want of daily life, while the stochastic expenses in this model are exclusively health-event related—e.g., an admission to a nursing home or the commencement of an episode of home health care—that occur only for a portion, if ever, during the elderly's remaining life, not on an annual basis.

*Deterministic Expenses*—The deterministic expenses are broken down into seven categories—food, apparel and services (dry cleaning, haircuts), transportation, entertainment, reading and education, housing, and basic health expenditures. Each of these expenses is estimated for the elderly (65 or older) by family size (single or couple) and family income (less than \$15,000, \$15,000 to \$29,999, and \$30,000, or more) of the individual.

The estimates are derived from the 2000 CES. The survey targets the total noninstitutionalized population (urban and rural) of the United States and is the basic source of data for revising the items and weights in the market basket of consumer purchases to be priced for the Consumer Price Index. CES data provide detailed data on expenditures and income of consumers, as well as the demographic characteristics of those consumers. The survey does not provide state estimates, but it does provide regional estimates. Thus, the estimates are broken down into four regions—Northeast, Midwest, South, and West—to account for the differences in the cost of living across various parts of the country.<sup>37</sup> Consequently, an expense value is calculated using actual experience of the elderly for each region, family size, and income level by averaging the observed expenses for the elderly within each category meeting the above criteria. The housing expenses are further broken down by

whether the elderly own or rent their home. The basic health expenditure category has additional data needs besides just the CES.

*Health*—The basic health expenditures category uses a somewhat different technique for estimation and is comprised of two parts. The first part uses the CES as above to estimate the elderly’s annual health expenditures that are paid out-of-pocket and are not reimbursed (covered) or at least not fully reimbursed by Medicare and/or private Medigap health insurance, e.g., prescription drugs.

The second part contains insurance premium estimates, including Medicare Part B premiums, and is not income related. All of the elderly are assumed to participate in Part B, and the premium is determined annually by the Medicare program and is the same nationally. For the Medigap insurance premium, we assume all of the elderly purchase a Medigap policy. A regional estimate is derived from a 2000 survey done by Weiss Ratings Inc. that received average quotes for three popular types of Medigap policies (A, F, and J) in 47 states and the District of Columbia. The estimates are calculated from the three policy types averaged over the states in the respective regions to arrive at the estimate for each region.

This approach is taken for two reasons. First, sufficient quality data do not exist for the matching of retiree medical care (as well as the generosity of and cost of the coverage) and Medigap policy use to various characteristics of the elderly. Second, the health status of the elderly at the age of 65 is not known, let alone over the entire course of their remaining lives. Thus, assuming everyone has a standard level of coverage eliminates trying to differentiate among all possible coverage types as well as determining whether the sick or healthy have the coverage. Therefore, averaging of the expenses over the entire population should have offsetting effects in the aggregate.

The total deterministic expenses for elderly individual or family is then the sum of the value in all the expense categories for family size, family income level, and region of the individual or family. These expenses make up the basic annual (recurring) expenses for the individual or family. However, if the individual or family meet the income and asset tests for Medicaid, Medicaid is assumed to cover the basic health care expenses (both parts), not the individual or family. Furthermore, Part B premium relief for the low-income elderly (not qualifying for Medicaid) is also incorporated.

*Stochastic Expenses*—The second component of health expenditures is the result of simulated health events that would require long-term care in a nursing home or home-based setting for the elderly. Neither of these simulated types of care would be care reimbursed by Medicare as they would be for custodial care that is not rehabilitative care. The incidence of the nursing home and home health care and the resulting expenditures on the care are estimated from the 1999 National Nursing Home Survey (NNHS) and the 2000 National Home and Hospice Care Survey (NHHCS). NNHS is a nationwide sample survey of nursing homes, their current residents, and discharges that was conducted by the National Center for Health Statistics from July through December 1999. The NHHCS is a nationwide sample survey of home health and hospice care agencies, their current and discharge patients that was conducted by the National Center for Health Statistics from August through December 2000.

For determining whether an individual has these expenses, the following process is undertaken. For an individual turning the Social Security normal retirement age, the person has a probability of being in one of four possible assumed “health” statuses:

- 1) Not receiving either home health or nursing home care,
- 2) Home health care patient,
- 3) Nursing home care patient, or
- 4) Death,

based upon the estimates of the use of each type of care from the surveys above and mortality. The individual is randomly assigned to each of these four categories with the likelihood of falling into one of the four categories based upon the estimated probabilities. If the individual does not need long-term care, no stochastic expenses are incurred. After a year, the individual will again face these probabilities (the probabilities of being in the different statuses will change as the individual becomes older after reaching age 75 then again at age 85) of being in each of the four statuses. This continues until death or the need for long-term care.

For those that have a resulting status of home health care or nursing home care, their duration of care is simulated based upon the distribution of the durations of care found in the NNHS and NHHCS. After the duration of care for a nursing home stay or episode of home health care, the individual will have a probability of being discharged to one of the other three statuses based upon the discharge estimates from NNHS and NHHCS, respectively. The stochastic expenses incurred is then determined by the length of the stay/number of days of care times the per diem charge estimated for the nursing home care and home health care, respectively, in each region.

For any person without the need for long-term care, this process repeats annually. The process repeats for individuals receiving home health care or nursing home care at the end of their duration of stay/care and subsequently if not receiving the specialized care again at their next birthday. Those that are simulated to die, of course, are not further simulated.

As with the basic health care expenses, the qualification of Medicaid by income and asset levels is considered to see how much of the stochastic expenses must be covered by the individual to determine the individual's final expenditures for the care. Only those expenditures attributable to the individual, not the Medicaid program, are considered as expenses to the individual.

*Total Expenditures*—The elderly individual's or families' expenses is then the sum of their assumed deterministic expenses based upon their demographic characteristics plus any simulated stochastic expenses that they may have incurred. In each subsequent year of life, the total expenditures are again calculated in this manner. The base year's expenditure value estimates, excluding the health care expenses, are adjusting annually using the assumed general inflation rate of 3.3 percent from the 2001 OASDI Trustees Report, while the health care expenses are adjusted annually using the 4.0 percent medical consumer price index that corresponds to the June 2002–June 2003 level.<sup>38, 39</sup>

### Results

Figure 2 shows the median percentage of compensation that must be saved each year until retirement for a 75 percent confidence level when combined with simulated retirement wealth, assuming current Social Security benefits and that housing equity is never liquidated. For example, all gender/family combinations in the first two income quartiles for the oldest birth cohort are at the 25 percent of compensation threshold. For those in the highest income quartile for this birth cohort, the percentages of compensation needed to be saved are 23.8 percent for single females, 13.9 percent for single males, and 6.1 percent for families.

## **Sensitivity Analysis**

### **Benefit Accrual Freezes for Defined Benefit Plans**

The first sensitivity analysis focuses on the impact of freezing benefit accruals on all private defined benefit plans beginning in 2005. Figure 3 shows the average decrease in real first-year



surplus as a result of this change. As expected, the dollar value increases the longer the cohort would be exposed to this condition and thus those born later experience larger decreases. Moreover, within each gender/family status/birth cohort, those in the higher income quartiles also experience larger decreases. This may be due to the increased likelihood of participating in a defined benefit plan as well as the integration provisions but it may also be caused by the higher levels shown in Figure 1. To control for the last factor, Figure 4 presents the same information but this time presented in percentage terms. While there is still a definite time trend present as expected, the impact on single females is more pronounced than either single males or families, particularly for those with income in the lower two quartiles. Overall, it appears that the decrease in average first-year surplus would reach as high as 16–21 percent for single females but only 10–13 percent for single males and 6–13 percent for families.

## **Modification to Cash Balance Plans**

### *Increase in Conversions of Traditional Final-Average Plans*

Another possible plan trend that may result in the diminution of annuitization at the time of retirement is the potential increase in conversions of traditional final average defined benefit plans to cash balance plans. Prior to the moratorium on determination letters for these plans in September 1999 the percentage of large defined benefit plan sponsors with a cash balance plan had increased from 6 percent in 1995 to 16 percent in 1999.<sup>40</sup> According to Pension Benefit Guaranty Corp. (PBGC) data and PBGC calculations from the 2000 Form 5500,<sup>41</sup> the number of PBGC-covered active and retired and deferred vested participants in single-employer plans stood at 34.3 million in 2000, with an estimated 7.2 million in some type of hybrid plan. While not all hybrid plans are of the cash balance type, 84 percent were by 1999.<sup>42</sup>

For the second part of the sensitivity analysis, we assume that all private final average defined benefit plans are immediately converted to cash balance plans; however, current employees are kept in the existing plan until job separation or retirement. Figure 5 shows the average decrease in real first-year surplus in this case. Most of the cohorts consisting of those born between 1936 and 1950 experience only a de minimis change in average surplus. Indeed, only one of the 36 cohorts has a change greater than \$500. However, the decreases begin to grow to sizeable numbers (up to nearly \$2,500 in real dollars) for those in the top income quartile for later birth cohorts although the percentage differences peak at 6 percent.<sup>43</sup>

These results should not be taken as an indication that cash balance plans will necessarily produce less retirement income than final average plans, *cet. par.*<sup>44</sup> However, for the current distribution of pay credits and interest credits it appears that the relative generosity differentials will grow with increased years of participation. This may very well be mitigated, or even reversed, when interest credits begin to increase toward those more representative of recent history.

### *Elimination of Existing Plans*

At the other end of the spectrum from the previous analysis, the continuing legislative and/or regulatory uncertainty over the status of cash balance plans as well as recent adverse court decisions have led some to question whether these plans will necessarily continue their current popularity. We have modeled an admittedly extreme example of this for the third sensitivity analysis by assuming that all cash balance plans would immediately terminate in the year 2005. Figure 6 provides the average decrease in real first-year surplus under this scenario. As expected, the average impact increases with duration and its value reaches a maximum of nearly \$1,400 (in current dollars) for the families in the highest income quartile born between 1961 and 1965. The average impact increases with income and is largest for families followed by single males and then single females.<sup>45</sup>

## **Assuming Lump-Sum Distributions Are Offered to All Defined Benefit Plan Participants at Retirement and They Are Always Chosen**

Another plan design trend that has been distressing to those who believe defined benefit plans should provide retirement income for the lifetime of former workers<sup>46</sup> is the continuing trend to provide employees with the option of taking a lump-sum distribution at the time of retirement.<sup>47</sup> Although this is not expected to have any impact on the amount of retirement income and/or wealth generated during the accumulation phase, there is a possibility that the amount of deficits experienced in retirement by an individual or family will increase under this arrangement. In an attempt to provide a first-order approximation to the impact this change may have on the ability of an individual or family to accumulate sufficient resources to provide for a 75 percent chance of covering simulated retirement expenses, Figure 7 shows the percentage increase in the median percentage of additional compensation that must be saved annually until retirement (cf with Figure 2). Although there appear to be no well-defined trends with respect to age, income, gender, or family status, the vast majority of cohorts would need to increase their savings rate between 10 percent and 20 percent of the rate needed if all defined benefit participants (other than those in cash balance plans) were assumed to receive an annuity.

## **Payment of All Accumulations as Life Annuities From All Qualified Plans and IRAs**

Although defined benefit plans are not necessarily more or less generous than their defined contribution plan counterparts with respect to the amount of wealth generated by retirement age for an individual employee, there are fundamental differences in the payout stage at least for those defined benefit plans that do not offer lump-sum distributions to their employees at retirement. When defined benefit payouts are offered in the form of an annuity to all retirees, two of the risks are retained by the employer instead of being transferred to the employee: investment risk and longevity risk. The value of the investment risk transfer is well known as is the fact that defined benefit plans (when not taken in the form of lump-sum distributions) eliminate the risk of outliving one's income; however, there does not appear to be any quantitative assessment of how important the latter might be. In this section, the value of longevity risk transfer is simulated based on mortality rates, the amount of retirement income and wealth the individual has at retirement, and the projected expenditures in retirement.

In the baseline case (Figure 2), it is assumed that all defined benefit plan benefits are paid in the form of an annuity while individual accounts are spent as needed to pay the simulated expenses. In the last sensitivity analysis, it is assumed that all individual account wealth is annuitized also. In both cases, deficits are recorded in any year that there is insufficient retirement income to meet that year's simulated expenses and there is not a sufficient amount in the individual account balances or retiree savings to cover the difference. If additional money becomes available later in the retiree's life, the excess is recorded as a negative deficit up to the amount of the then-existing cumulative deficit.

Figure 8 shows the percentage reduction in median percentage of additional compensation that must be saved annually until retirement for a 75 percent chance of covering simulated expense as a result of annuitizing all individual accounts at retirement. Overall, most cohorts would see the median percentage of compensation reduced by 20 percent to 30 percent. In general, it appears that those in the higher income quartiles would have larger decreases, *cet. par.*

## **Conclusion**

Until recently, there was little quantitative evidence available to determine the likely size of the future shortfall in American's retirement income security, which has forced the issue to be debated more on emotion and rhetoric than facts. An examination of this shortfall based on a wide range of statistical data was published by the Employee Benefit Research Institute (EBRI) in November 2003,

using the EBRI-ERF Retirement Security Projection Model<sup>®</sup> (RSPM<sup>®</sup>) and showed that American retirees will have at least \$45 billion less in retirement income in 2030 than what they will need to cover basic expenditures and projected expenses associated with potential episodes of care in a nursing home or from a home health care provider. Under one set of assumptions, the aggregate deficit in retiree income during the decade ending 2030 will be \$400 billion.

This analysis uses variants of the EBRI-ERF Retirement Income Projection Model (RIPM) and RSPM<sup>®</sup> to provide quantitative assessments of the future financial security implications of various types of moves away from defined benefit promises and from annuity payments (“traditional” employer-provided pensions)—a long-term trend that has been well-documented since the enactment of the Employee Retirement Income Security Act (ERISA) in 1974, and which has been accelerating in recent years for a variety of reasons. The analysis provides preliminary results on the following modifications to the plan system and to public policy on the use of the assets in tax-favored savings arrangements:

1. Benefit accrual freezes for private defined benefit plans.
2. Modification to cash balance plans (both increases in conversions of traditional final average plans and elimination of existing plans).
3. Lump-sum distributions (assuming that they are offered to all defined benefit plan participants at retirement and that they are always chosen).
4. Payment of all accumulations as life annuities from all qualified plans and IRAs.

As expected, this analysis finds that the impact from *freezing benefit accruals* for all private defined benefit plans beginning in 2005 would have a larger impact (as measured in terms of average real dollar decrease in first-year surplus) on younger cohorts. The average annual decrease for those in the youngest cohort modeled (born between 1961 and 1965, inclusive, or those currently between ages 39 and 43) would be \$4,886 for families, \$2,752 for single males, and \$1,686 for single females.

*Converting* all traditional final average defined benefit plans to cash balance plans in 2005 would be expected to have a much smaller impact, but again one that is expected to increase with time. The youngest cohort in this case would experience a decrease only 26–30 percent as great as the case in which all defined benefit accruals would be frozen: average annual decreases of \$1,447 for families, \$721 for single males, and \$444 for single females. However, these decreases would be expected to be mitigated somewhat once interest rates rise to more historically normal levels.

*Terminating* all cash balance plans without a replacement plan in 2005 would be expected to have a smaller impact than the conversions modeled above, since a much smaller percentage of participants would be impacted. The average annual decrease for those in the youngest cohort would be \$722 for families, \$415 for single males, and \$264 for single females.

The last two sensitivity analyses tested the value of annuitization and therefore needed to simulate a significant number of future life-paths to capture the longevity risk experienced by retirees. The output metric used was similar to that created in VanDerhei and Copeland (2003): the median percentage of additional compensation that must be saved annually until retirement for a 75 percent chance of covering simulated expenses. If one assumes that all defined benefit participants take lump-sum distributions at retirement, the average annual increase in needed savings is 14.9 percent, whereas assuming that all individual accounts are annuitized at retirement has an impact twice as large—but in the opposite direction (a 30.0 percent decrease in needed annual savings).

Each of these sensitivity analyses was performed assuming there would be no compensating differentials. For example, if a defined benefit plan sponsor were assumed to freeze benefit accruals permanently in 2005, none of the eventual cost savings would be channeled into a defined contribution plan for the same employees, either through initial implementation or increase in the

generosity parameters of an already existing plan. Therefore, the estimates in this sensitivity analysis could be perceived as a worst-case scenario in many respects.

The value of private defined benefit pension plans, as well as the annuitization of retirement benefits rather than lump-sum distribution, has long been recognized by experts in this field. This *Issue Brief* provides preliminary evidence on the average impact on future cohorts of severe modifications of these arrangements (e.g., all private defined benefit sponsors freezing accruals). The actual impact of future changes is likely to take some intermediate value that may be determined by taking a proportion of the values shown in Figures 3–8.

Regardless of the scenario modeled and/or the expected proportion of sponsors or employees assumed to take the proscribed action, it is clear that there will be some significant reductions in retiree welfare. Moreover, the average and median values presented in this *Issue Brief* mask the fact that some retirees will suffer much larger losses. Whether these losses should be permitted is a question that needs to be answered through private employer decisions as well as public policy debates on the best method of providing incentives for retirement income. Hopefully, these values will be of assistance in making the appropriate cost/benefit analysis.

Policy makers should take action sooner rather than later in order to create greater regulatory certainty for plan sponsors. Decisions are needed on the status of cash balance pension plans, permanent funding rules, and interest rates to be used in plan calculations, accounting treatment related to using smoothing versus mark-to-market for investment returns and interest rates, and rules and premiums under Title IV of ERISA and the Pension Benefit Guaranty Corporation. Until these kinds of policy decisions are made, further erosion of the defined benefit system can be expected to continue. While the decisions made could either slow or speed that erosion, they would at least create an environment in which individuals could better assess what they are likely to have as retirement assets and income, and plan to continue working, or to exit the workforce, accordingly. A demographic time bomb is ticking, and the time to act is now.

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## Endnotes

<sup>1</sup> CIEBA (2004), p. 7. The study also analyzes the impact of discount rate reform and the use of an unsmoothed corporate yield curve for funding purposes. However, this was prior to April 10, when President Bush signed H.R. 3108 that (at least temporarily) replaced the 30-year Treasury bond interest rate with a higher composite rate for plan funding purposes. For plan years beginning in 2004 and 2005, the plan may use any rate between 90 and 100 percent for a weighted four-year average of the rates of interest on long-term investment grade corporate bonds.

<sup>2</sup> Ibid, p. 14. A total of 9 percent responded that they would be *very likely* to freeze accruals to existing entrants, while 38 percent respond that it is *possible*. When the option is changed to freezing entry of *new* participants, 21 percent indicate they would be very likely to do so while 32 percent respond that it is possible.

In addition, 75 percent of the sponsors participating in the survey were likely to respond by decreasing their equity exposure by 15 percent in the defined benefit investment portfolio. Assuming a positive long-term equity premium, this would drive up the employer's cost of providing the same level of retirement benefits, *cet. par.* Moreover, a sudden switch to bonds may drive up prices, reduce yields, and further complicate the sponsor's predicament by increasing pension liabilities and thus driving up minimum required contributions (depending on available credit balances in the funding standard account and any special dispensation from the deficit reduction contribution as a result of the recent legislation).

<sup>3</sup> "Pension Crisis Prompting Majority of Surveyed Companies to Change or Consider Changing Their Plans," Deloitte Consulting LLP, press release available on the Internet at [www.deloitte.com/dtt/press\\_release/0,2309,sid%253D2283%2526cid%253D46521,00.html](http://www.deloitte.com/dtt/press_release/0,2309,sid%253D2283%2526cid%253D46521,00.html) (April 27, 2004).

<sup>4</sup> Portions of this section draw heavily from VanDerhei (2003).

<sup>5</sup> Life annuities provide a payment on a periodic basis for the life of the participant and possibly his or her spouse.

<sup>6</sup> There is often a mistaken notion that a DC plan will commit the employer to a specific contribution (typically a percentage of compensation) each year. While this is true of one type of DC plan (a money purchase plan requires the same contribution each year unless the plan is amended or terminated), employer contributions to a DC plan may be made as a percentage of profits, a percentage return on investment or equity, or as a discretionary amount decided annually. Usually, DC plans allocate the contribution as a percentage of employees' earnings or savings.

<sup>7</sup> Flat-benefit formulas are often encountered under collectively bargained (union) plans.

<sup>8</sup> Under the latter formula, an employee would receive the same benefit at retirement regardless of the number of years worked (typically subject to some minimum threshold such as 10 years). Under the former, an employee typically earns more benefits for every year of additional service.

<sup>9</sup> Employees' contributions to DB plans are granted tax-favored status only in public-sector plans.

<sup>10</sup> Bodie (1990) develops the first four and also includes a fifth risk: Social Security cuts. The latter refers to the political risk that the financial problems currently facing the Social Security system may be resolved by



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cutting back on benefits currently scheduled to be paid. See Olsen, VanDerhei, and Salisbury (1997) for a more complete discussion of this issue.

<sup>11</sup> For an exhaustive list of plans specifically excluded from coverage by the PBGC, see pages 278–279 of Allen et al., 1997.

<sup>12</sup> An individual can use self-annuitization as a strategy to ensure that he or she does not outlive a particular amount of principal. This may be accomplished by dividing the account balance each year by his or her life expectancy at that point in time and limiting annual consumption to the amount determined by the calculation. This step is typically repeated each year, and the annual amount will vary from year to year depending on investment income and changing life expectancies.

<sup>13</sup> There may be second-order impacts to consider. For example, a sponsor that has had extraordinarily favorable investment experience in recent years may be more likely to provide future benefit improvements or ad hoc cost-of-living adjustments (COLAs).

<sup>14</sup> Note that this is not the same as guaranteeing the standard of living will not be impacted. For an interesting discussion of the possible application of this concept to retirement plans, see Merton (1983).

<sup>15</sup> See Clark, Allen, and Sumner (1983) for a survey of practices among private sponsors.

<sup>16</sup> Prior to 1980, employer pension accounting was governed by Accounting Principles Board Opinion No. 8, *Accounting for the Cost of Pension Plans*. This opinion replaced the previous discretionary method of accounting for pension costs with a possible range of minimum and maximum annual costs based on a number of approved actuarial cost methods. However, the relevance of this methodology was questioned after the enactment of the Employee Retirement Income Security Act (ERISA) in 1974. FASB therefore added two pension projects to its agenda: one for the pension plan itself (FAS 35) and one to cover accounting by plan sponsors for pension benefits. The latter project yielded an interim statement (FAS 36) in 1980 that was later replaced with FAS 87. The new accounting requirements mandated by FAS 87 were phased in over several years. The income statement provisions were to be applied for fiscal years beginning after Dec. 15, 1986, while the balance sheet provisions were to be applied for fiscal years beginning after Dec. 15, 1988. For additional detail on the evolution of pension accounting standards, see VanDerhei (1988).

<sup>17</sup> At the time of enactment, one of the most controversial aspects of FAS 87 was the imposition of a single actuarial cost method for accounting purposes. Critics felt that companies and their actuaries should be permitted to select the most appropriate actuarial cost method for their particular circumstance. At one public hearing prior to the adoption of FAS 87 it was suggested that FASB work with the actuarial profession to determine what specific factors and circumstances warrant the use of particular methods. Although theoretical frameworks based on the relationship between the type of market from which a firm secures its labor force and its pension accounting implications have introduced and analyzed the firm-specific factors and circumstances that are relevant to particular actuarial cost and expense recognizing methods (Johnson and VanDerhei, 1985), empirical investigation of the correlation between choice of actuarial cost method and the type of labor market (i.e., short-term versus career employees) found no statistically significant relationships (Johnson and VanDerhei, 1987). Another empirical study (VanDerhei and Joannette, 1988) investigated whether the accounting flexibility with respect to the choice of actuarial cost method in the pre-FAS 87 era followed an economic rationale. Since the projected unit credit method is likely to result in lower initial pension expense than the other approved actuarial cost methods, *cet. par.*, the choice of an actuarial cost method may have a material effect on the current period's reported net income and on key financial variables that are constrained by contractual arrangements. The results of this analysis show that economic incentives are correlated with the actuarial cost method choice made by plan sponsors prior to FAS 87. Sponsors that chose projected unit credit methods were more highly leveraged, showed more systematic risk, and had a lower interest coverage ratio. The results add credence to FASB's decision to standardize the actuarial cost method for pension expenses.

<sup>18</sup> A recent study by two Federal Reserve Board staff members concludes that stocks of those sponsors reporting substantial earnings from pension plans were systematically overvalued in recent years as a result of the accounting rules (Weil, 2003). The authors of the study conclude that investors tend to apply the same P/E multiples to pension earnings as they do to earnings from the sponsor's core operations.

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<sup>19</sup> See Exhibit 2 of Levy and Young (2003) for a comparison of FRS 17, FAS 87 and the international standard, IAS 19.

<sup>20</sup> A corridor of 10 percent of the maximum valuation of the plan assets and the projected benefit obligation is used to allow plan sponsors to shelter (at least in some years) the annual pension expense from a portion of the gains and losses for the year.

<sup>21</sup> An immunization program attempts to construct a portfolio of bonds whose market value equals the present value for the selected set of liabilities and whose value will always be at least as great as the value of the liabilities even if the interest rate changes.

<sup>22</sup> As mentioned above, the Pension Benefit Guaranty Corporation insures promised benefits (subject to a maximum monthly limit) when a bankrupt plan sponsor is unable to pay all the promised benefits from an underfunded plan.

<sup>23</sup> Obvious exceptions are money purchase plans and certain profit-sharing plans in which the plan sponsor has made an irrevocable commitment to a specific plan contribution.

<sup>24</sup> Whether this is the case will depend, inter alia, on whether there is a credit balance in the funding standard account as well as the plan's deficit reduction contribution status.

<sup>25</sup> Although this discussion focuses exclusively on cash balance plans, hybrid arrangements that combine traditional defined benefit and defined contribution concepts include pension equity plans, age-weighted profit-sharing plans, new comparability plans, floor-offset plans, new comparability profit-sharing plans and target plans (Campbell, 1996).

<sup>26</sup> For more information with respect to the institutional details of cash balance plans, see VanDerhei (1999).

<sup>27</sup> For example, Eastman Kodak reportedly will introduce a first-time match to its 401(k) plan to counterbalance losses from its conversion from a final-average plan to a cash balance plan (Morrow, 1999).

<sup>28</sup> In addition to the potential cash flow problems arising from increased lump-sum distributions under cash balance plans, the liability durations of cash balance plans appear to be between seven to eight years as opposed to the 12- to 20-year durations typically calculated for traditional final-average plans. Although the eventual impact (once the various transition provisions allow more of the liabilities to be generated via the new cash balance component) of the decreasing liability durations on the plan sponsor's asset allocation is debatable (Williamson, 1999), it would appear that the expected rate of return to the plan sponsor on cash balance portfolios will remain significantly greater than the expected interest rate credited to the employees.

<sup>29</sup> See Bone (1999) for a more complete description of the calculations required under FASB Statement No. 87.

<sup>30</sup> As the authors point out, this is a procedure that can be utilized by plan sponsors with or without a shift to a cash balance plan.

<sup>31</sup> The model is currently programmed to allow the employee to participate in a nonintegrated career-average plan; an integrated career-average plan; a five-year final average plan without integration; a three-year final average plan without integration; a five-year final average plan with covered compensation as the integration level; a three-year final average plan with covered compensation as the integration level; a five-year final average plan with a PIA offset; a three-year final average plan with a PIA offset; a cash balance plan, or a flat benefit plan

<sup>32</sup> BLS information was utilized to code the distribution of generosity parameters for flat benefit plans.

<sup>33</sup> Sarah Holden and Jack VanDerhei, "401(k) Plan Asset Allocation, Account Balances, and Loan Activity in 1999," *EBRI Issue Brief* (Employee Benefit Research Institute, February 2001).

<sup>34</sup> Jack VanDerhei and Craig Copeland, "A behavioral model for predicting employee contributions to 401(k) plans," *North American Actuarial Journal* (First Quarter, 2001).

<sup>35</sup> MINT assumes a CPI growth rate of 3.50 percent, a real rate of return for stocks of 6.98 percent, and a real rate of return for bonds of 3.00 percent. It subtracts 1 percent from each of the stock and bond real rates of

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return to reflect administrative costs. Eric Toder and others. "Modeling Income in the Near Term: Projections of Retirement Income Through 2020 for the 1931–1960 Birth Cohorts, 1999." Final Report, SSA Contract No: 600-96-27332. Washington, DC: The Urban Institute.

<sup>36</sup> Of course this does not imply that all members within the cohorts will have sufficient income.

<sup>37</sup> The Northeast region includes the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. The Midwest region includes the states of Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. The South region includes the states of Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas; while the West region includes the states of Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii.

<sup>38</sup> The 2003 OASDI Trustees report subsequently reduced the assumed general inflation rate to 3.0 percent. The actuaries at the Center for Medicare and Medicaid Services developed a personal health care chain-type index that is a composite index of health care prices in the overall health care economy, which they predict will rise at a 3.5 percent level annually from 2004–2008 and 3.9 percent annually from 2009–2012.

<sup>39</sup> While the medical consumer price index only accounts for the increases in prices of the health care services, it does not account for the changes in the number and/or intensity of services obtained. Thus, with increased longevity, the rate of health care expenditure growth will be significantly higher than the 4.0 percent medical inflation rate, as has been the case in recent years.

<sup>40</sup> Jack L. VanDerhei, "Key Issues in the Cash Balance Debate," Invited testimony for the Senate Health, Education, Labor and Pensions Committee Hearing on Hybrid Pensions, September 1999.

<sup>41</sup> *PBGC, Pension Insurance Data Book 2000*, p. 6.

<sup>42</sup> *Ibid.*

<sup>43</sup> Percentage differences are not graphed due to the extremely small denominators in many cases.

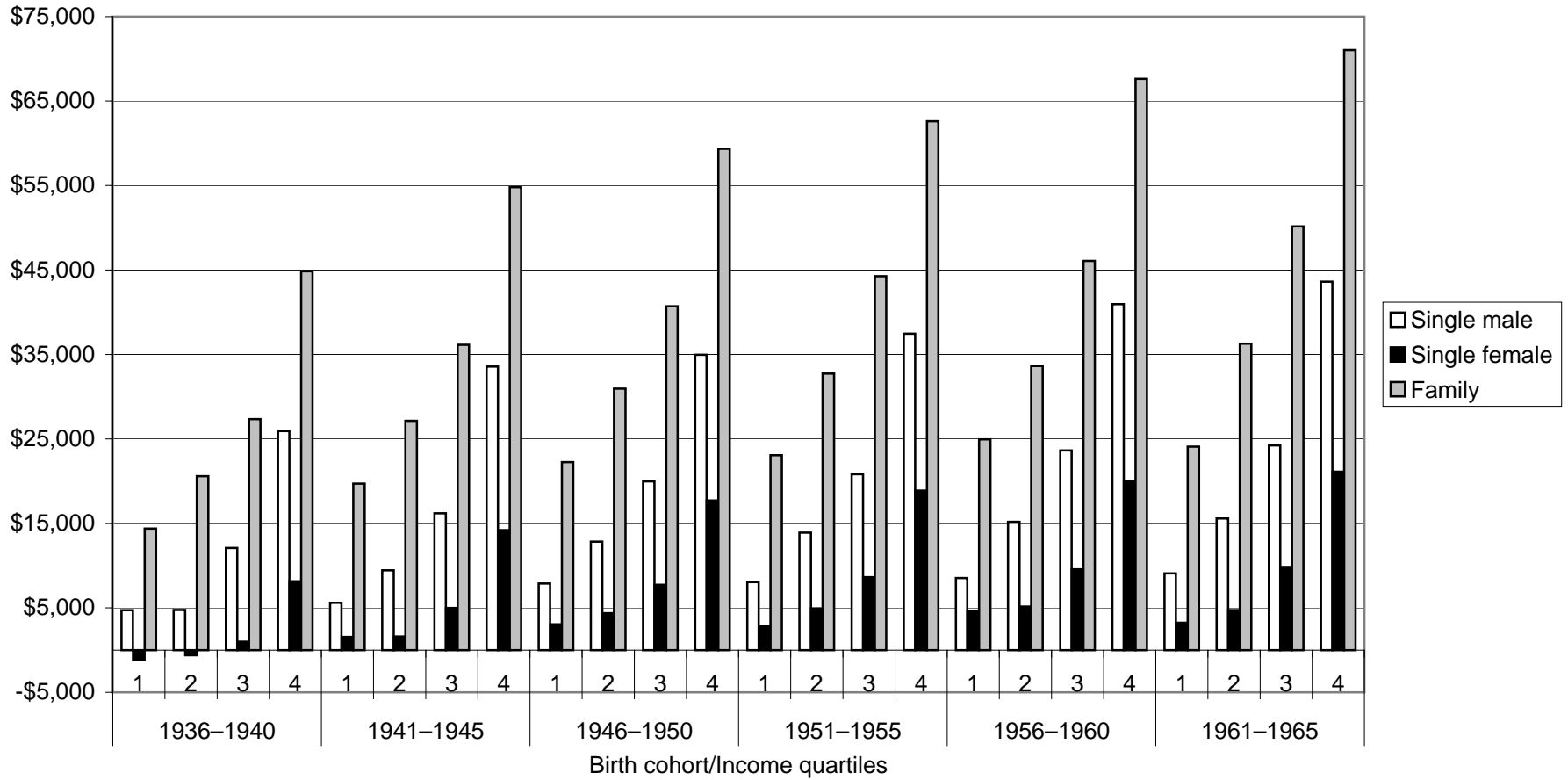
<sup>44</sup> Another factor contributing to possible reduction in retirement benefits shown in this section is that cash balance plan participants are more likely to take lump-sum distributions than are final-average plan participants.

<sup>45</sup> Percentage differences are not graphed due to the extremely small denominators in many cases.

<sup>46</sup> Dallas L. Salisbury, Statement before the Committee on Ways and Means Subcommittee on Oversight United States House of Representatives Hearing on Retirement Security and Defined Benefit Pension Plans, June 20, 2002.

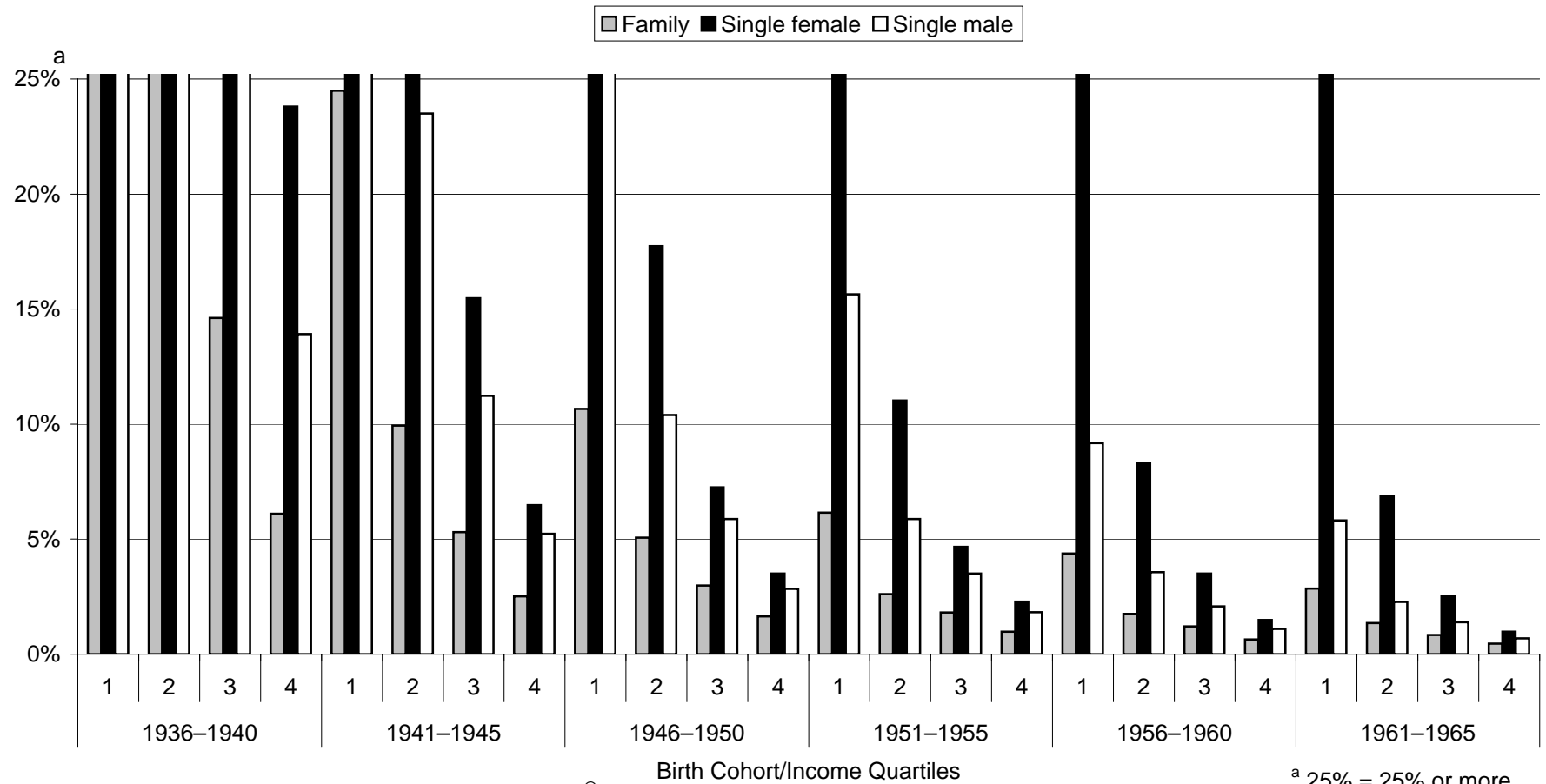
<sup>47</sup> A 1998 study by Watson Wyatt Worldwide found that 65 percent of defined benefit participants over age 60 elected a lump-sum distribution when it was available. The study is available on the Internet at [www.watsonwyatt.com/us/pubs/insider/showarticle.asp?ArticleID=7249&Component=The+Insider](http://www.watsonwyatt.com/us/pubs/insider/showarticle.asp?ArticleID=7249&Component=The+Insider)

**Figure 1**  
**Average Real First Year Surplus Assuming All Individual Accounts Are Annuitized:**  
**Baseline Case (Status Quo for All Qualified Plans and Social Security)**



Source EBRI-ERF Retirement Income Projection Model.

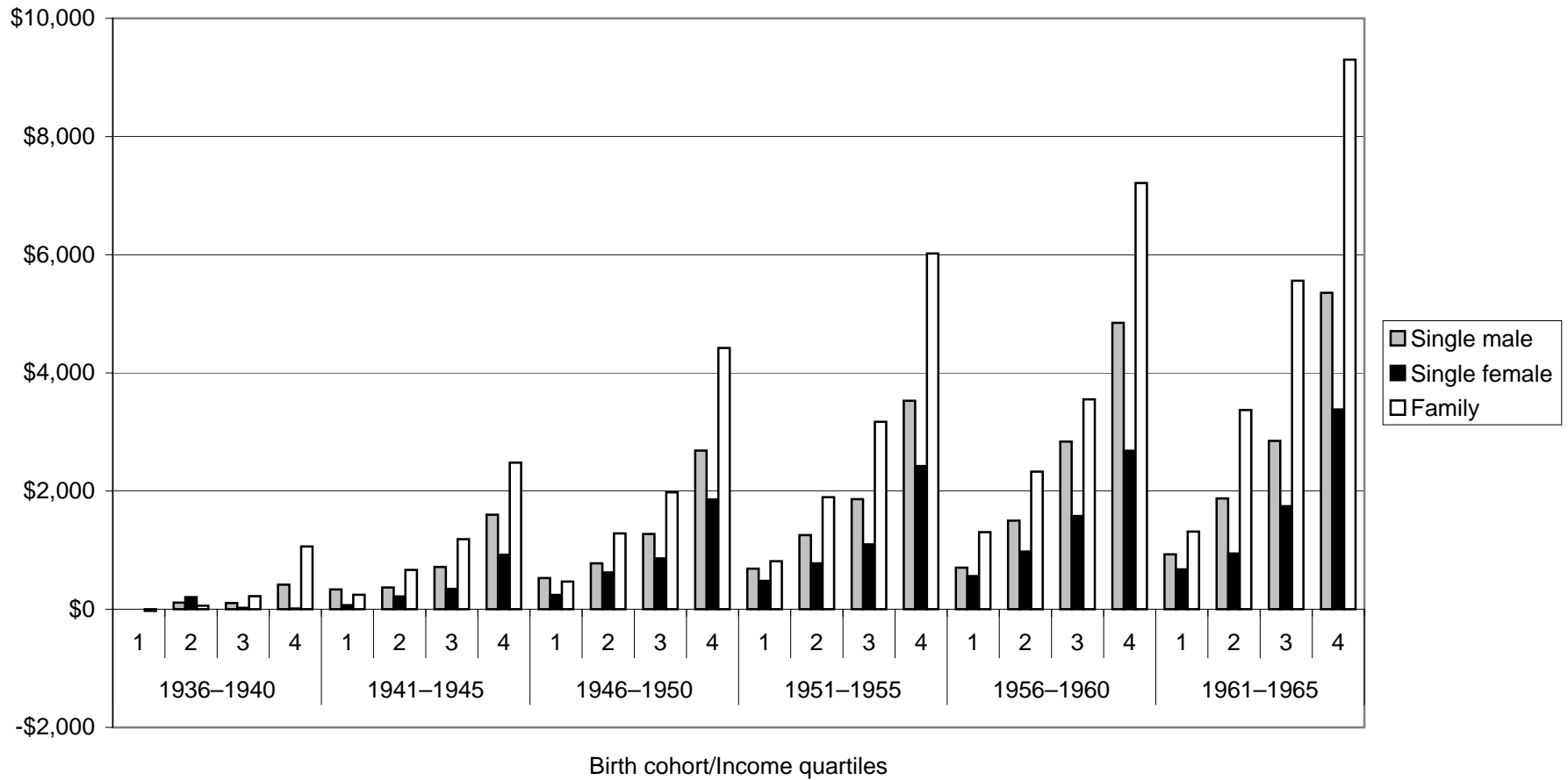
Figure 2  
**Percentage of Added Compensation That Must Be Saved Annually Until Retirement For a 75% Chance of Covering Basic Retirement Expenses**  
 (assumes current Social Security and housing equity is never liquidated)



Source: EBRI-ERF Retirement Security Projection Model.®

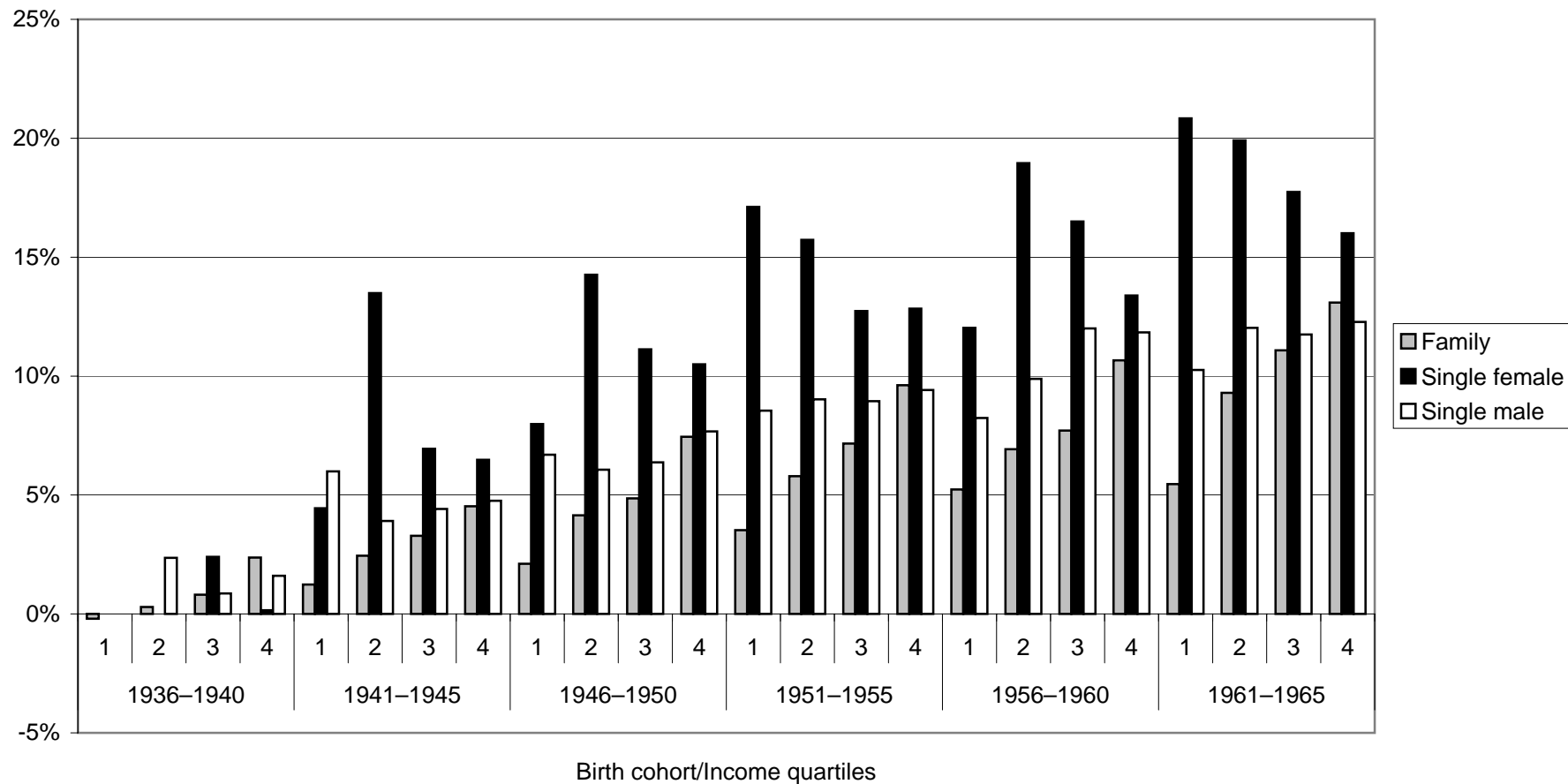
<sup>a</sup> 25% = 25% or more.

**Figure 3**  
**Average Dollar Decrease in Real First-Year Surplus As a Result**  
**of a Freeze in All Private Defined Benefit Accruals in 2005**



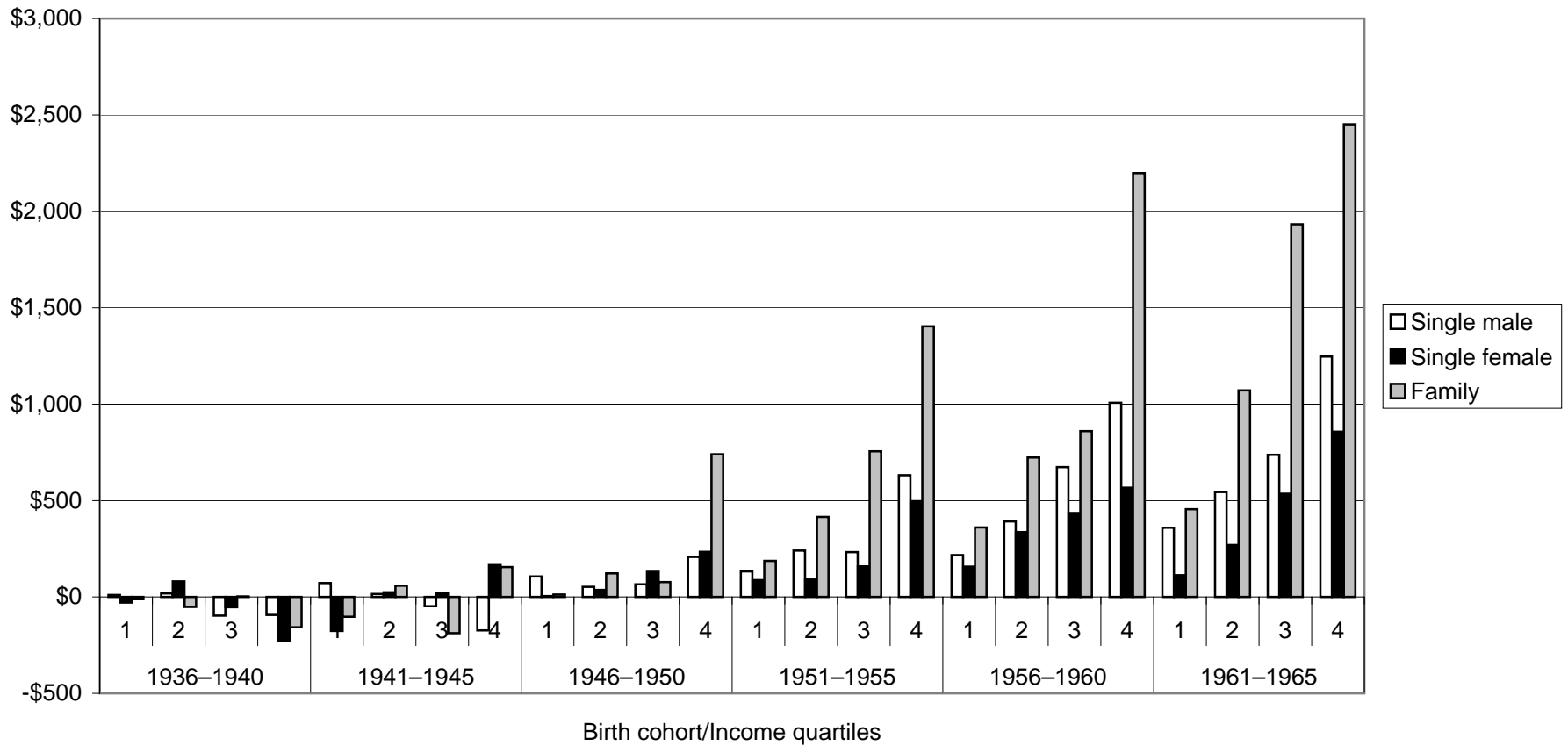
Source EBRI-ERF Retirement Income Projection Model.®

**Figure 4**  
**Average Percentage Decrease in Real First-Year Surplus**  
**As A Result of a Freeze in All Private Defined Benefit Accruals in 2005**



Source EBRI-ERF Retirement Income Projection Model.®

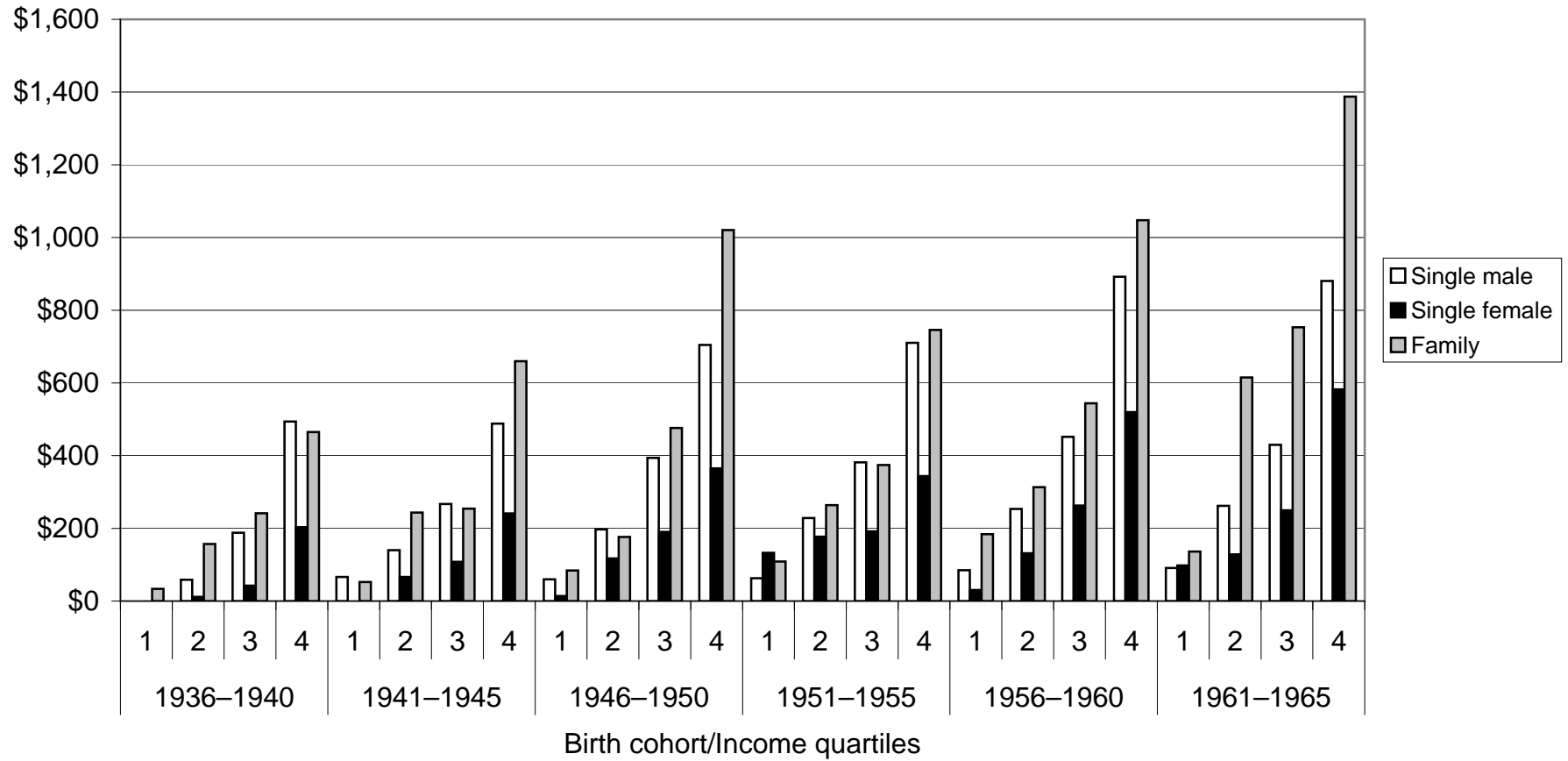
**Figure 5**  
**Average Decrease in Real First-Year Surplus as a Result of Converting**  
**Traditional Final Average Defined Benefit Plans to Cash Balance in 2005**  
 (assuming all employees are automatically grandfathered into the existing plan provisions)



Source: EBRI-ERF Retirement Income Projection Model.®

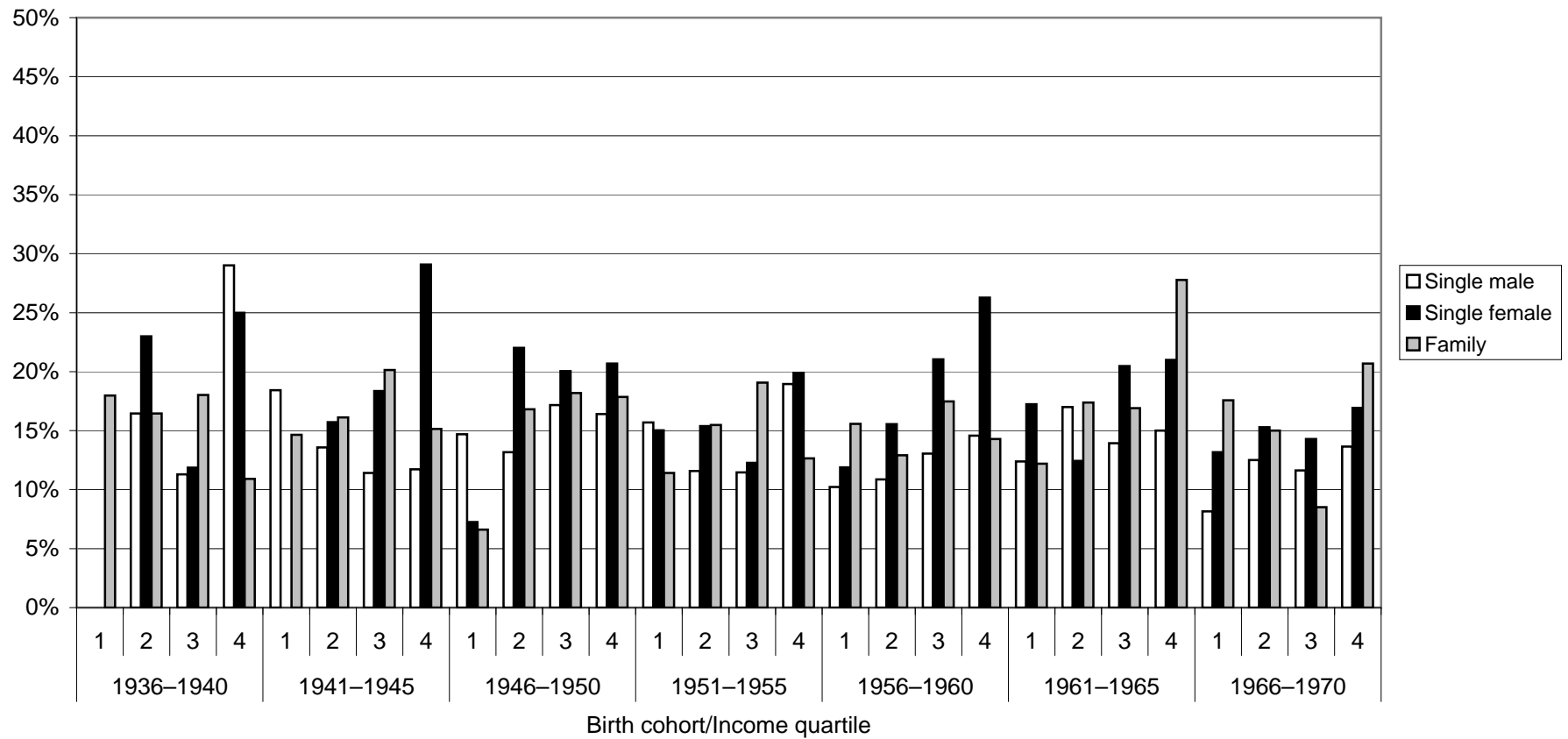


**Figure 6**  
**Average Decrease in Real First Year Surplus as a Result of Terminating All Cash Balance Plans (Without Replacement) in 2005**



Source: EBRI-ERF Retirement Income Projection Model.®

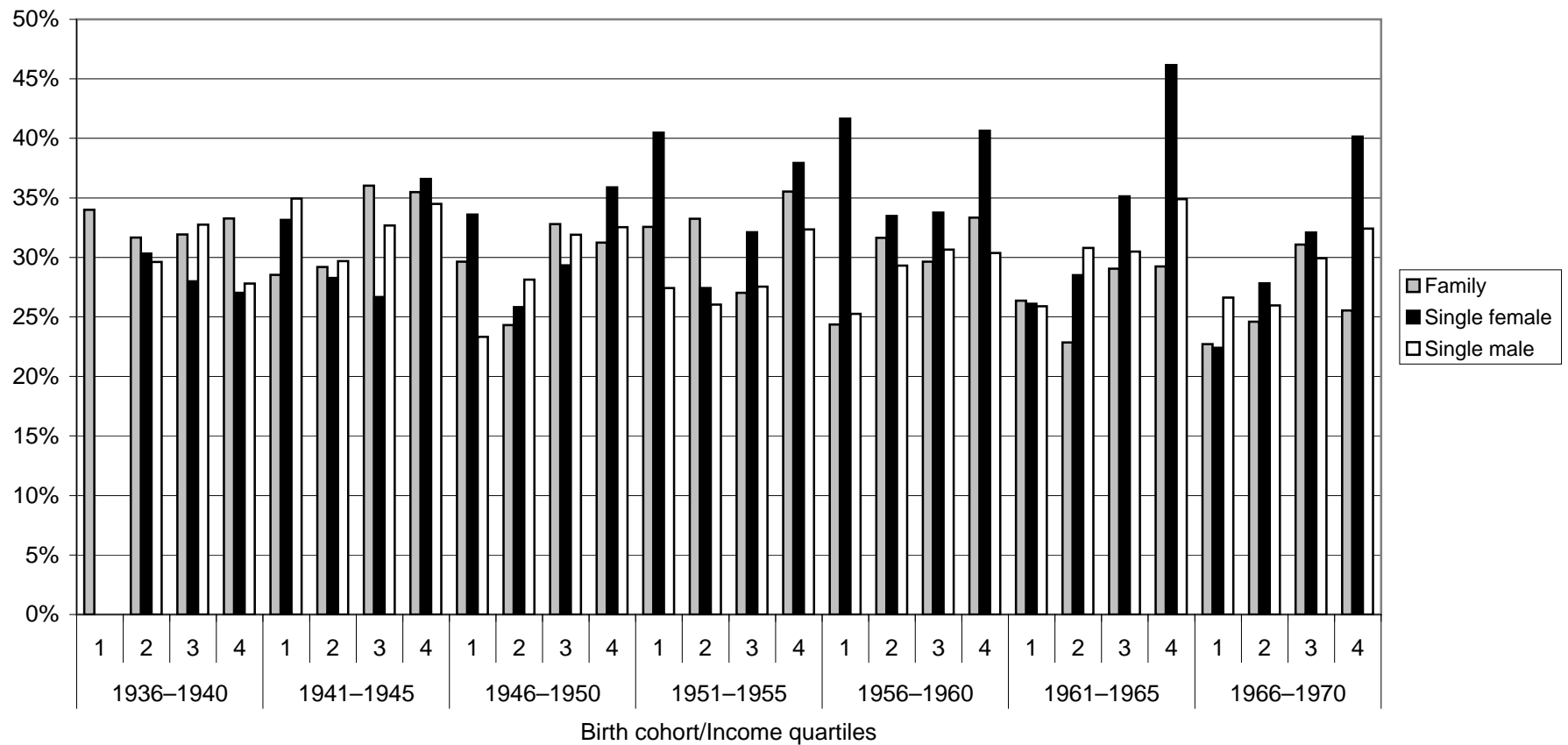
**Figure 7**  
**Increase in Median Percentage of Additional Compensation That Must Be Saved Annually**  
**Until Retirement for a 75% Chance of Covering Simulated Expenses, as a Result of Assuming**  
**All Defined Benefit Participants Take LSDs<sup>a</sup> at Retirement**



Source: EBRI-ERF Retirement Security Projection Model.<sup>®</sup>

<sup>a</sup> Lump-sum distributions.

**Figure 8**  
**Reduction in Median Percentage of Additional Compensation That Must Be Saved Annually**  
**Until Retirement for a 75% Chance of Covering Simulated Expense, as a Result of Annuitizing**  
**All Individual Accounts at Retirement**



Source: EBRI-ERF Retirement Security Projection Model.®

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