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Defined Benefit Plan Freezes: Who's Affected, How Much, and Replacing Lost Accruals

by Jack VanDerhei, Temple University and EBRI Fellow

- **Pension freezes not a new trend:** Despite recent news reports about the supposedly “new” trend among private defined benefit plan sponsors of “freezing” their pension plans, these decisions have been quite prevalent in recent years, and are part of the well-documented and long-term decline of “traditional” pension plans.
- **Current data:** According to PBGC analysis of 2003 Form 5500 filings (the most recent year available), more than 2,700 of the 29,000 (or 9.4 percent) private-sector defined benefit pension plans for which data are available were already hard-frozen in 2003. Between 1975 and 2004, more than 3,400 terminations of *underfunded* single-employer plans had taken place, as well as of at least 165,000 *adequately funded* plans. Many of these plans may well have been frozen at some point prior to termination.
- **EBRI analysis of impact on workers:** This *Issue Brief* provides a detailed analysis of how such activity is likely to impact existing employees as a function of plan type and employee demographics. The accumulation portion of the EBRI-ERF Retirement Security Projection Model was used to estimate the financial consequences of a potential pension freeze for the general population of participants in private defined benefit plans in 2006.
- **Wide range of results due to different factors:** This analysis provides a construct for employers to estimate the relative impact of certain demographics on those covered by defined benefit pension plans in general. This report presents its findings in terms of additional compensation (in a defined contribution plan, whether provided by the employer and/or the worker) needed to cover the accruals lost to a pension freeze. Results range widely for a variety of factors, since each plan contains design features that make it unique; workers vary widely by age, wage, and tenure; and future interest rates will vary. There is fundamentally no simple answer to the question of how all workers will be affected by a pension freeze: Individual analysis of costs and benefits needs to be done for each employer contemplating such a move.
- **General findings:**
 - **For workers in career-average pension plans:**¹ The median annual contribution rate needed to financially indemnify a participant in a career-average defined benefit pension plan whose plan was frozen in 2006 would be about 7 percent, assuming an 8 percent rate of return. A contribution rate of about 15 percent would cover three-quarters of the employees in this type of plan.
 - **For workers in final-average pension plans:** The median contribution rate for a final-average plan is slightly larger: 8 percent (assuming an 8 percent return); a contribution rate of 16 percent would cover three-quarters of the workers in this type of plan.
 - **Cash balance plans:** For workers in hybrid pension (cash balance) plans, the median contribution rate would be about 3 percent; a contribution rate of 4.5 percent would cover three-quarters of the workers, based on current interest credits.
 - **Interest rate impact:** In all of these scenarios, the rate of return on investments has a major impact on the contribution rate; lower rates would require higher contributions to offset the benefit loss from a pension freeze.

Jack VanDerhei, Temple University, is research director of the Employee Benefit Research Institute Fellows Program. Any views expressed in this report are those of the author 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.

Table of Contents

Defined Benefit Plan Freezes: Who’s Affected, How Much, and Replacing Lost Accruals	1
Table of Contents	2
Figures.....	2
Introduction.....	3
Previous Analysis of Pension Freezes.....	4
Reasons to Freeze	6
Likely Future Activity.....	7
Financial Consequences of a Pension Freeze.....	7
Analyzing the Financial Consequences of a Pension Freeze	9
Overall Results by Plan Type.....	9
Results by Age and Plan Type	9
Results by Tenure With the Current Employer at the Time of the Pension Freeze and by Plan Type....	12
Results by Remaining Years to Retirement After Leaving Job With the Current Employer and by Plan Type	12
Results by Tenure With Employer After the Pension Freeze Until Job Change, and by Plan Type.....	12
Conclusions	16
References	17
Endnotes.....	17

Figures

Figure 1, PBGC Terminations (1975–2004): Single-Employer Program	4
Figure 2, Current-Liability-Funded Ratios of Frozen and Unfrozen Pension Plans, 2003.....	5
Figure 3, Percentage of Frozen Pension Plans, by Funded Ratio and Plan Size, 2003	5
Figure 4, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type and Years Already Worked on the Job With the Current Employer (assumes 4% annual rate of return).....	10
Figure 5, Cumulative Distribution Function of the Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type (assumes 4% annual rate of return)	10
Figure 6, Cumulative Distribution Function of the Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type (assumes 8% annual rate of return))...	11
Figure 7, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Total Number of Years Assumed to Be on the Job With the Current Employer (assumes 4% annual rate of return)	11
Figure 8, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type and Current Age (assumes 4% annual rate of return).....	13
Figure 9, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years on the Job With the Current Employer (assumes 8% annual rate of return).....	13

Figure 10, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years on the Job With the Current Employer (assumes 4% annual rate of return)	14
Figure 11, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years to Retirement after Leaving Job With the Current Employer (assumes 8% annual rate of return).....	14
Figure 12, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years to Retirement after Leaving Job With the Current Employer (assumes 8% annual rate of return).....	15
Figure 13, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years on the Job With the Current Employer (assumes 8% annual rate of return)	15
Figure 14, Median Percentage of a Worker’s Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years on the Job With the Current Employer (assumes 4% annual rate of return)	16

Introduction

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

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

The literature documenting the evolution from defined benefit (pension) to defined contribution (primarily 401(k)-type) retirement plans in the last 20 years is replete with studies analyzing the change in the relative composition of plans and participants;² however, very few have focused on the sizeable number of large plan sponsors that have had *both* defined benefit and defined contribution plans in place, at least since the advent of the 401(k) plan in the early 1980s.³ For these sponsors, the primary decision in many cases is not whether to retain *both* forms of retirement plan, but the relative value of each in terms of future accruals or contributions. While this may not be considered to be an optimal choice for some sponsors, after recognizing certain legal⁴ and/or financial constraints, such as the inability to terminate an underfunded pension plan (with the exception of certain sponsors satisfying the bankruptcy conditions necessary to trigger pension insurance coverage by the Pension Benefit Guaranty Corporation, or PBGC) and the imposition of a 20 percent or 50 percent excise tax on the recoupment of excess assets in the case of a reversion,⁵ the best available choice may be to gradually reduce the relative value of the defined benefit plan in the future by the imposition of a pension freeze.

It should be noted that there is more than one definition of a pension freeze:⁶

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

Previous Analysis of Pension Freezes

In recent years, Form 5500⁷ has included a question as to whether the plan has undergone a hard freeze. The PBGC (2005) analyzed the vast majority of the 2003 Form 5500 filings (the most recent year available at the time) and concluded that more than 2,700 of the 29,000 plans (or 9.4 percent) for which 2003 data are available were hard-frozen in 2003. Note that the PBGC analysis was limited to plans insured by the single-employer program and presumably did not cover plans that had already been terminated prior to that time. Figure 1 shows that between 1975 and 2004, more than 3,400 terminations of *underfunded* single-employer plans had taken place, as well as of least 165,000 *adequately funded* plans. Many of these plans may well have been frozen at some point prior to termination.

Figure 1
PBGC Terminations (1975–2004):
Single-Employer Program

Fiscal Year	Adequately Funded Plan Terminations	Underfunded Plan Terminations
1975–1979	28,572	586
1980–1984	29,236	621
1985–1989	48,519	537
1990–1994	36,340	692
1995–1999	15,620	438
2000–2004	6,969	595
TOTAL	165,256	3,469

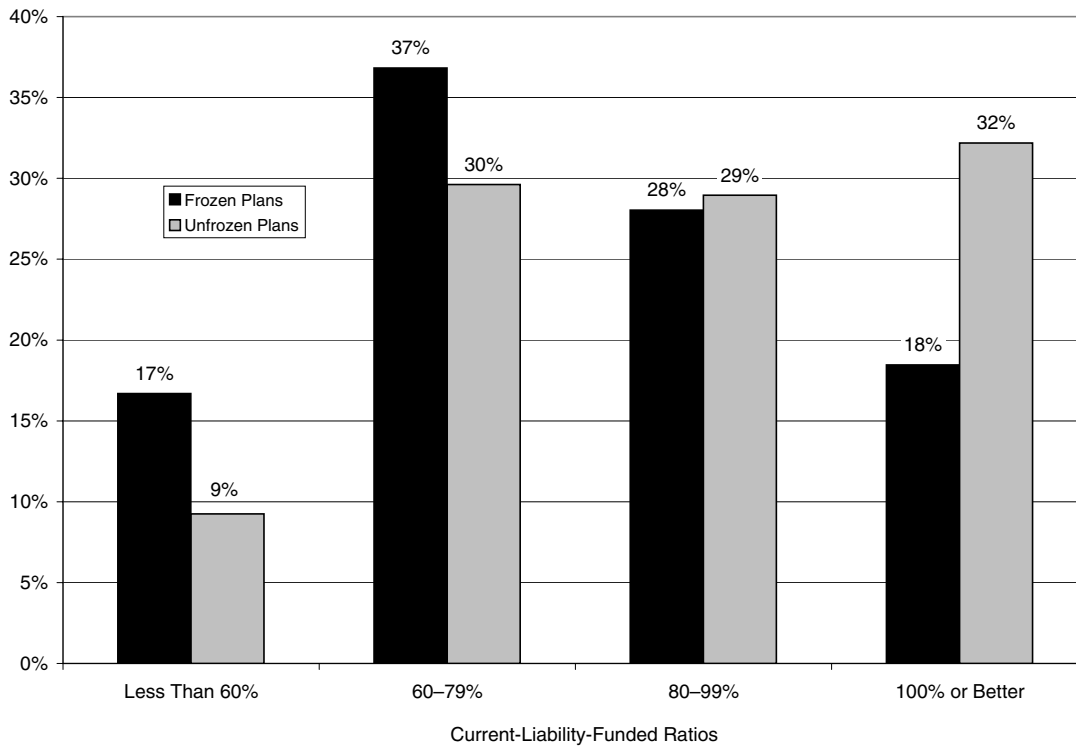
Source: Pension Benefit Guaranty Corporation, *Pension Data Book, 2004*

However, most of the frozen plans were small and collectively had only 2.5 percent of the participants in PBGC-insured plans. While analysis of this type of data may not be ideal with respect to some of the current public policy questions,⁸ it is the only study that undertakes an analysis of the entire population of private defined benefit sponsors.

The PBGC study found that hard freezes were much more likely to take place among small plans: 10.1 percent of those with fewer than 100 participants were hard-frozen, versus only 2.2 percent of those with more than 5,000 participants. Moreover, the study found that hybrid plans (such as cash balance) were less likely to be hard-frozen (5.7 percent) than pay-based plans (8.8 percent). Also, frozen plans were much more likely to be underfunded (and in some cases considerably so) than their unfrozen counterparts. Figure 2 shows that, in 2003, less than 20 percent of the frozen plans had a current liability funded ratio in excess of 100 percent, whereas approximately one-third of the unfrozen plans were not underfunded when measured on this basis. More than 15 percent of the frozen plans were determined to be less than 60 percent funded (or, conversely, more than 40 percent underfunded), compared with less than 10 percent of the unfrozen plans. Figure 3 shows that this is not simply a matter of plan size, as small frozen plans (defined as those with fewer than 100 participants) were more likely to be more than 40 percent underfunded *and* more likely to be overfunded than the larger plans that had adopted a hard freeze.

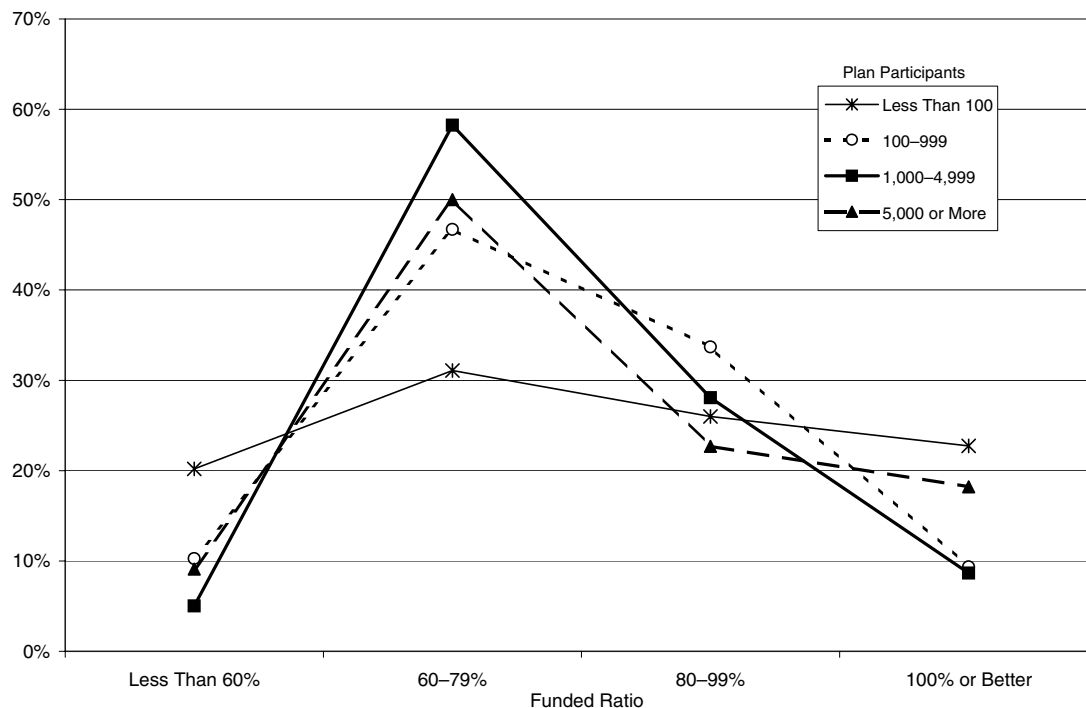
In addition to the PBGC study, several consulting firms have been able to provide additional analysis that provides more recent information on pension freezes, as well as additional information on reasons for the pension freeze and/or plans for future freeze activity. As early as October 2003, Aon (2003) studied the history of more than 1,000 plans from their clients that either have or had defined benefit plans. They found that 2 percent of these plans had frozen benefits before 2001, another 15 percent had taken action to freeze benefits since Jan. 1, 2001, with most of the freezes (13 of the 15 percent) already in effect, and that sponsors of an additional 6 percent of plans were actively considering a plan freeze.

Figure 2
Current-Liability-Funded Ratios of Frozen and Unfrozen Plans, 2003



Source: Pension Benefit Guaranty Corporation, "An Analysis of Frozen Defined Benefit Plans," Dec. 21, 2005.

Figure 3
Percentage of Frozen Plans, by Funded Ratio and Plan Size, 2003



Source: Pension Benefit Guaranty Corporation, "An Analysis of Frozen Defined benefit Plans," Dec. 21, 2005.

According to a study by Watson Wyatt (2005), the number of Fortune 1,000 firms with a frozen or terminated plan increased from 7 percent to 11 percent in 2004. At that time, of the 71 companies that had frozen or terminated plans, just under half had below investment-grade credit ratings, as compared with 25 percent of those with active defined benefit plans. Similar to the PBGC findings, these firms had an average funding ratio of 75 percent, as compared with 83 percent for the active sample.

Watson Wyatt also found that 25 of these firms had benefit accruals for the active participants but were closed to new participants in 2004; however, unlike the frozen or terminated plans, funding ratios and credit ratings for these plans were comparable to those in fully active plans. This may suggest that this form of freeze appeals to a more generic profile of plan sponsor than those undertaking a freeze for the entire work force population.

Mercer (2006) analyzed the financials of 15 S&P 500 companies with stated intentions to freeze their defined benefit plans in the last 18 months. This provides additional insight with respect to whether plan sponsors are adopting these changes voluntarily (perhaps as a part of a total compensation redesign) or whether they perceive their actions to be forced by corporate financial situations. They find that the median credit rating for those electing to freeze is slightly better than the median S&P 500 company; however, the median cash contribution requirements for the pension plan as a percentage of revenue or operating cash flow are two to three times higher than those of the rest of the S&P 500. This suggests that some of the companies undertaking a pension freeze are doing so more out of a strategic corporate redesign than in response to immediate financial difficulties.⁹

In addition to required cash contributions to defined benefit plans, many sponsors have had a negative reaction to the potential increase in liability recognition and/or pension expense volatility as a result of the recent accounting rule projects announced by the Financial Accounting Standards Board (FASB).¹⁰ Of the 15 companies stating their intention to freeze in the Mercer study, the median pension expense as a percentage of revenue is significantly higher than that of the S&P 500 firms, and plans with higher service costs are more likely to be frozen. The estimated impact of the anticipated FASB proposal to recognize pension plans' funded status on the corporate balance sheet results in a median reduction in equity of 7 percent for these companies, compared with 2 percent for all S&P 500 plan sponsors, and the median plan liability for these companies is 37 percent of corporate liabilities, as compared with 17 percent for the S&P 500.

Reasons to Freeze

It should be noted that some of the pension freezes that have taken place already (or may take place in the future) have little to do with the desire to change the importance of the defined benefit component in the retirement security package. In many cases, especially when merger and acquisition activity has taken place, the inability to gracefully merge two or more legacy plans will result in the freezing of the previous plans and the introduction of a new defined benefit plan to cover the combined population of employees with a consistent benefit formula.

However, a significant proportion of firms studied by consultants have indicated that financial considerations play a major role in this decision. According to the Aon study, among the most prevalent causes of a pension freeze were:

- Amount of contributions the sponsor must make to the plan (45 percent).
- Volatility of required annual contributions to the plan (39 percent).
- Impact on corporate expense (35 percent).
- Inability to accurately predict future contribution requirements (24 percent).

According to the Mercer study:

- Approximately one-third listed "reduce cost volatility" as the most important reason.¹¹
- Approximately one-quarter listed long-term cost savings.
- Approximately 3 percent listed the shift in investment risk.

Likely Future Activity

As part of their annual review of human resource professionals, Hewitt Associates (2006) asked sponsors of both traditional defined benefit plans as well as hybrid plans their likely changes to defined contribution and defined benefit plans for their active salaried U.S. employees in 2006. Responses of 227 employers were received from a sample of relatively large employers.¹² Of the 96 respondents with traditional defined benefit plans, 32 percent were either very or somewhat likely to no longer allow new employees to enter the defined benefit plan (meaning they would freeze the plan to new workers), whereas 16 percent were either very or somewhat likely to cease benefit accruals for all or a portion of participants. Among the 56 respondents with cash balance plans, 27 percent were either very or somewhat likely to no longer allow new employees to enter defined benefit plan, whereas 16 percent were either very or somewhat likely to cease benefit accruals for all or a portion of participants.

Mercer (2006) reviewed approximately 35 plan redesign projects completed in 2005 and noted that roughly 60 percent of the companies had committed to freezing their defined benefit plans and moving to an all-defined contribution platform. They note that in most cases this would be for current as well as new employees. Moreover, the Mercer study notes that early discussion with approximately 70 other companies suggests that 85 percent list some sort of pension plan close, freeze, or termination as an option under consideration.

Financial Consequences of a Pension Freeze

This process can be illustrated through the use of a stylized example. Assume an employee begins participating in a defined benefit pension plan at age 30 and plans to retire at age 65. The defined benefit plan is a final-average plan that provides a benefit accrual of 1 percent per year of participation times the average of the final three years of compensation. In 2006, when the employee is age 50 and earning \$70,000, the defined benefit plan is frozen and replaced with a 401(k) plan. How much will the employee need to accumulate in the plan to end up with the same expected retirement income as he or she would have had if the plan had not been frozen? If the employee is assumed to have a constant salary growth of 3 percent per year, the final year's salary at age 64 would be equal to \$105,881 and the final three-year average compensation would be \$102,827. This would have provided a nominal annual annuity of \$35,989 beginning at age 65 if the plan had not been frozen.

However, the average compensation after the plan is frozen is now \$67,980 and the accrued benefit is frozen at \$13,596 per year beginning at age 65. The difference of \$22,393 would need to be made up by purchasing an annuity at age 65 with the proceeds of the 401(k) balance. Assuming that the annuity purchase price at that time is 13.38,¹³ the employee would have needed to accumulate \$299,536 in his 401(k) plan to purchase an annuity to fill in the gap created by the pension freeze. If one assumes the same age-specific asset allocations observed in the EBRI/ICI Participant-Directed Retirement Plan data base from year-end 2004¹⁴ and a deterministic annual rate of return of 10.4 percent nominal on equities and 5.5 percent nominal on other asset classes, the requisite amount of money would be accumulated during the following 15 years if a total contribution of 12.87 percent of compensation is made at the end of each year to the employee's 401(k) plan. Whether this money is provided by the employee, the employer, or a combination of the two is irrelevant for purposes of providing the full benefit that was expected prior to the freeze;¹⁵ however, in most cases the previous (defined benefit) plan would be noncontributory and a full financial indemnification for the freeze would suggest that the full annual contribution be provided by the employer.

While the previous example illustrates the percentage of annual compensation that must be contributed for indemnification of the amount of expected retirement income lost as a result of the pension freeze, the result is extremely sensitive to many of the underlying assumptions that were made. For example, if the assumed rate of return on equities is decreased to 8 percent nominal per year, the percentage of compensation needed to indemnify the individual for the loss in *expected* retirement income as a result of the pension freeze (hereafter referred to as the "indemnification contribution rate") would increase from 12.87 percent to

14.3 percent. In a similar manner, if the assumed salary growth rate increased to 4 percent nominal per year, the indemnification contribution rate would increase to 14.6 percent.

On the other hand, there are other assumptions that may not be realized in the stylized example that would tend to *reduce* (rather than increase) the indemnification contribution rate. Perhaps the most obvious example is that very few employees will work for a single employer for their entire careers—which means very few employees will qualify for the full final-average pension benefit potentially attainable.¹⁶ If the assumption in the stylized example above is relaxed such that the employee were to change jobs five years after the pension freeze (at age 55), the indemnification contribution rate drops to 7.5 percent per year (this is because the potential final-average pension benefit is substantially smaller due to the job change).

Beside the key assumptions of future rates of return on various asset classes and future salary growth, the indemnification contribution rate will depend, among other things, upon:

- ***The type of defined benefit plan that was previously sponsored.*** Final-average plans (and to a lesser extent, career-average plans) tend to grow faster toward the end of the employee's active working career than the other plan types, and (all else equal) should have a larger indemnification contribution rate for older and/or longer-tenured employees; the bigger the potential pension benefit, the more would have to be made up through 401(k) contributions. Cash balance pension plans tend to accumulate benefits in a fashion that is similar to 401(k) plans and the indemnification contribution rate will be determined by the relative size of the cash balance pay credits and the spread between the assumed interest credit for the cash balance plans and the assumed rate of return for the 401(k) plans. One particularly vexing problem in estimating the indemnification contribution rate for cash balance plans deals with the choice of an assumed interest credit in the future. Although the distribution of current rates can be sampled, assumptions regarding future rates may be more likely to trend toward rates of return on long-term Treasuries. This problem is addressed later in the report by analyzing cash balance plans with both current and long-term rates.¹⁷
- ***Generosity parameters of the defined benefit plan.*** Within any plan type, there are a variety of plan design considerations that may make the plan more or less valuable to the employee. For example, in the stylized example above, the 1 percent of final-average, three-year compensation could have been 1.5 percent. Alternatively, the averaging period might have been five years or the plan benefits might have been integrated with Social Security. As described above, the higher the relative value of the defined benefit pension plan, the higher the indemnification contribution rate.
- ***Age of initial participation in the current plan, age at time of pension freeze, and age at time of job change following the pension freeze.*** Mathematically, the indemnification contribution rate will be determined by each of these values and can be analyzed by looking at the impact of each of the following on the indemnification contribution rate:
 1. Length of time with the employer after the pension freeze until job change.
 2. Remaining years to retirement after leaving the current job.
 3. Years already worked on the current job.
 4. Age at the time of the pension freeze.

With the exception of the first variable above, there should be a straightforward relationship between the values of each of these and the indemnification contribution rate. The second variable should have a negative association with the indemnification contribution rate, given that the longer the time after the job change, the longer the period of time the 401(k) balance can accumulate until retirement age without having a commensurate increase in the defined benefit accrual under the assumption that the plan had not been terminated. The last two variables should have a positive association with the indemnification contribution rate: The first is indeterminate (since there are two opposing forces at work: the longer the employee was going to work after the point of the pension freeze, the larger the future defined benefit accrual; however, the longer period also gives additional time for 401(k) contributions to accumulate under the assumption that the defined benefit pension has been frozen).

Analyzing the Financial Consequences of a Pension Freeze

This section analyzes the financial consequences of a pension freeze for the general population of participants in private defined benefit plans in 2006. This is accomplished by utilizing the accumulation portion of the EBRI-ERF Retirement Security Projection Model.¹⁸ Briefly, the model takes the current population of workers in the private sector in 2006, statistically attributes whether or not they are participating in a defined benefit plan and, if so, what type of plan and the attendant generosity parameters.

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

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

In addition, one more modification is made by the EBRI-ERF model before undertaking this analysis. It is a well-known fact that job tenure is longer for defined benefit participants than for either defined contribution participants or workers in general, given the financial consequences of job change upon employees participating in a final-average defined benefit pension plan. Therefore, the typical tenure distributions are replaced with those for participants *exclusively* in defined contribution plans (Figure 4) to account for the increased job mobility that is likely to accompany the pension freeze.

Overall Results by Plan Type

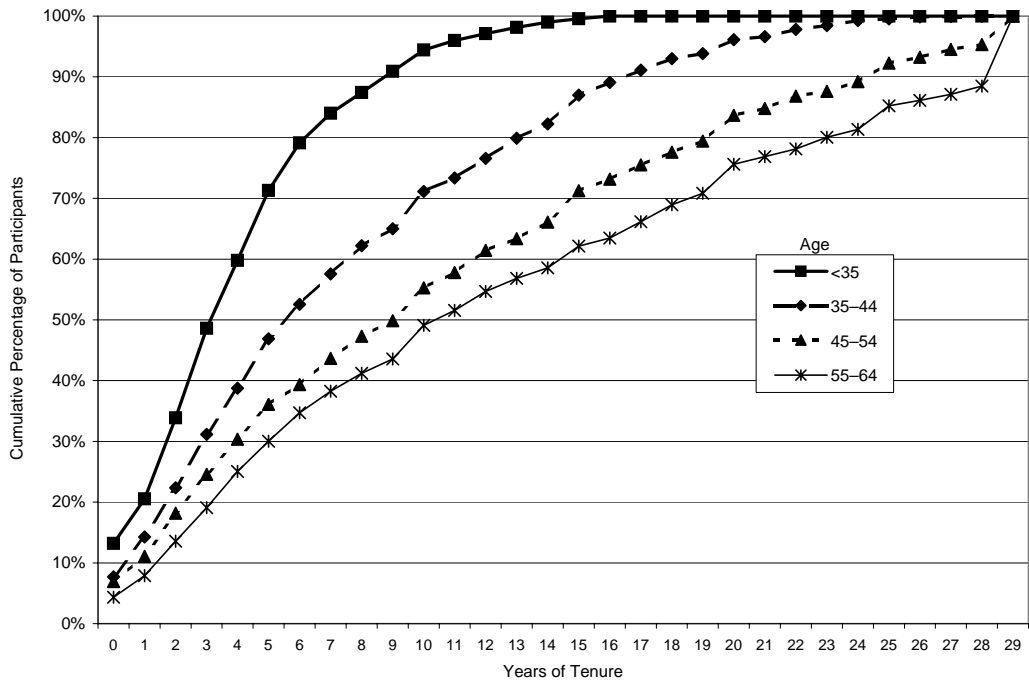
4 percent rate of return: The median indemnification contribution rate for a career-average defined benefit pension plan is 11.6 percent, assuming a 4 percent rate of return (Figure 5). An indemnification contribution rate of 18.8 percent would be sufficient to cover 75 percent of the employees covered by this type of plan. The median rate for a final-average plan is larger, as expected: 13.5 percent, and the threshold rate for the 75th percentile increases to 21.0 percent. Cash balance plans have a median indemnification contribution rate of 4.6 percent, with a 75th percentile threshold rate of 6.3 percent using the current interest credits. These values increase to 5.7 percent and 7.3 percent if, instead, the cash balance plans are assumed to credit interest at the intermediate long-term assumption for the interest rate of the Treasury special public-debt obligation bonds issuable to the OASDI trust funds, as specified in the 2005 Trustees of the OASDI Trust Funds Report (5.8 percent).

8 percent rate of return: If the rate of return assumption is increased to 8 percent nominal (Figure 6), the median indemnification contribution rate for a career-average defined benefit plan is 6.6 percent. An indemnification contribution rate of 14.8 percent would be sufficient to cover 75 percent of the employees covered by this type of plan. The median for a final-average plan is 8.1 percent and the 75th percentile threshold increases to 16.0 percent. Cash balance plans have a median indemnification contribution rate of 2.7 percent, with a 75th percentile threshold of 4.5 percent using the current interest credits. These values increase to 3.1 percent and 5.2 percent if the cash balance plans are assumed to credit interest at 5.8 percent.

Results by Age and Plan Type

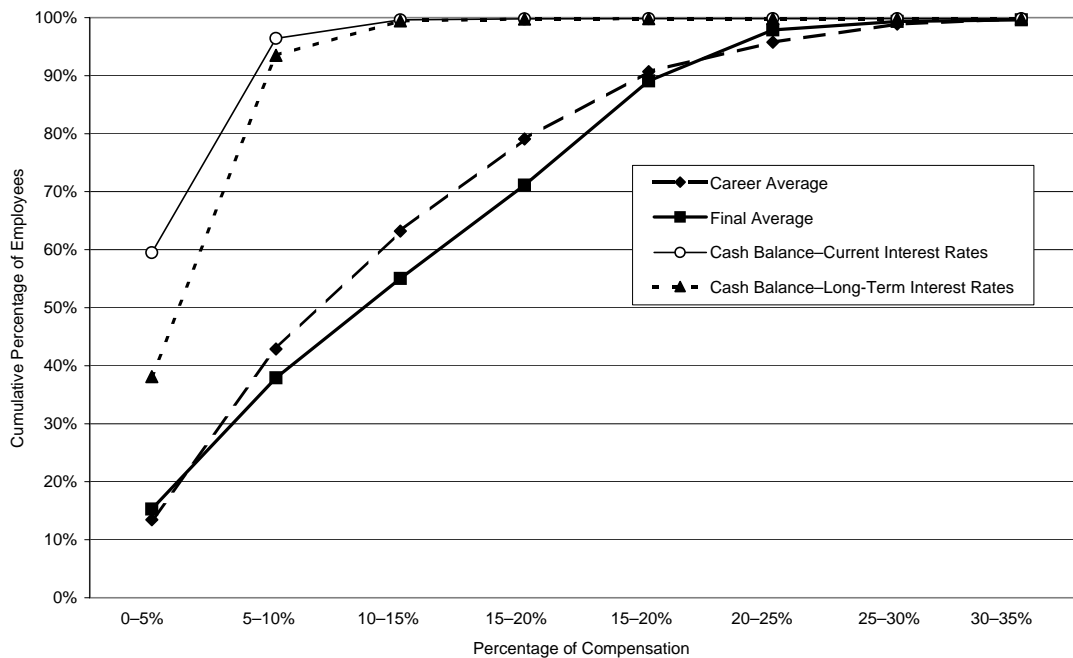
Although the median indemnification contribution rates for career- and final-average plans at a 4 percent rate of return were 11.6 percent and 13.5 percent, respectively, these values ignore the impact of the employee's age on the rates. Figure 7 shows that the median rates increase substantially with the age of the employee. For career-average plans, the medians increase from 5.1 percent for those currently age 30–34 to 20.1 percent when they are 60–64. Final-average plans have an even larger increase: from 3.9 percent to 22.4 percent. Cash balance plans display little variation by age regardless of the interest credit chosen.

Figure 4
Cumulative Distribution Function of Tenure for Private-Sector Participants Exclusively in Defined Contribution Plans, by Age, 2003



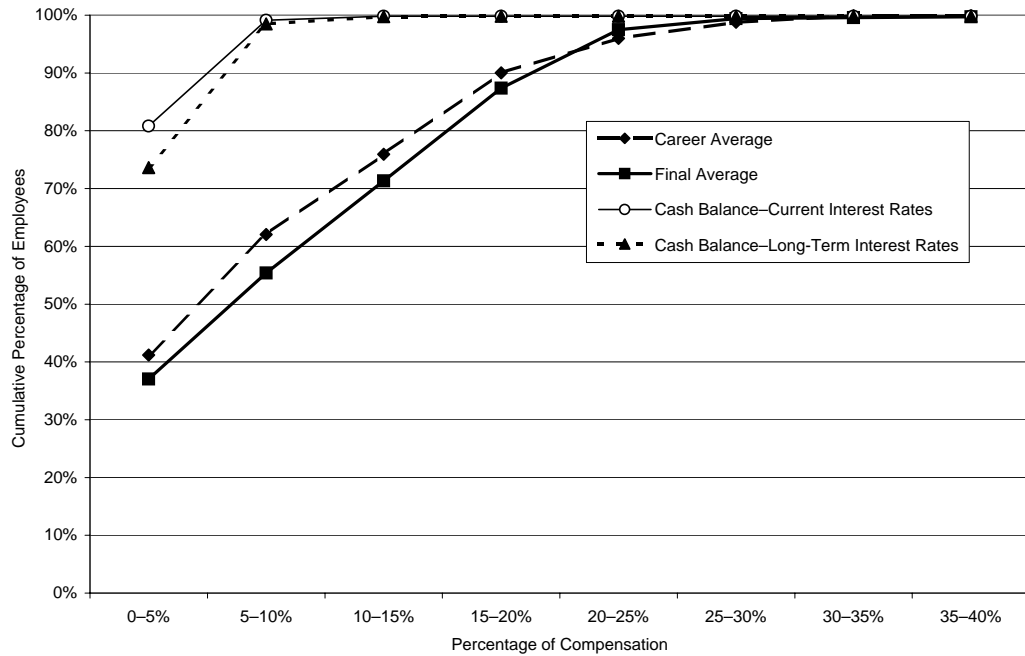
Source: Employee Benefit Research Institute estimates from 2001 Panel of the Survey of Income and Program Participation Topical Module 7.

Figure 5
Cumulative Distribution Function of the Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type
 (assumes 4% annual rate of return)



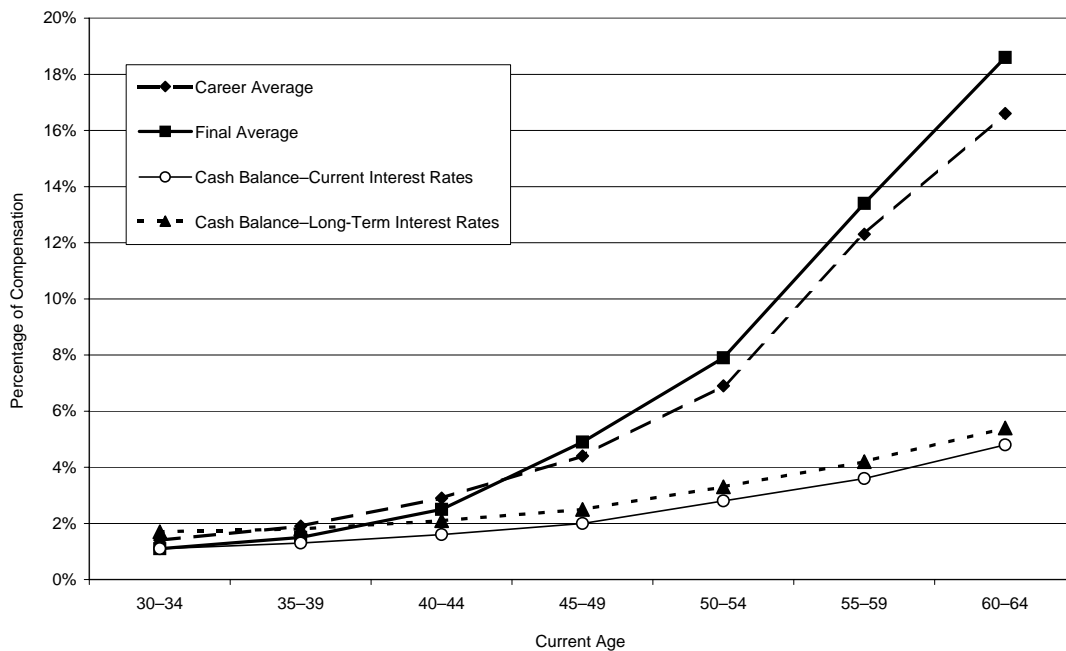
Source: Author's tabulations from the EBRI/ERF Retirement Income Projection Model.

Figure 6
Cumulative Distribution Function of the Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type
 (assumes 8% annual rate of return)



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

Figure 7
Median Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type and Current Age
 (assumes 8% annual rate of return)



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

Figure 8 shows similar results when an 8 percent rate of return is chosen: the indemnification contribution rates for career-average plans increase from 1.4 percent for the youngest workers analyzed to 16.6 percent for the oldest cohort. The rates for final-average plans increase from 1.1 percent to 18.6 percent for the respective age cohorts, while cash balance plans remain much flatter than the other two types but no longer appear age-invariant: For cash balance plans, the rates increase from 1.1 percent to 4.8 percent for the young/old age cohorts when current interest credits are used, and 1.7 percent to 5.4 percent when long-term rates are assumed.

Results by Tenure With the Current Employer at the Time of the Pension Freeze and by Plan Type

The number of years already worked with the current employer at the time of the pension freeze can have two potential influences on the indemnification contribution rate for noncash balance plans. First, the longer an employee has worked with an employer at the time of the freeze, the shorter the period of time he or she will have to accumulate balances in the 401(k) plan after the subsequent job change with respect to the current employer. Second, the longer an employee has worked for an employer at the time of the freeze, the more years of accruals will be affected by the reduced salary average in a final-average plan. Career-average plans will be affected by the first influence only, while final-average plans will be affected by both.

Figure 9 shows the impact of this factor at an assumed rate of return of 4 percent. The career-average indemnification contribution rate increases from 10.7 percent for employees with zero to four years of prior tenure with the employer, to 14.0 percent for those with 15 or more years. The final-average indemnification contribution rate for similar groups increases from 10.7 percent to 17.3 percent.

Figure 10 shows the same results assuming an 8 percent rate of return. The career-average indemnification contribution rate increases from 5.2 percent for employees with zero to four years of prior tenure with the employer, to 10.8 percent for those with 15 or more years. The final-average indemnification contribution rate for similar groups increases from 6.0 percent to 12.9 percent.

Results by Remaining Years to Retirement After Leaving Job With the Current Employer and by Plan Type

The remaining years to retirement after leaving a job with the current employer are expected to affect the indemnification contribution rate because this represents the remaining time employees would have to accumulate investment returns in a 401(k) plan, assuming the pension freeze had occurred with a corresponding benefit accrual. In fact, the reason the current-age graphs (Figures 7 and 8) had the relationship they did was because they were acting as a proxy for this variable.

At a 4 percent rate of return (Figure 11), the indemnification contribution rate for a career-average plan decreases from 18.9 percent for employees with zero to four years of remaining years to retirement, to 3.9 percent for those with 30 or more years. The final-average indemnification contribution rate for similar groups decreases from 20.7 percent to 3.5 percent.

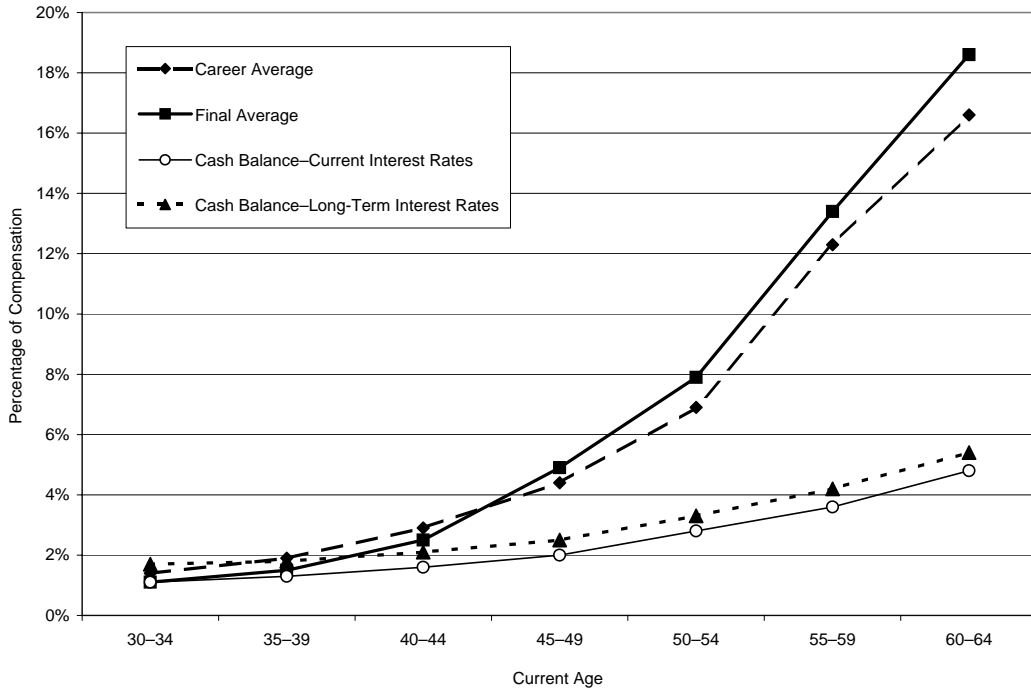
At an 8 percent rate of return (Figure 12), the career-average indemnification contribution rate decreases from 14.9 percent for employees with zero to four years of remaining years to retirement to 1.1 percent for those with 30 or more years. The final-average indemnification contribution rate for similar groups decreases from 15.7 percent to 1.0 percent.

These figures demonstrate the strong impact that a pension freeze has on older workers (who have little time left in their working careers to accumulate assets in a defined contribution plan), especially compared with younger workers (who have much more time).

Results by Tenure With Employer After the Pension Freeze Until Job Change, and by Plan Type

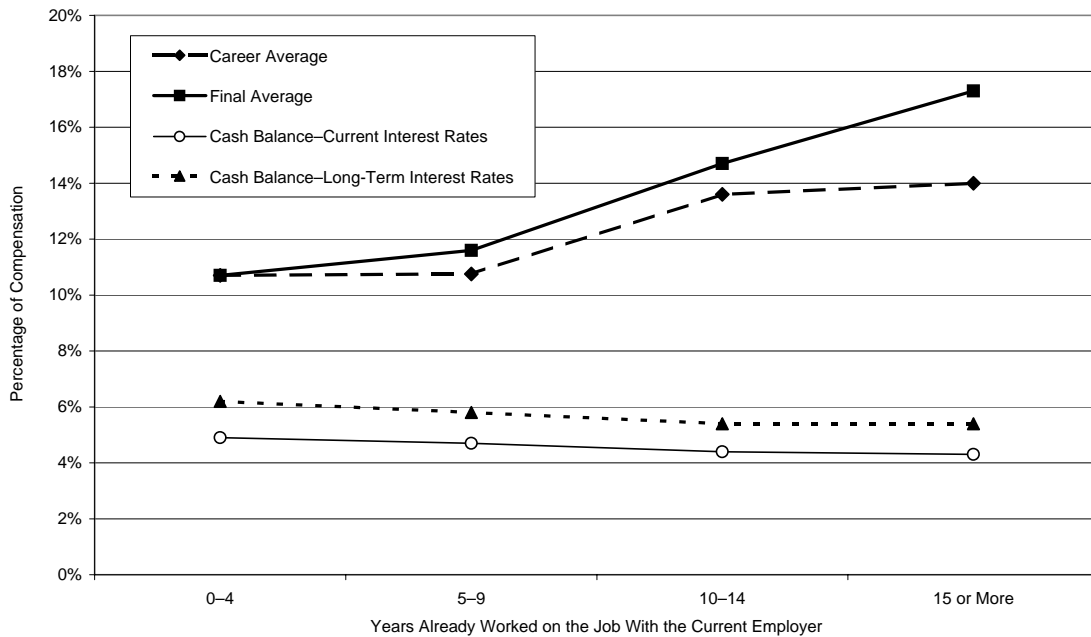
The number of years that an employee remains with an employer after the pension plan is frozen will affect the indemnification contribution rate. For final- and career-average plans, the indemnification contribution rate is likely to increase for several years until the point where the 401(k) accumulations can offset the incremental benefit accruals. For example, in Figure 13 the indemnification contribution rate for final-average plans peaks at 13.0 percent for employees with 10–14 remaining years with the employer after the freeze. After that point, additional 401(k) accumulations more than make up for the extra pension

Figure 8
Median Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type and Current Age
 (assumes 8% annual rate of return)



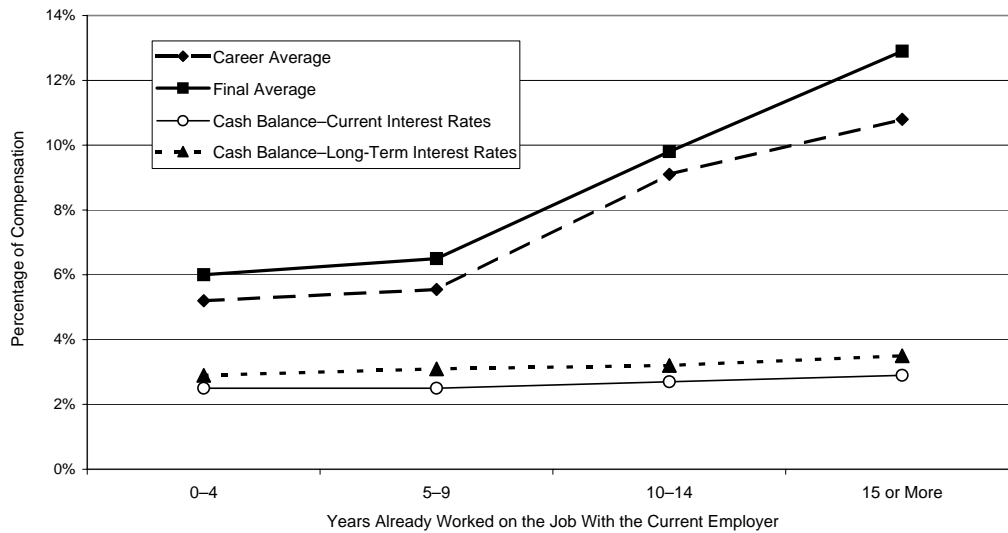
Source: Author's tabulations from the EBRI/ERF Retirement Income Projection Model.

Figure 9
Median Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type and Years Already Worked on the Job With the Current Employer
 (assumes 4% annual rate of return)



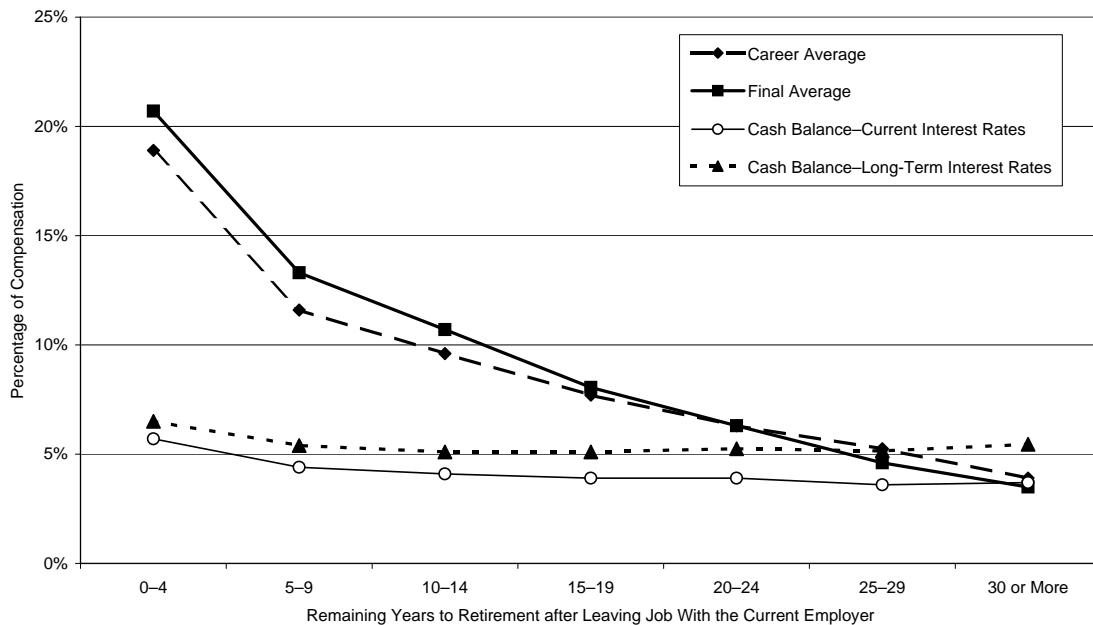
Source: Author's tabulations from the EBRI/ERF Retirement Income Projection Model.

Figure 10
Median Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze in 2006, by Pension Plan Type and Years Already Worked on the Job With the Current Employer
 (assumes 8% annual rate of return)



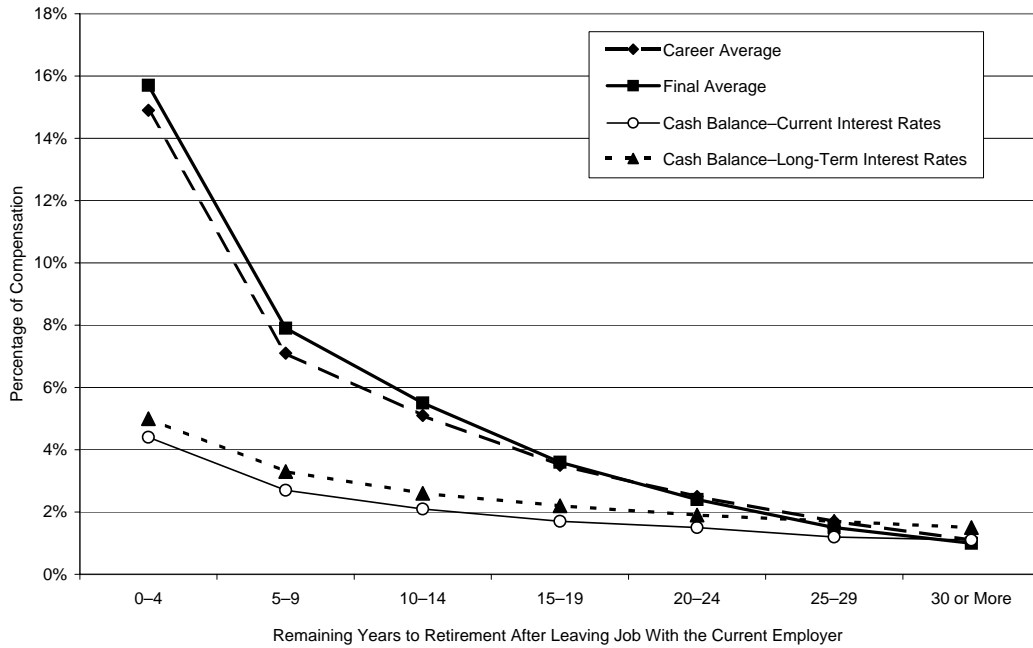
Source: Author's tabulations from the EBRI/ERF Retirement Income Projection Model.

Figure 11
Median Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years to Retirement after Leaving Job With the Current Employer
 (assumes 4% annual rate of return)



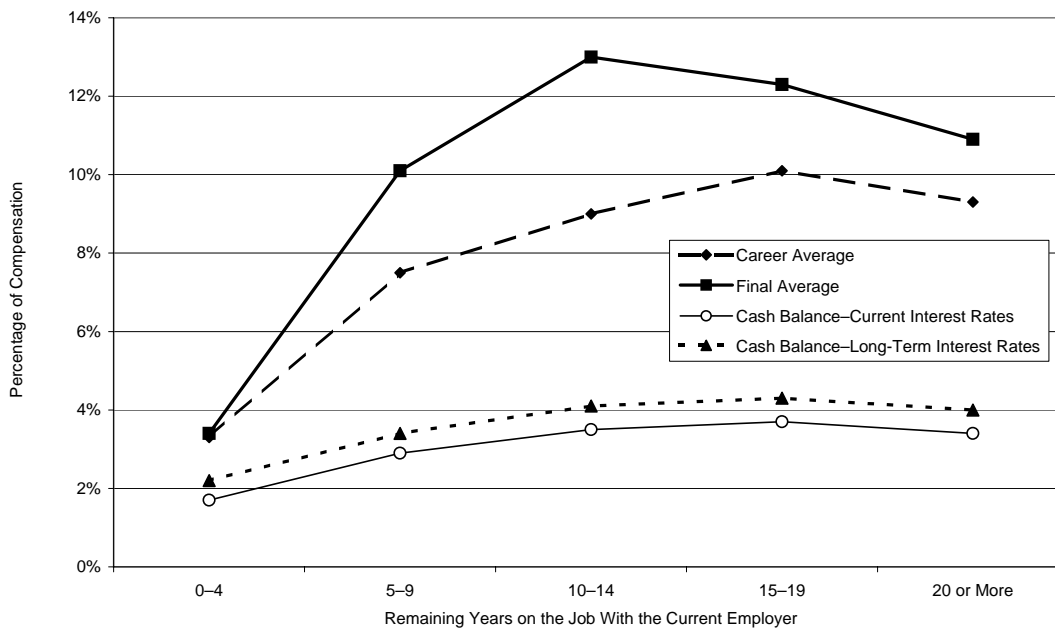
Source: Author's tabulations from the EBRI/ERF Retirement Income Projection Model.

Figure 12
Median Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years to Retirement after Leaving Job With the Current Employer
 (assumes 8% annual rate of return)



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

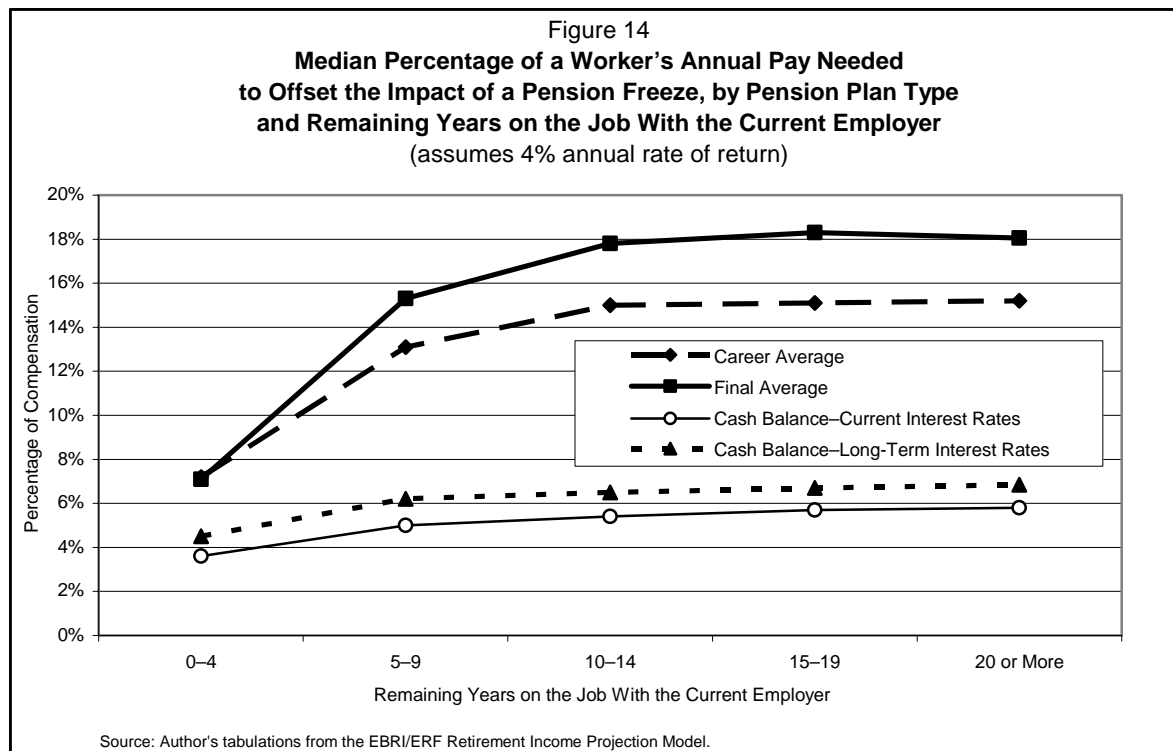
Figure 13
Median Percentage of a Worker's Annual Pay Needed to Offset the Impact of a Pension Freeze, by Pension Plan Type and Remaining Years on the Job With the Current Employer
 (assumes 8% annual rate of return)



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

accruals that would have been accumulated if the plan was not frozen, so the indemnification contribution rate begins to decrease: 12.3 percent for workers with 15–19 years of tenure and 10.9 percent for those with 20 or more years. A similar situation arises for the career-average plans; however, it does not peak until 15–19 years after the pension freeze.

Figure 14 shows the same situation for a 4 percent rate of return; however, with the reduced amount of investment income, the period for the downturn in the indemnification contribution rate curve is delayed. For example, the final-average indemnification contribution rate peaks at 18.3 percent for employees 15–19 years after the pension freeze and decreases nominally to 18.0 percent for those with 20 or more years of tenure.



Conclusions

As defined benefit pension sponsors continue to freeze benefit accruals for new and/or current employees and substitute either new or enhanced 401(k) plans, many observers will be concerned whether the total *expected* retirement income from the combination of the frozen defined benefit and the new/additional 401(k) balances will equal or exceed what the employees might have thought they would receive from the original defined benefit plan, assuming it continued without modifications. As Figures 5 and 6 show, there is tremendous variability regarding what it would take to financially indemnify an employee for such a freeze. Because workers affected by a pension freeze vary greatly by age, salary, and job tenure; by the specific provisions and formula in the types of retirement plans they are covered by (both pension and 401(k)); and by the underlying economic assumptions that are used to estimate the effects of a pension freeze, there is fundamentally no simple answer to the question. However, these data illustrate the general impact of age and tenure: Older, longer-tenure workers tend to be affected by a pension freeze more than younger workers because they do not have as much time left in their working careers in a 401(k) plan to offset the accrual loss from a pension freeze.

This analysis has used the EBRI/ERF model (Figures 7–14) to show how results will differ depending on plan type, assumed rate of return, and a variety of tenure factors. This analysis provides a construct for employers to estimate the relative impact of certain demographics on those covered by defined benefit pension plans in general. However, each plan contains design features that make it unique, and individual analysis of costs and benefits needs to be done for each employer contemplating such a move.

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Endnotes

- ¹ A *career-average* plan bases annual retirement benefits on the number of years of participation and the average salary during the employee's entire career with the plan sponsor. A *final-average* plan bases annual retirement benefits on the number of years of participation and the average salary during the employee's final years (typically three or five) with the plan sponsor. In contrast, a *cash balance* plan will use a notional account to communicate to the employee the growth of the retirement benefit; each year the previous account balance will be increased by both a pay credit and an interest credit.
- ² For a review of this literature, see William Gale, Leslie Papke, and Jack L. VanDerhei, "Understanding the Shift Toward Defined Contribution Plans," in *The Evolving Pension System* (Washington, DC: Brookings Institution Press, 2005).
- ³ For an analysis that did look at the cash flow implications instead, see Jack L. VanDerhei and Kelly Olsen, "Defined Contribution Plan Dominance Grows Across Sectors and Employer Sizes, While Mega Defined Benefit Plans Remain Strong: Where We Are and Where We Are Going?" in Dallas Salisbury, ed., *Retirement Prospects in a Defined Contribution World* (Washington, DC: Employee Benefit Research Institute, 1997), pp. 55–92.
- ⁴ Another constraint that may be operative for some sponsors is the legal uncertainty surrounding a conversion to a cash balance plan. See Jack L. VanDerhei, "The Controversy of Traditional vs. Cash Balance Plans," *ACA Journal*, Vol. 8, no. 4 (Fourth Quarter 1999): pp. 7–16 for additional detail.
- ⁵ See Jack L. VanDerhei, "Pension Plan Surplus: Revert, Transfer, or Hold?" *EBRI Issue Brief* no. 88 (Employee Benefit Research Institute, March 1989) for additional detail.
- ⁶ Pension Benefit Guaranty Corporation, "An Analysis of Frozen Defined Benefit Plans" (Washington, DC: Brookings Institution, Dec. 21, 2005).
- ⁷ Form 5500 is the annual report of an employee benefit plan that employers must file with the U.S. Treasury Department, the Labor Department, and the Pension Benefit Guaranty Corporation.
- ⁸ In addition to the potential for 2003 data to be too outdated to pick up much of the recent activity in this regard, there is the possibility that similar transactions will be undetected. For example, a plan closed to new entrants will not meet the definition of the event coded on Form 5500. For additional insight into the potential financial consequences of this event, see Jack L. VanDerhei and Craig Copeland, "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).

⁹ It should be noted that even after a pension freeze (regardless of the definition), minimum contributions may still be required for several years, depending on the plan's funding status. The only component that will be eliminated is the normal cost for the portion of the participant population that is frozen.

¹⁰ Stephen Miller, "Another Hurdle for Traditional Pensions: Prepare for Changes in Defined Benefit Plan Accounting" (SHRMonline, February 2006), www.shrm.org/rewards/news_published/CMS_015694.asp#P-4_0 (last accessed March 8, 2006).

¹¹ While this may be a response that deals with the perceived FASB problem from a long-term perspective, it appears that there will be little short-term advantage in following this route given the small impact of service cost on overall pension expense volatility.

¹² The median number of U.S. employees responding to the survey was 8,500. Only 6 percent of the respondents had fewer than 1,000 U.S. employees.

¹³ Note that these prices (which express the amount of the lump sum that needs to be available for each dollar of annual income for life at the time the immediate annuity is purchased) will be determined by, among other things, the life expectancies and the discount rates at the time of the future purchase.

¹⁴ See Sarah Holden and Jack L. VanDerhei, "401(k) Plan Asset Allocation, Account Balances, and Loan Activity in 2004," *EBRI Issue Brief* no. 285 (Employee Benefit Research Institute, September 2005).

¹⁵ This stylized example abstracts from any considerations that may be necessary to account for changes in tax rates over time and/or the possibility that the employee would make use of Roth 401(k) plan contributions.

¹⁶ This was the implicit assumption used by the author for the calculations in the *New York Times* article, "When Your Pension is Frozen..." (Jan. 22, 2006).

¹⁷ Two other plans that were not modeled in this study are likely to have an indemnification contribution rate between final-/career-average plans and cash balance plans. Flat benefit plans provide an annual income based exclusively on the number of years of participation (compensation is ignored), and pension equity plans are a type of hybrid plan that provides benefits that can be more valuable to older and/or longer tenured employees than cash balance plans in general.

¹⁸ For a detailed discussion of the model, see Jack L. VanDerhei and Craig Copeland, "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).

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