"Valuing Losses of Pension Benefits"

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Date of Draft: June 15, 2003

I. Introduction

After medical and medically-related insurance, the next most significant category of fringe benefits that employers voluntarily provide to employees is retirement and savings benefits, most often referred to as a pension plan or pension benefit program. According to the 2002 fringe benefit survey conducted by the U.S. Chamber of Commerce, a cost equal to 10.4% of payroll and pay for time not worked was incurred by the surveyed firms to provide medical and medically-related benefits to employees; 6.6% of payroll and pay for time not worked was spent providing retirement and savings benefit programs to employees.[1] A roughly similar picture about the relative size of these two categories of fringe benefits is provided by data from the U.S. Department of Labor for September, 2002. Employer costs per hour worked for employee compensation were $19.09 for wages and salaries, paid leave, and supplemental pay (presumably comparable to "payroll" plus "pay for time not worked" in the U.S. Chamber of Commerce study), $1.67 for insurance benefits and $0.80 for retirement and savings plans; hence, insurance amounted to about 8.7% of hourly wages and salaries, while retirement and savings plans constituted about 4.2% of hourly wages and salaries.[2]

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[1]Source: U.S. Chamber of Commerce, Statistics and Research Center, *The 2002 Employee Benefits Study*, 2002, Table 1. An adjustment was made to the "payroll" measure in the U.S. Chamber of Commerce study to make the fringe benefit percentages in that study more nearly comparable to the fringe benefit data from the U.S. Dept. of Labor. Total payroll of approximately $21.7 billion for 464,717 full-time equivalent (FTE) employees represented in the survey was augmented by an additional $2.4 billion paid for time not worked, for a total of $24.1 billion, or $51,952 per FTE. The amounts spent on medical and medically-related payments, and retirement and savings, were $5,415 and $3,444 per employee, respectively. Without including pay for time not worked (which averaged $5,147), the percentages for insurance and retirement would be 11.0 and 8.0, respectively. (There is a problem with the figures reported in the U.S. Chamber of Commerce study, however, in that the ratio of 8.0/11.0 exceeds the ratio $3,444/$5,415 by more than what would be accounted for by rounding alone.)

[2]Source: http://www.bls.gov/news.release/ecec.t01.htm. Both surveys include in the data firms that do not provide one or more categories of benefits. Hence, the

The purpose of this paper is to discuss some issues that arise is carrying out the task of putting a value on losses of retirement and savings plans provided to employees. It is assumed in this paper that the reason such benefits are to be valued is due to a need to estimate damages from a wrongful termination, personal injury, or wrongful death that is the subject of litigation.[3] Section II reviews some major types of retirement and savings plans. Section III describes the process of valuing the losses in this type of fringe benefit due to an event that causes a reduction in earnings.

II. Types of Retirement and Savings Benefits

One of the most significant features of the retirement plans provided to workers by employers is that the plans are virtually always "qualified" retirement plans. According to one authority,[4] a qualified retirement plan has two distinct elements. First, it is a retirement plan, meaning a plan that either provides retirement income to employees, or results in a deferral of income by employees for periods extending to the end of the employment period or beyond. Second, the plan is "qualified," meaning that the plan is given special tax treatment for meeting a host of requirements for such a plan under the Internal Revenue Code. A "qualified" retirement plan provides workers with considerable tax-shelter benefits due to the fact that the contributions to the plan, whether by the worker or the employer, are sheltered from tax at the time they are made to the plan, and the interest, dividend and stock appreciation earned by money invested in the plan also is sheltered from tax until the time such earnings are withdrawn. Further, income taxes on certain types of distributions from the plan may be deferred by rolling over the distribution to an individual retirement account (IRA).

Qualified retirement plans are classified as either defined contribution (DC) plans or defined benefit (DB) plans. A DC plan is a retirement plan that "...provides for an individual account for each participant and for benefits based solely upon the amount

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aggregate results average in the "zeros" for firms providing none of certain categories of benefits. A paper that compares the U.S. Dept. of Labor fringe benefit data with those of the U.S. Chamber of Commerce and discusses the reasons for differences in the results of these two surveys would be very useful. To the best of my knowledge, no such comparison paper has yet been published.

[3]Pensions often need to be valued in divorce cases, and, despite some differences in such valuations compared to those in personal injury cases, it is somewhat surprising that the literature discussing pension valuation in marital dissolution cases is not more frequently cited in the literature dealing with the valuation of fringe benefits in personal injury cases. For a discussion of pension valuation in divorce cases, see Allman (1993), Frasca (1990), Stoller (1992), and Trout (1988).

[4]Krass (2003), Chap. 1.

contributed to the participant's account, and any income, expenses, gains or losses, and any forfeitures of accounts of other participants which may be allocated to such participant's account." [Erisa § 3(34); IRC § 414 (i), as quoted from Krass, p. 2-1] With a defined contribution plan, there are three major consequences:[5] 1) plan contributions, but not retirement benefits, are defined by formula and not by actuarial requirements (except for target benefit plans, described below); 2) plan earnings and losses are allocated to each participant's account and do not affect the company's retirement plan costs; and 3) plan benefits are not insured by the Pension Benefit Guaranty Corporation (PBGC).

A retirement plan that is not a DC plan is classified as a DB plan; under a DB plan annual retirement benefits must be definitely determinable, based on a formula contained in the plan. For example, in the Pennsylvania State Employees Retirement System, the annual retirement benefit for most employees reaching the normal retirement age of 60 is computed as the average of the three highest years of earnings x 2.5% x the number of years of state service. If a plan is categorized as a DB plan, then 1) plan formulas are geared to retirement benefits and not to contributions (except for cash balance plans); 2) the annual contribution is usually actuarially determined; 3) certain benefits may be insured by the PBGC; 4) early termination of the plan is subject to special rules; and 5) forfeitures (due to termination of employees not fully vested) reduce the company's cost of providing retirement benefits.

According to Ippolito (Table 1), over the period from 1980 to 1999, the percentage of the private labor force in the United States covered by an employer-sponsored pension plan remained very steady at about 46%. This steadiness in the overall percentage was accompanied, however, by a significant change in the mix of plans offered. The percentage of workers covered by a DB plan declined from about 38% of workers to about 20%, whereas the percentage of workers covered by a DC plan rose from about 8% to about 26%. Using data from the Survey of Income and Program Participation (SIPP), Copeland documents a similar dramatic shift for the decade ending in 1998, finding the proportion of workers covered in defined benefit plans shrank from approximately two-thirds of workers with pension coverage to one-third, with a corresponding increase in the proportion with defined contribution plans.

Some major types of DC and DB plans and some plans that mix features of the two are briefly described below.[6]

A. Defined Contribution Plans

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[5] *Ibid,* p. 2-2.

[6] The descriptions of various types of defined contribution and defined benefit plans appearing below are taken primarily from *Ibid*.

1) money purchase pension plans. With this type of plan, the company's contributions are mandatory and must be made even if the company has no profits. Contributions are usually based on each participant's compensation, e.g., 10% of compensation. Age and length of service do not affect the size of the company's contribution. Retirement benefits are based on whatever pension can be purchased with the money in the participant's account at the time of retirement.

2) profit sharing plans and age-based profit-sharing plans. With the profit-sharing type of DC plan, the company agrees to make "substantial and recurring" contributions, though these contributions are discretionary. Amounts contributed are invested and accumulate tax free for distribution to participants (or their beneficiaries) at retirement, after a fixed number of years, or upon the occurrence of some specified event, such as disability, death or termination of employment. The profit allocation to each participant may be in proportion to the participant's compensation to the total of compensation paid to all plan participants. Some companies may obligate themselves to make a contribution to the profit sharing plan as a percentage of each participant's compensation, provided profits exceed a minimum amount. Forfeitures arising from employee turnover may be allocated among the remaining participants.

An age-based profit-sharing plan allocates company contributions as a function of both age and level of compensation, with older employees receiving a larger proportion of the total. The allocation formula under an age-based plan is derived from the present value of a dollar due is "x" years, where "x" is a period measured by the length of time from the participant's current age to a "testing age," which may be a normal retirement age, such as age 65, from which the present value is computed. The interest rate used is mandated by U.S. Dept. of Treasury regulations to be in the range of 7.5% to 8.5%. For example, with an interest rate of 8.5% and a testing age of 65, the present value factor for a 50-year-old participant would be 0.294. His salary (say $50,000) would be multiplied by this factor to obtain $14,700. A 30-year-old participant would have a present value factor of 0.058. If this younger participant had a $25,000 salary, this salary would be multiplied by 0.058 to obtain $1,450. If these were the only two plan participants, the older participant would receive $14,700/($14,700 + 1,450) x 100 = 91% of the company profit-sharing contribution, with 9% going to the younger participant.

3) thrift or savings plans. A thrift or savings plan is a DC plan that involves employees directly in making contributions. The plan may be set up as a profit-sharing plan or a money purchase plan. Employer contributions are tied to employee contributions in the sense that employees can only participate in the plan if they contribute a part of their compensation to it. Employer contributions are made on a matching basis, such as 100%, of the employee's contribution. This matching may be limited to a certain percentage, e.g., 3%, of the employee's compensation. There may also be provisions for the employee to make additional voluntary contributions, over and above what the company will match, and for the employer to make additional discretionary

contributions.

4) 401(k) plans. A 401(k) plan is a qualified profit sharing or stock bonus plan that offers participants an election to receive company contributions in cash or have these amounts contributed to the plan. Such amounts are not included in the participants taxable income, in spite of the fact that the amount could have been taken in cash. The employee may also be offered the option of taking a reduction in current compensation, or foregoing a raise and having that amount contributed to the plan. Benefits may not be distributed from a 401(k) plan without penalty until the employee retires, becomes disabled, dies, or reaches age 59 ½ years. Contributions made to the plan by the employer at the election of the employee are 100% vested at all times.

5) stock bonus plans. A stock bonus plan is similar to a profit-sharing plan except the company contribution to the plan is in the form of company stock. The plan may permit cash distributions instead of stock, subject to the employee's right to demand a distribution of stock instead of cash. If a plan permits cash distributions and the securities are not readily tradable, participants must be given the right to demand that the company repurchase distributed stock under a fair valuation formula.

6) employee stock option plans (ESOPs) This is a special breed of a qualified retirement plan that is essentially a DC plan whose funds must be invested primarily in employer securities.

7) simplified employee pensions (SEPs). A SEP is a DC plan that takes the form of an individual retirement account or individual retirement annuity established for an employee to which the employer makes tax-deductible contributions. A SEP may be adopted by incorporated or unincorporated businesses.

B. Defined Benefit Plans

8). flat benefit plan. The benefit formula makes retirement benefits depend solely on compensation, e.g., 30% of compensation at the time of retirement. Hence, a person making $2,000.00 per month at retirement would get a pension of $600.00 per month, and another making $4,000.00 per month at retirement would get $1,200.00 per month.

9). unit benefit plan. This type of benefit formula rewards longer tenure with an employer by making benefits depend on both compensation and years of service. The benefit formula of the Pennsylvania State Employees Retirement System described above is an example of a unit benefit plan.

C. Mixed Plans

10) target benefit pension plans. A target pension plan is a hybrid between a DB plan

and a DC money purchase plan. It is like a DB plan in that the annual employer contribution is determined by the amount needed each year to accumulate a fund that will be of a size sufficient to pay retirement benefits to plan participants. The target plan might contain a target formula for retirement benefits, e.g., 30% of an employee's annual compensation at the time of retirement. Given the same assumptions about interest rates, age distribution of employees and their mortality, and employee turnover, the employer's contribution for the year to the target benefit plan would be the same as the contribution to a DB plan with the same benefit formula. However, the employer contribution is placed into individual employee accounts. If the balance in the accounts earns less or more than assumed in determining the annual contribution, no offsetting adjustment is made in employer contributions. Instead, there is a change in the amount of benefits payable to participants at the time of retirement. Hence, in a target benefit plan, the actual benefits that a worker can afford to purchase with his or her account at retirement my exceed or fall short of the "target" level of retirement benefits. There is also a limit on annual additions to a participant's account.

11) floor-offset plans. A floor-offset plan is a hybrid plan in which the employer maintains both a DB and a DC plan. The former sets a floor on retirement benefits that is offset by the benefits that the DC plan is able to provide. The participant is effectively insured against a decline in the value of his DC account due to poor market performance. On the other hand, if the benefit under the DC plan exceeds what DB benefit, the participant receives benefits exclusively under the DC plan. Basically, the participant has the best of both worlds in regard to being insured against poor market performance via the DB plan, but at the same time being allowed to benefit from good market performance under the DC plan.

12) cash balance plans. A cash balance plan is a DB plan, but it that has features of both a DB and a DC plan. Each employee is given a separate cash balance account, and benefits are defined by reference to amount of the employee's hypothetical account balance. When a cash balance plan replaces an existing defined benefit plan, employees are given a opening balance based most often on the actuarial present value of the accrued prior plan benefits. Additional credits are added thereafter to the employee's hypothetical cash balance through annual credits computed as a flat percentage (e.g., 4% or 5%) of employee pay. Furthermore, employee balances grow based on interest credits. The interest rate varies from year to year and is based on an interest rate announced before the start of the year. The interest rate might be the yield on one-year U.S. Treasury securities. The interest rate is not tied to the investment performance of the plan's assets but is rather determined independently, based on specific provisions of the plan document. A minimum and maximum interest rate may be specified. The employer bears the risk of fluctuations in the rate of return on plan assets and for making contributions, actuarially determined, such that the benefits promised by the plan can actually be paid. The hypothetical allocations and hypothetical earnings in the plan mimic the allocations of actual contributions and actual earnings to an

employee's account under a DC plan. At the time of withdrawal, the cash balance plan must provide an annuity option. A lump sum withdrawal option is at the employer's discretion.

An advantage of cash balance plans is that most permit, after termination of employment, a single-sum distribution equal to the employee's account balance as of the date of the termination. To calculate the amount of this single-sum distribution, the balance in the employee's hypothetical account must be projected to normal retirement age, and then the employee must be paid at least the present value, determined by the present value determination rules, of that hypothetical account balance. If the current hypothetical balance is less than the present value of the hypothetical balance at normal retirement, the rules require that the higher amount be awarded. Otherwise, the hypothetical balance at the date of distribution is awarded.

Over the past decade, a number of companies with traditional defined benefit plans have replaced these traditional plans with cash balance plans. This conversion has been interpreted by Copeland and Coronado to be a response to competitive pressures in the labor market, rather than an effort to avoid penalty taxes (levied on firms that convert over-funded defined benefit plans to defined contribution plans), or surreptitiously reduce worker pension benefits. Cash balance conversions have been more prevalent in industries with younger, more mobile workers and tighter labor markets. Copeland and Coronado conclude that such conversions reflect a desire to improve the pension plan offered to a mobile work force but at the same time preserve the benefits (reduced employee turnover, increased loyalty) of having some form of deferred compensation. Most cash balance plans have 5-year vesting requirements and increased employer contributions with tenure at the firm because contributions are a percentage of pay and pay typically rises with tenure.[7]

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[7]Cash balance plans have been studied by Johnson and Uccello (2002). They compared the pension benefits from traditional defined benefit plans with those of hypothetical cash balance plans for a sample of U.S. workers with pension coverage who are near retirement–under the assumption that workers participated in cash balance plans instead of defined benefit plans during their entire period of covered employment. The focus was on what benefits different types of workers can expect to receive under each plan and the consequent differences in the distribution of pension wealth across different groups of workers. A major finding is that replacing traditional defined benefit plans with cash balance plans would redistribute pension wealth from those who held long-term jobs to those with a series of short-term jobs. Defined benefit pension wealth increases slowly over a person's career with a given firm, then increases rapidly near retirement age, and then declines at older ages. The worker begins receiving benefits once he or she reaches normal retirement age and leaves the employer. Workers who quit before reaching retirement age forfeit substantial pension wealth. In contrast, with cash balance plans, those who leave their jobs before retiring

III. Valuation of Pensions as a Fringe Benefit in Different Types of Cases

The brief review of pension plans in the previous section reveals that a wide variety of plans exist. Valuing the loss of pension benefits in a particular case obviously requires knowledge of the specific plan. However, there are a number of issues and principles that arise in attempting to put a value on the any retirement and savings plan. I begin with a discussion of some of these issues and principles and then turn to some examples of pension valuation in wrongful termination, personal injury and death cases.

A. Some General Issues and Principles

Valuing a Pension as a Percentage of Lost Earnings. A substantial number of economic reports I have seen, and a sizable number that I have written myself, value the loss of fringe benefits as a percentage of lost earnings. Many of these reports rely for this purpose on the Chamber of Commerce or Department of Labor statistics cited at the beginning of this paper. The first issue that needs to be addressed is the question of when is it appropriate to value the loss of pension benefits as a percentage of lost earnings.

If all employers offered defined contribution plans under which each employer contributed 3% of each employee's gross earnings to a pension plan account in the employee's name, the task of valuing pension plans with be easy. To each estimate of earnings loss one would just add 3% for the pension plan. But a substantial number of employers do not offer pension plans, and those that do offer a variety of plans, as described above. Hence, the duration of employment that a worker would have had with a particular employer and the type of pension plans offered by other employers for whom worker might have worked had become matters of concern.

The circumstance in which use of a percentage of earnings to value pension benefits seems most compelling is the case of an injury of a young person who has not yet entered the labor force. There is no employer and no track record of earnings. U.S. Chamber of Commerce or U.S. Dept. of Labor statistics cited at the beginning of this paper to estimate the loss of pension benefits would seem to be the only recourse. These statistics include employers who have no employee pension plan and cover all types of employers. The future labor market experience very much a blank slate for this person and average statistics for a sample of employers spanning all industries and occupations in the labor force would seem to be the best way of obtaining a measure of

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can generally reinvest their plan assets elsewhere, instead of having to wait until retirement age to begin drawing a pension that will be computed using the wages and years of service earned at a job held years in the past.

the pension benefit loss.

Another circumstance where the "percentage of earnings" approach might be the best procedure is where it is known that the person was employed at the time of the case-causing event but nothing is known about the fringe benefits. Use of a percentage to measure all relevant[8] fringe benefits, including a pension plan, is a stop-gap, temporary solution that may be remedied at a later time if and when more information becomes available.

Based on the discussion of pension plan trends presented above, it is clear that, while the chances of a randomly-selected worker being covered by any type of pension plan have stayed about the same, the chances are getting greater that, given coverage, the worker will be covered by a defined contribution plan, or by a cash balance plan. For both of these types of plan–in sharp contrast to defined benefit plans, as emphasized below--valuation of pension losses as a percentage of earnings is appropriate. Hence, to take yet another situation where use of a "percentage of earnings" may be a reasonable approach, if a worker randomly selected from the working-age population is unemployed at the time of the case-causing event, it is more likely today than in 1980 or 1990 that the next job the worker gets will be a job with a defined contribution pension plan.[9]

When the Percentage of Earnings Approach Is Inappropriate. If a worker is employed at the time of the case-causing event and is covered by a defined benefit plan, the details of which can be determined, it is inappropriate to use a percentage of the estimated loss of earnings to measure the worker's loss of the pension benefits arising from the reduction in earnings. With a defined benefit plan, there is no separate account set aside for each specific worker. The amount the employer contributes to the defined benefit plan each year is determined by a variety of factors considered by the plan actuary, as described above, such as the age distribution of employees and their mortality, the amount of employee turnover which affects the percentage of employees who are vested in the plan, and the level of interest rates and the rate of return on other assets in which the funds of the plan are invested. When all of these factors influencing a firm's contributions to its pension plan are considered, it become obvious that the link

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[8]Some fringe benefits, like vacation pay, may already be included in the measure of lost earnings and are excluded to avoid double counting. Other fringe benefits, such as unemployment compensation, may not be estimated because of an assumption used in the lost earnings estimate that the person would never have experienced unemployment.

[9]Of course, in a particular case, the worker is not randomly selected and knowledge about his or her work history will usually allow a much better prediction about the type of job and benefits the worker will have once re-employed.

between the firm's contributions to its pension plan per employee in any given year, or over the last X years, would bear only a very loose and uncertain relationship to the present value of the employee's loss of pension benefits during the time of retirement.

An argument that might be made for using the percentage of lost earnings approach to value the pension loss when a person is covered by a defined benefit pension benefits is based in the KISS (Keep it simple, stupid) principle. The use of the percentage of earnings approach simplifies a damage report in several ways. For one thing, it avoids making the loss period reach any further into the future than the end of the person's working life. Valuing the pension losses by computing the present value of future pension benefits but for and given the case-causing event and deducting the latter from the former means extending the loss period out to the end of the worker's life expectancy. This duration is virtually always longer than the projected age of retirement. As Gerald Martin has noted, "Most economists seem to claim the loss over the worklife as a loss of benefits because this avoids the need to push another 20 years or so further into the future."[10] A simpler damage report and opinion is easier to present in testimony and it takes less time to prepare. It is therefore less expensive. The loss of wages itself may in many cases be sufficiently high to exceed the applicable insurance limits for the case. Incurring additional expert fees for the time to undertake a relatively elaborate computation of the pension loss may be an expense that fails the attorney's cost-benefit test. If some cheaper proxy for all lost fringe benefits, including the pension loss, is available, well and good. Do it poorly and cheaply, or, in the alternative, don't include an estimate of the pension loss at all.

Given a world where nine in ten cases settle without trial, using inappropriate methods to compute damages is a calculated risk. Use of inappropriate methods makes the using side vulnerable to an effective attack that exposes the error in the proffered estimate. Depending on the particular context, such an exposure could call into question the entire damage appraisal.

Valuing Losses of Benefits from Contributory vs. Non-Contributory Defined Benefit Plans. With many if not most defined benefit plans, workers covered by the plan are required to contribute some percentage of pay toward the cost of the plan. For the same level of pension benefits at retirement, a plan that requires contributions from the worker is worth less to the worker than would be the case if no contributions are required. When valuing the pension loss arising from a reduction in earnings, care must be taken, therefore, to reflect this obvious fact in the valuation of the pension loss. The most straightforward way of doing this is to deduct the worker's pension contribution from the estimate of the pension loss or the estimate of lost earnings.

A Double Counting Mistake to Avoid. It would clearly be inappropriate to value

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[10]Martin, p. 4-16.2.

the loss of pension from a defined benefit plan as a percentage of earnings and also by computing the present value of the loss of future benefits. Such double counting may occur because of sloppy work: the pension loss is estimated as the present value of the loss of future pension benefits paid after retirement; a "percentage of earnings" approach is used to value the loss of all other fringe benefits except the pension loss, with the expert forgetting to remove the component of the fringe benefit percentage representing retirement plans before multiplying it by the loss of earnings.

Having discussed some issues and ideas that apply to the valuation of pension losses in all kinds of cases, I provide some examples and discuss some additional issues that arise in the context of particular kinds of cases.

B. Valuation of a Pension as a Fringe Benefit in Wrongful Termination Cases[11]

Suppose that a person is wrongfully terminated and, for sake of concreteness, has lost 3 years of back pay and is expected to lose 2 additional years of front pay before retiring from the work force at age 65.

DC Savings Plan with Employer Match. First assume that the discharged employee had a DC savings plan wherein the employer matched 50% of the employee's contribution up to 4% of pay. Suppose the employee had pay of $30,000 per year, and assume that pay would have increased by 3% per year over the 5-year loss period. Suppose further that the employee had a history of contributing the maximum of 4% of pay to the DC plan each year. Under these assumptions, and discounting of future losses to present worth at 5%, the mortality-adjusted present value of the pension loss would be $3,158, as shown in Part A of Table 1. The present value is computed as of 1/1/03. For simplicity, the assumption being made that pay is received at the end of the year. The mortality adjustment (based on mortality data for all persons in the U.S. in 2000) makes little difference: without the adjustment, the loss is $3,184, only $26 more. The adjustment is included for extension to the estimate of the loss with a DB plan, discussed below.

DB Plan Funded 100% by the Employer with No Early Retirement. Assume alternatively that the employee was covered under a DB plan. Assume that the plan's benefit formula is such that annual retirement benefits equal to 1% of salary during the year before the date of retirement multiplied by years of service. The retirement age under the plan is age 65 with no provision for early retirement. Assume that the pension is solely funded by the firm with no contribution required of employees. Suppose at the time of the wrongful termination, the employee had 30 years of service and would have

[11]There are tax issues surrounding wrongful termination damage awards that are ignored here because those issues are not the focus of this paper. For a discussion, see Ben-Zion (2000) and Rodgers (2003).

been eligible to retire at 65 with 35 years of service, but for the wrongful termination. Assume a salary of $30,000 per year and a 3% pay increase each year. But for the wrongful termination, the person would have had retirement benefits of 1% x $34,778 x 35 years = $12,172 per year. Given the wrongful termination, the person will be able to draw benefits, at the normal retirement age, of 1% x $30,000 x 30 years = $9,000 per year. The annual loss of pension, therefore, is $3,172 per year. Using the 2000 United States Life Tables, cited in Table 1, the life expectancy of a person exactly 60 years old is 21.6 years to age 81.6. Assuming a 16.6-year life expectancy beyond retirement at age 65, the present value of this loss using a 5% discount rate would be $31,185, as shown in Table 1. If, instead of using this "annuity certain" approach, the "life annuity" approach is used to compute the present value of the pension loss, that loss would be $29,599, also shown in Table 1.[12]

DB Plan with Early Retirement Provision. Now consider a modification to this example wherein the employee is allowed to begin drawing a reduced pension immediately at the time of termination due to an "early retirement" provision that allows employees to retire as early as age 60, with at least 25 years of service. Suppose further that the penalty for "early retirement" is 5% for each year the employee is under age 65. The loss of pension due to wrongful termination is computed for this scenario in Table 2. The early retirement option reduces the size of the pension loss to $22,339 using the annuity certain approach and to $18,390 using the life annuity approach. More generally, the smaller the penalty for early retirement, the smaller the pension loss. If there was no penalty for retirement at age 60 or later, the pension loss from retiring at age 60 rather than age 65 would be negative, meaning that retiring with a pension of $9,000 at age 60 has a higher present value as of age 63 than waiting to age 65 and retiring with an annual pension of $12,172.

Note that is would be difficult if not impossible to determine the value of the employee's pension loss by computing the employer's contribution to the plan on behalf of this particular employee. As noted above, with a DB plan the employer does not make contributions on behalf of particular employees. Even if the amount the employer contributed in the years after the termination could be determined and divided by the number of employees in the plan, the resulting average contribution per employee would have only a minuscule chance of measuring the employee's pension loss. It is also worth noting that the average percentage of employee pay that employers spend

[12]The difference between "annuity certain" and "life annuity" approaches is lucidly described in Ben-Zion and Reddall (1985). Ben-Zion (2002) further discusses the error in using the annuity certain approach and provides some actuarial tables that simplify the computation of the present value of pension losses. He also mortality tables that have a build in an adjustment for future reductions in mortality risk based on past trends. The mortality adjustments made in this paper use the mortality data in the U.S. for the overall population for the year 2000.

on retirement and savings plans--6.6% using the U.S. Chamber of Commerce survey, and 4.2% using data from the U.S. Dept. of Labor in the year 2002--would provide poor estimates of the DB pension loss computed in Tables 1 and 2. For example, in Table 1, the life annuity pension loss of $29,599 is about 18.6% of the loss of earnings of $159,211. Using either of these employer cost percentages to estimate the pension loss as a multiple of lost earnings-- either 6.6% or 4.2% of the loss of earnings of $159,211--significantly understates the loss of pension benefits. Similarly, in Table 2, the life annuity pension loss of $18,390 is about 11.6% of lost earnings of $159,211.

DB Plan Funded Partly by the Employer and Partly by the Employee. Take the same scenario as that depicted in Part B of Table 1, with one change. Assume that employees are required to contribute 5% of earnings to the DB retirement plan. The correct valuation of the pension loss when the employee is required to make a contribution is to deduct the amount of that contribution from the loss. The contribution is a cost to the employee of participating in the plan and makes the plan less valuable than one with the same benefits that is totally financed by the employer. Hence, the pension loss would be the Table 1 loss of $29,599, as above, less 5% x $159,211 = $7,961. The pension loss is therefore $21,638 = $29,599 - $7,961.[13]

Valuing the Loss in A Cash Balance Plan. As a final alternative, suppose the employer provides employees with a cash balance pension plan. Assume that at the time of the employee's termination, the amount in the employee's hypothetical account is $250,000. Suppose further that additional credits are added thereafter to the employee's hypothetical cash balance through annual credits computed as 4% of employee pay. Furthermore, assume that employee balances grow based on interest credits that are not conditioned on continued employment. Under these assumptions the loss in the value of the cash balance plan is simply 4% of the loss of back and front pay. Continuing the above example, the loss would be 4% x $159,211 = $6,368. Because the interest credits are not conditioned on continued employment, those credits would not be part of the loss.

Estimating the Loss of Social Security Benefits. Social Security provides a type of defined benefit pension plan under which retirement benefits depend on years spent working in covered employment and the amount of earnings in all those years. This record of earnings is summarized in the employee's "average indexed monthly earnings" (AIME). As I have argued elsewhere (Rodgers, 2000), multiplying the employer's FICA tax "contribution" 5.3% (the part of the FICA tax of 7.65% that funds

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[13]In these two examples, comparing a DB plan that was 100% employer funded with an equivalent one that required some employee contribution, the wage paid the employee is held constant to focus on the difference in the pension valuation. In some situations, it might be more reasonable to assume that a job with a more generous pension plan would pay a lower wage than a job with a less generous plan.

the retirement portion of the Social Security program) by the lost earnings virtually always provides a poor estimate of the employee's loss of Social Security benefits.

To continue with above example, the loss of the last five years of the terminated employee's working life could have the effect of reducing the employee's AIME, which would result in a loss of Social Security retirement benefits relative to what those benefits would have been but for the termination. The loss depends on the terminated worker's earnings history in covered employment. The loss can be as low as zero if the earnings the worker would have received but for the wrongful termination would not have been used to compute the worker's AIME--a situation that would arise if those earnings were not among the highest 35 years of indexed earnings used to compute AIME.

The maximum loss that the worker could sustain would be the total loss of Social Security retirement benefits from being denied coverage because the loss of the five years of work was enough to keep the worker from being "fully insured." This would be an unusual situation where the worker had attained less than 40 quarters (credits) of coverage up to the time of the wrongful termination at age 60. The situation where a worker begins working full time after age 50 and has obtained no quarters of coverage prior to that date is probably very rare indeed. But in such an instance, the wrongful termination could render the person ineligible for any benefits. If this person was "on the cusp" of becoming fully insured and never become so due to the wrongful termination, then the loss of social security retirement benefits could be substantial.

A somewhat more likely scenario where there could be a substantial loss of Social Security retirement benefits would be the situation where a person had worked for many years as a Federal civilian employee (being hired prior to 1984) and then took a job in the private sector in 1994 at age 54. Such a worker would have obtained 24 quarters of coverage by age 60–less than the 40 quarters of coverage required to be eligible for Social Security retirement benefits. But for the termination, the worker, using the assumptions above, would have obtained an additional 20 quarters of coverage over the five years of employment during the period 2000 through 2004, allowing the worker to be eligible for a Social Security pension.[14]

Table 3 shows an example of the calculation of the loss of Social Security

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[14]However, there is a "windfall elimination provision" to restrain "double-dipping" that alters the PIA calculation formula for such workers. For workers reaching age 62 in 2002, the regular PIA formula is 90% x $592 + 32% x ($3,567 - $592) + 15% for AIME greater than $3,567. For workers with 20 years or less of covered employment, the windfall elimination provision reduces the first percentage in the formula from 90% to 40%, cutting the benefit by 50% of $592, or by $296 per month. See http://www.ssa.gov/pubs/10045.html

benefits in two scenarios. In the first, It is assumed that the terminated worker had earnings prior to 1999 that bore the same relationship to average covered earnings in those years as earnings of $30,000 in 1999 bore to average covered earnings in that year. The worker's AIME based on the highest 35 years of indexed earnings from age 22 to age 64 is computed, but for, and given the termination. As can be seen, AIME is $2,652 but for the termination and $2,638, given the termination, so the effect of the termination on AIME is very small. The effect of the termination on the primary insurance amount (PIA) is therefore very small, reducing the amount from $1,192 to $1,188, or by $4 per month. The reduction is the same for the age 65 monthly benefit, from $1,152 to $1,148 per month.[15] This reduced monthly benefit will have a smaller present value than the present value of the 5.3% OASI portion of the FICA tax paid by the employee on the lost earnings, which, from the example above, is 5.3% x $159,211 = $8,438. The net loss, as shown in Table 4, is a **negative** $7,860.[16]

In the second scenario, it is assumed that the worker began working in covered employment in 1994 at the age of 54. Therefore, at the time of the termination, insufficient quarters of coverage (24) were held for being "fully insured," and no Social Security benefits would be collectable, given the termination. But for the termination, the worker would have had sufficient quarters of coverage. Hence, the entire present value of benefits, but for the termination, would constitute the worker's loss of benefits. Table 5 computes the present value of the gross loss of benefits as $44,359, and the net loss after OASI FICA taxes as $35,921.

It is worth noting that multiplying the employer's 5.3% tax "contribution" times the loss of earnings of $159,211 produces a number equal to $8,438. This number is a not a good estimate of the Social Security pension losses in either of the two scenarios depicted in Tables 4 and 5. This illustrates the point noted above that what might be termed the "FICA tax method" of estimating the employee's loss of Social Security benefits does not accurately estimate such losses.

Same Scenarios But Involving a Younger Employee. The previous situations

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[15]Between 2002 and 2005, three cost-of-living increases will be given. The increase for 2003 was 1.4%. The projections for 2004 and 2005 are 2.4% and 2.4%, respectively. These increases have been built into the figures shown in Table 4. By 2005, the benefit, but for the termination, would have grown to $1,225 per month, and the benefit, given the termination, would have grown to $1,221 per month. Projections for 2006 and 2007 are 2.7% and 2.9%, respectively, and 3.0% thereafter. See the 2003 Report from the Chief Actuary of the Social Security Administration, available at the web address: http://www.ssa.gov/OACT/TR/TR03/V_economic.html#wp131314.

[16]In Tables 4, 5 and 6, for simplicity, I have dispensed with the mortality adjustment used in Tables 1 and 2.

were couched in terms of an older employee close to retirement. Let us examine the loss of pension for a case of a younger employee, but otherwise in the same circumstances.

For the **DC Savings Plan with Employer Match** scenario, the loss remains the same, namely, $3,184, as shown in Table 1. For the **DB Plan Funded 100% by the Employer**, there is a difference in the loss. To fix the difference, assume that the younger terminated employee was 40 years old with 10 years of service at the time of termination. Assume, as before, that there are 3 years of back pay losses and 2 years of front pay losses, with the same pay structure.[17] But for the wrongful termination, the retirement benefits would have been computed as 1% x $34,778 x 15 years = $5,217 per year. Given the wrongful termination, the person will be able to draw benefits, at the normal retirement age, of 1% x $30,000 x 10 years = $3,000 per year. The annual loss of pension, therefore, is $2,217 per year. Assuming a 15-year life expectancy beyond retirement, the present value of this loss using a 5% discount rate would be $7,867, as shown in Table 2. The loss is much smaller due to the effect of discounting a loss occurring further in the future. In the scenario, **DB Plan Funded Partly by the Employer and Partly by the Employee**, a deduction of an employee contribution of 5% of lost earnings would result in no net loss of pension, as the present value of the employee contribution to the pension plan of $7,961 would exceed the present value of the pension loss of $7,867. In **Valuing the Loss in A Cash Balance Plan**, the loss would continue to be the same with the same credit of 4% of employee pay, and the loss would be the same as in the earlier example, namely, $6,368. **Estimating the Loss of Social Security Benefits** for a younger person would entail the same type of issues as for an older person, but with the added uncertainty created by the much longer time period for market work and earnings before retirement. The likelihood of a net loss of benefits arising would be smaller due to the nearness in time of the employee's 5.3% "contribution," compared to the possible loss of benefits is a distant, more heavily discounted future.

C. Valuation of a Pension as a Fringe Benefit in Personal Injury Cases

Personal injury cases obviously differ from wrongful termination cases in a number of ways. In termination cases, the plaintiff has not been physically injured and a significant focus in the litigation may be on the plaintiff's efforts to mitigate wage loss.[18] Even absent the wrongful termination, the plaintiff may have left the terminating employer for other reasons (e.g., layoff due to economic conditions, taking a preferred job at another employer), and the loss period ends at the point in time when the plaintiff

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[17]After two years of front pay loss it is assumed that the worker finds alternative and comparable employment with another employer.

[18]A useful paper on mitigation in employment cases is Toppino and Hollis (2003).

would have left the terminating employer. In a personal injury case, the loss arising from the injury is tied to the person rather than a particular employer. In the personal injury case, the plaintiff has been physically injured in some manner, and these injuries may have a negative impact on the plaintiff's earnings capacity that is significant and long-lasting. The key variables that affect the computation of pension benefit loss from an injury are a) age at the time of the injury, b) severity of the injury, and c) the type of pension plan under which the worker will be covered over his or her working life.

Age at the time of injury. A key aspect in the valuation of pension losses in personal injury cases is the age of the person at the time of the injury. At one extreme the plaintiff may be a young person who has not yet completed his or her education and entered the labor force. At the other extreme, the injured person may have already retired from the labor force and be drawing one or more pensions. Or the person may be somewhere in between in his or her 20's, 30's, 40s or 50's. For the very young person not yet in the labor force, there is no employer and no track record of earnings. As noted above, this is a situation where the strongest case can be made for using the U.S. Chamber of Commerce or U.S. Dept. of Labor statistics cited at the beginning of this paper to estimate the loss of pension benefits. The future labor market experience is very much a blank slate for this person and average statistics for a sample of employers spanning all industries and occupations in the labor force can be used to provide a rough measure of the pension benefit loss.

Once a person enters the labor force after completing his or her education, more is known about the likely career. Even so, young people are more likely to change jobs than older people. Indeed, one of the main reasons for the rapid rise in earnings at younger ages, as observed in age-earnings cycle data, is the wage increases that come with a change in employers. If a person would have had several employers over a career, each offering a different type of pension plan, the problem of estimating the loss of pension becomes formidable. However, the pension plan offered by the employer at the time of the injury may provide some guidance about the time of plan the person may have for the remainder of their career, and the details of that plan can guide the estimate of the pension component of the fringe benefit loss. For example, if the person has begun a career as a public school teacher, it is may be reasonable to assume a career with employers who offer the type of defined benefit plan the person held at the time of the injury. Appraisals for persons who have an established career and track record of employment allow more to be known about the type of pension benefit plan the person will likely have over their working career. The older the person, the more likely the person is to stay with their long-standing occupation due to the cost of changing to a new one. Employers offering jobs to persons in that occupation may provide similar benefit packages including pensions. When a person nears retirement, it should be possible to compute the stream of pension benefits after retirement and how that stream of benefits will be affected by an injury that causes a loss of earnings. Once the person's working life is mostly over, an injury that diminishes earnings has less

years to adversely impact the future stream of pension income, which is already largely determined by years of service accumulation and/or the accumulation of retirement assets in tax-sheltered DC plans. After retirement, an injury to a retired person that left the person alive and with the same life expectancy (or mortality risk over future ages) would not alter the flow of pension benefits.

Severity and duration of the injury. A number of types of situations can be distinguished. 1) In personal injury cases with the smallest economic losses, the injured person is able to continue working at the same employer in the same job, after a short recovery period of a few weeks. In this type of situation, the loss of wages and fringe benefits will be zero or very small. 2) More severe is the case where the injury requires a change in job duties but which allows the person to remain with the same employer with the injuries accommodated in a job that carries a lower rate of pay. Here there will a loss of pension benefits whose value is a function of annual earnings. However, to the extent that the employee's own contributions to the cost of the plan are correspondingly reduced, the size of the pension loss is also reduced. 3) The injury may require that the employee change employers because no work is available at the old firm that can be performed by the employee, given the injuries sustained. In this situation, there will be a pension loss due to the loss of wages and a reduced employer contribution to a DC plan, or, for a DB plan, a loss of service credits during the time interval off work between the pre-injury and the post-injury job. Furthermore, the pension plan, if any, provided by the new employer may provide for pension benefits having a higher or lower value than those provided by the pre-accident employer. If wages are lower in the new job and pension benefits depend on wages, the pension benefits are likely to have a lower value than those provided in the old job. This is obviously true, a fortiori, if no pension plan offered by the new employer. 4) The injuries may be so severe as to require a substantial period of recovery, during which the person is out of the labor force, followed by the capacity to engage in work on a more limited basis, perhaps allowing only part-time work. Part-time employment may offer no employer-provided fringe benefits of any kind, except for those benefits which are legally mandated. 5) Finally, the injuries may be so severe as to render the person totally and permanently disabled, thereby qualifying the person for a disability pension from Social Security, worker's compensation and/or an employer-provided disability pension. The disability pension may be treated as a collateral source that cannot be mentioned in trial testimony or used to offset other economic losses of wages or fringe benefits. However, there may be subrogation claims by disability insurance carriers against a court award or settlement received by the injured person. When earnings are reduced to zero, this will, of course, generate pension losses for any retirement pension whose amount is a function of earnings. In the Social Security program, this impact is mitigated by the existence of both disability and retirement pensions and by the fact that payments are indexed to the increases in the CPI-W. Should a person become totally and permanently disabled, disability payments continue until the person is eligible to retire, after which the payments changes from being labeled a "disability pension" to being

labeled a “retirement pension.” If the person is relatively young when disabled, there will likely be a loss of Social Security pension benefits during the retirement years because the person is denied the earnings increases associated with economy-wide and personal productivity increases over what would have been his working life cycle and only experiences increases tied to the cost-of-living indexing. However, the extra Social Security taxes the person would have paid on these productivity enhanced earnings may more than offset the extra Social Security benefits that would have been received during retirement, but for the disabling injuries.

The duration of tenure with a particular employer and pension plan type. Because employers do not offer defined contribution plans under which each employer contributed x% of each employee’s gross earnings to a pension plan, the task of valuing pension plan losses in personal injury cases is made more difficult. A substantial number of employers do not offer pension plans, and those that do offer a variety of plans, as described earlier in this paper. Hence, the duration of employment that worker would have had with a particular employer and the type of pension plans offered in other jobs the worker might have had become matters of concern. How long the person would have remained with that employer even if the injury had not occurred? The implicit or explicit assumption made in many forensic economic damage reports is either that, but for the injury, (i) the injured worker would have continued working at the same firm until retirement from the labor force, or (ii) any changes of employer would have resulted in the worker receiving a wage and fringe benefit package comparable to that provided by the employing firm at the time of the injury. The specifics of the case may allow a reasonable inference to be made about the probability that the injured person would have continued work in the same job and for the same employer, but for the accident or incident requiring the change in employers. The older the worker at the time of injury, the more likely it is that one or both of these statements will be good prediction. For example, a 50-year-old public school teacher with 25 years of service for a particular school district and 10 years away from retirement is likely, but for a totally disabling injury, to have continued working as a school teacher until retirement. The loss of future retirement benefits under the defined benefit plan is relatively easy to calculate as the benefit reduction occasioned by the reduced years of service and the reduced level of pay, given the injury, that will be used in a DB formula that uses income and years of service as the two variables for determining retirement benefits.

By contrast, it may be reasonable to assume that a younger worker would have changed employers many times, even if an injury had not occurred. The significance of employer change in regard to the valuation of pensions is that job change can cause a pension loss for at least two reasons. First, if the job change occurs before an employee becomes vested, all pension benefits are lost. Second, there is a pension loss because pension benefits accrue more rapidly as the retirement age under the plan is approached. Leaving a job prior to this point causes the participant to miss this period of most rapid accrual (Copeland and Coronado). This feature of plans is, of course, a way a reducing employment turnover. (Cash balance plans have more evenness in the rate

of benefit accrual, meaning that the pension loss arising from changing employers is smaller than with a conventional DB plan.) Of course, the specifics of the situation must be examined to determine whether an injured employee who was forced to change employers has sustained such pension loss. If the defined benefit pension plan loss is determined in the manner suggested in Table 1, the accrual rate of benefits is automatically taken into account.

D. Valuation of a Pension as a Fringe Benefit in Death Cases

In wrongful death cases, there is no uncertainty about the duration of loss of the earnings stream, and the focus shifts from what the person subject to employment discrimination or bodily injury has lost to what the survivors of the decedent have lost. In regard to pensions, the focus therefore has to shift to survivors as well. The key question becomes, what does the death of a person covered by a pension plan mean for the person's survivors? How does the operation of collateral source rules impact consideration of these losses? Many of the points issues and principles discussed above carry over to wrongful death cases. I will make only a few points.

Consider the situation of a person who has already retired from his primary employment at the time of his wrongful death. Call this person Joe. Assume that Joe is drawing a pension of $4,000 per month. Assume that Joe is married to Mary. At the time of his retirement at age 60, Joe chose the pension option of a "single-life" annuity over his own life, rather than the option of a joint annuity that paid a pension of $3,500 per month over his own life, and $1,750 per month over the balance of Mary's life, should Joe die before Mary. To give his wife some protection, should he die and leave her without a monthly pension, Joe simultaneously bought a life insurance policy for $400,000 on his own life with Mary as the beneficiary. The monthly life insurance premium was $250.00. Shortly after retirement, Joe is wrongfully killed, a lawsuit is filed and an economic damage report is prepared. Assuming that the life insurance proceeds paid to Mary upon Joe's death are treated as a collateral source, Mary receives the insurance proceeds and also makes a claim for the loss of support from Joe's pension of $4,000 per month less Joe's personal consumption (or personal maintenance is some states). Had Joe chosen the joint and survivor option, receiving $3,500 per month until his death, Mary would have begun receiving $1,750 at the time of Joe's death, and these payments may or may not be regarded as collateral source payments that cannot be used to offset the $3,500 loss of monthly pension. If there is a requirement that the widow's pension of $1,750 per month must be used as an offset against the $3,500 monthly loss arising from Joe's death, then Mary is at a serious disadvantage with the choice of the joint and survivor pension option, relative to the single life annuity option paying Joe $4,000 per month, coupled with the insurance policy.

One sometimes sees appraisals of economic damages in death cases that stop counting damages as of the date when it is projected that the decedent would have

retired from the labor force, but for the decedent's premature death. In such appraisals fringe benefits are typically estimated as a percentage of lost money earnings, as is the deduction for the personal consumption of the decedent. Where income taxes must be taken into account, the assumption may be made that fringe benefits are offset by taxes and work expenses.[19] All loss calculations stop at the date of retirement. The valuation of the loss of a DB pension, however, requires a computation of the present value over the life expectancy of the decedent, or the life expectancy of survivors, whichever is shorter. In order assess the value of the pension but for the wrongful death, the assumption must be made that the decedent would have been alive to collect it. Hence, in calculating a defined benefit pension loss, it is necessary to deduct for personal consumption or personal maintenance over the life expectancy of the decedent.

IV. Conclusion

Pension losses may comprise one of the larger fringe benefit losses in cases of personal injury, wrongful death and wrongful termination. For persons covered by a pension plan at the time of the incident causing the litigation, computing this loss accurately requires that the forensic economist be familiar with the details of the plan. For defined contribution plans the loss is typically very easy to compute as the loss of employer contributions to the plan occasioned by the loss of earnings. For defined benefit plans, it is generally inaccurate to estimate the pension loss based on the value of the employer contribution per employee. Rather, the loss must be computed as the difference between the present value of the future pension benefits but for and given the incident causing the litigation.

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[19]In *Jones & Laughlin Steel Corp. v. Pfiefer* (1983), the litigants agreed to simplify the litigation by assuming that fringe benefits offset income taxes and work expenses. For further discussion, see Ireland, et al. (2002).

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TABLE 1

Part A. Wrongful Termination: Matching DC Savings Plan

Year	Age	Salary	Increase Factor	Salary With Increase	Discount Factor	Present Value	2% Firm Pension Contribution	Number Dying from Age x to x+1 (a)	Cumulative Number (a) Dying From 84,521 Alive at Exact Age 63	Survival Probability from Exact Age 63 to the end the indi-cated year	Mortality-Adjusted Present Value
2000	60	$30,000	1.03000	$30,900	1	$30,900	$618	0	0	1	$618
2001	61	$30,000	1.06090	$31,827	1	$31,827	$637	0	0	1	$637
2002	62	$30,000	1.09273	$32,782	1	$32,782	$656	0	0	1	$656
2003	63	$30,000	1.12551	$33,765	0.952381	$32,157	$643	1153	1153	0.986358	$634
2004	64	$30,000	1.15927	$34,778	0.907029	$31,545	$631	1236	2389	0.971735	$613
						$159,211	$3,184				$3,158

Part B. Wrongful Termination: DB Unit Benefit Plan □ No Early Retirement Before Age 65 Allowed

Year	Age	Pension But For WT	Pension Given WT	Annual Pension Loss	Discount Factor	Annuity Certain Present Value (b)	Number Dying from Age x to x+1	Cumulative Number Dying From 84521 Alive at Exact Age 63	Survival Probability from Age 63 to the end the indi-cated year	Mortality-Adjusted Present Value
2005	65	$12,172	$9,000	$3,172	0.863838	$2,740	1319	3708	0.956129	$2,620
2006	66	$12,172	$9,000	$3,172	0.822702	$2,610	1406	5114	0.939494	$2,452
2007	67	$12,172	$9,000	$3,172	0.783526	$2,486	1503	6617	0.921712	$2,291
2008	68	$12,172	$9,000	$3,172	0.746215	$2,367	1613	8230	0.902628	$2,137
2009	69	$12,172	$9,000	$3,172	0.710681	$2,255	1729	9959	0.882171	$1,989
2010	70	$12,172	$9,000	$3,172	0.676839	$2,147	1840	11799	0.860402	$1,847
2011	71	$12,172	$9,000	$3,172	0.644609	$2,045	1945	13744	0.837390	$1,712
2012	72	$12,172	$9,000	$3,172	0.613913	$1,948	2056	15800	0.813064	$1,583
2013	73	$12,172	$9,000	$3,172	0.584679	$1,855	2176	17976	0.787319	$1,460
2014	74	$12,172	$9,000	$3,172	0.556837	$1,766	2302	20278	0.760083	$1,343
2015	75	$12,172	$9,000	$3,172	0.530321	$1,682	2420	22698	0.731451	$1,231
2016	76	$12,172	$9,000	$3,172	0.505068	$1,602	2528	25226	0.701542	$1,124
2017	77	$12,172	$9,000	$3,172	0.481017	$1,526	2635	27861	0.670366	$1,023
2018	78	$12,172	$9,000	$3,172	0.458112	$1,453	2750	30611	0.637830	$927
2019	79	$12,172	$9,000	$3,172	0.436297	$1,384	2874	33485	0.603826	$836
2020	80	$12,172	$9,000	$3,172	0.415521	$1,318	3003	36488	0.568297	$749
2021	81	$7,303	$5,400	$1,903	0.395734	$753	1876.2	38364.2	0.546099	$411
						$31,185				$25,736
2021	81	4868.9511	3600	$1,269	0.395734	$502	1250.8	39615	0.531300	$267
2022	82	12172.378	9000	$3,172	0.376889	$1,196	3240	42855	0.492966	$589
2023	83	12172.378	9000	$3,172	0.358942	$1,139	3327	46182	0.453603	$517
2024	84	12172.378	9000	$3,172	0.341850	$1,084	3381	49563	0.413601	$449
2025	85	12172.378	9000	$3,172	0.325571	$1,033	3382	52945	0.373588	$386
2026	86	12172.378	9000	$3,172	0.310068	$984	3343	56288	0.334035	$329
2027	87	12172.378	9000	$3,172	0.295303	$937	3246	59534	0.295631	$277
2028	88	12172.378	9000	$3,172	0.281241	$892	3144	62678	0.258433	$231
2029	89	12172.378	9000	$3,172	0.267848	$850	2986	65664	0.223104	$190
2030	90	12172.378	9000	$3,172	0.255094	$809	2794	68458	0.190047	$154
2031	91	12172.378	9000	$3,172	0.242946	$771	2574	71032	0.159593	$123
2032	92	12172.378	9000	$3,172	0.231377	$734	2331	73363	0.132015	$97
2033	93	12172.378	9000	$3,172	0.220359	$699	2075	75438	0.107464	$75
2034	94	12172.378	9000	$3,172	0.209866	$666	1813	77251	0.086014	$57
2035	95	12172.378	9000	$3,172	0.199873	$634	1554	78805	0.067628	$43
2036	96	12172.378	9000	$3,172	0.190355	$604	1305	80110	0.052188	$32
2037	97	12172.378	9000	$3,172	0.181290	$575	1072	81182	0.039505	$23
2038	98	12172.378	9000	$3,172	0.172657	$548	862	82044	0.029306	$16
2039	99	12172.378	9000	$3,172	0.164436	$522	677	82721	0.021296	$11
2040	100	12172.378	9000	$3,172	0.156605	$497	1781	84502	0.000225	$0
										$29,599

(a) Source: Elizabeth Arias, "United States Life Tables, 2000," National Vital Statistics Reports, Vol. 51, No. 3, December 19, 2002, Table 1. The web site for this source is: http://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_03.pdf

(b) Overstatement of Loss using annuity-certain approach: ($31,185 - $29,599)/$29,599 x 100 = 5.36%.

TABLE 2

Part A. Wrongful Termination: Matching DC Savings Plan

Year	Age	Salary	Increase Factor	Salary With Increase	Discount Factor	Present Value	2% Firm Pension Contribution	Number Dying from Age x to x+1 (a)	Cumulative Number (a) Dying From 84,521 Alive at Exact Age 63	Survival Probability from Exact Age 63 to the end the indicated year	Mortality-Adjusted Present Value
2000	60	$30,000	1.03000	$30,900	1	$30,900	$618	0	0	1	$618
2001	61	$30,000	1.06090	$31,827	1	$31,827	$637	0	0	1	$637
2002	62	$30,000	1.09273	$32,782	1	$32,782	$656	0	0	1	$656
2003	63	$30,000	1.12551	$33,765	0.952381	$32,157	$643	1153	1153	0.986358	$634
2004	64	$30,000	1.15927	$34,778	0.907029	$31,545	$631	1236	2389	0.971735	$613
						$159,211	$3,184				$3,158

Part B. Wrongful Termination: DB Unit Benefit Plan □ Early Retirement at Age 60 With 5% Annual Penalty for Each Year Under Age 65

Year	Age	Pension But For WT	Pension Given WT	Annual Pension Loss	Discount Factor	Annuity Certain Present Value (b)	Number Dying from Age x to x+1	Cumulative Number Dying From 84521 Alive at Exact Age 63	Survival Probability from Age 63 to the end the indicated year	Mortality-Adjusted Present Value
2000	60	$0	$6,750	($6,750)	1	($6,750)	0	0	1	($6,750)
2001	61	$0	$6,750	($6,750)	1	($6,750)	0	0	1	($6,750)
2002	62	$0	$6,750	($6,750)	1	($6,750)	0	0	1	($6,750)
2003	63	$0	$6,750	($6,750)	0.952381	($6,429)	1153	1153	0.986358	($6,341)
2004	64	$0	$6,750	($6,750)	0.907029	($6,122)	1236	2389	0.971735	($5,949)
2005	65	$12,172	$6,750	$5,422	0.863838	$4,684	1319	3708	0.956129	$4,479
2006	66	$12,172	$6,750	$5,422	0.822702	$4,461	1406	5114	0.939494	$4,191
2007	67	$12,172	$6,750	$5,422	0.783526	$4,249	1503	6617	0.921712	$3,916
2008	68	$12,172	$6,750	$5,422	0.746215	$4,046	1613	8230	0.902628	$3,652
2009	69	$12,172	$6,750	$5,422	0.710681	$3,854	1729	9959	0.882171	$3,400
2010	70	$12,172	$6,750	$5,422	0.676839	$3,670	1840	11799	0.860402	$3,158
2011	71	$12,172	$6,750	$5,422	0.644609	$3,495	1945	13744	0.837390	$2,927
2012	72	$12,172	$6,750	$5,422	0.613913	$3,329	2056	15800	0.813064	$2,707
2013	73	$12,172	$6,750	$5,422	0.584679	$3,170	2176	17976	0.787319	$2,496
2014	74	$12,172	$6,750	$5,422	0.556837	$3,019	2302	20278	0.760083	$2,295
2015	75	$12,172	$6,750	$5,422	0.530321	$2,876	2420	22698	0.731451	$2,103
2016	76	$12,172	$6,750	$5,422	0.505068	$2,739	2528	25226	0.701542	$1,921
2017	77	$12,172	$6,750	$5,422	0.505068	$2,739	2635	27861	0.670366	$1,836
2018	78	$12,172	$6,750	$5,422	0.481017	$2,608	2750	30611	0.637830	$1,664
2019	79	$12,172	$6,750	$5,422	0.458112	$2,484	2874	33485	0.603826	$1,500
2020	80	$12,172	$6,750	$5,422	0.436297	$2,366	3003	36488	0.568297	$1,344
2021	81	$7,303	$4,050	$3,253	0.415521	$1,352	1876.2	38364.2	0.546099	$738
						$22,339				$11,786
2021	81	$4,869	$2,700	$2,169	0.395734	$858	1250.8	39615	0.531300	$456
2022	82	$12,172	$6,750	$5,422	0.376889	$2,044	3240	42855	0.492966	$1,007
2023	83	$12,172	$6,750	$5,422	0.358942	$1,946	3327	46182	0.453603	$883
2024	84	$12,172	$6,750	$5,422	0.341850	$1,854	3381	49563	0.413601	$767
2025	85	$12,172	$6,750	$5,422	0.325571	$1,765	3382	52945	0.373588	$660
2026	86	$12,172	$6,750	$5,422	0.310068	$1,681	3343	56288	0.334035	$562
2027	87	$12,172	$6,750	$5,422	0.295303	$1,601	3246	59534	0.295631	$473
2028	88	$12,172	$6,750	$5,422	0.281241	$1,525	3144	62678	0.258433	$394
2029	89	$12,172	$6,750	$5,422	0.267848	$1,452	2986	65664	0.223104	$324
2030	90	$12,172	$6,750	$5,422	0.255094	$1,383	2794	68458	0.190047	$263
2031	91	$12,172	$6,750	$5,422	0.242946	$1,317	2574	71032	0.159593	$210
2032	92	$12,172	$6,750	$5,422	0.231377	$1,255	2331	73363	0.132015	$166
2033	93	$12,172	$6,750	$5,422	0.220359	$1,195	2075	75438	0.107464	$128
2034	94	$12,172	$6,750	$5,422	0.209866	$1,138	1813	77251	0.086014	$98
2035	95	$12,172	$6,750	$5,422	0.199873	$1,084	1554	78805	0.067628	$73
2036	96	$12,172	$6,750	$5,422	0.190355	$1,032	1305	80110	0.052188	$54
2037	97	$12,172	$6,750	$5,422	0.181290	$983	1072	81182	0.039505	$39
2038	98	$12,172	$6,750	$5,422	0.172657	$936	862	82044	0.029306	$27
2039	99	$12,172	$6,750	$5,422	0.164436	$892	677	82721	0.021296	$19
2040	100	$12,172	$6,750	$5,422	0.156605	$849	1781	84502	0.000225	$0
										$18,390

(a) Source: Elizabeth Arias, "United States Life Tables, 2000," National Vital Statistics Reports, Vol. 51, No. 3, December 19, 2002, Table 1. The web site for this source is: http://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_03.pdf

(b) Overstatement of Loss using annuity-certain approach: ($22,339 - $18,390)/$18,390 x 100 = 21.47%.

TABLE 3
Estimating the Loss of Social Security Retirement Benefits

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Year	Age	Maximum Taxable Earnings(a)	Average Covered Earnings	Terminated Worker's Earnings	Year 2002 Factors (a)	Indexed Earnings (3) x (5)	Arrayed Indexed Earnings
1962	22	$4,800	$4,291	$4,225	7.4935912	$31,659	$31,659
1963	23	$4,800	$4,397	$4,329	7.3129406	$31,659	$31,659
1964	24	$4,800	$4,576	$4,505	7.0268794	$31,659	$31,659
1965	25	$4,800	$4,659	$4,587	6.9016956	$31,659	$31,659
1966	26	$6,600	$4,938	$4,862	6.5117456	$31,659	$31,659
1967	27	$6,600	$5,213	$5,133	6.1682333	$31,659	$31,659
1968	28	$7,800	$5,572	$5,486	5.7708184	$31,659	$31,659
1969	29	$7,800	$5,894	$5,803	5.4555480	$31,659	$31,659
1970	30	$7,800	$6,186	$6,091	5.1980278	$31,659	$31,659
1971	31	$7,800	$6,497	$6,397	4.9492073	$31,659	$31,659
1972	32	$9,000	$7,134	$7,024	4.5072890	$31,659	$31,659
1973	33	$10,800	$7,580	$7,463	4.2420844	$31,659	$31,659
1974	34	$13,200	$8,031	$7,907	4.0038600	$31,659	$31,659
1975	35	$14,100	$8,631	$8,498	3.7255243	$31,659	$31,659
1976	36	$15,300	$9,226	$9,084	3.4852591	$31,659	$31,659
1977	37	$16,500	$9,779	$9,628	3.2881685	$31,659	$31,659
1978	38	$17,700	$10,556	$10,393	3.0461349	$31,659	$31,659
1979	39	$22,900	$11,479	$11,302	2.8012022	$31,659	$31,659
1980	40	$25,900	$12,513	$12,320	2.5697275	$31,659	$31,659
1981	41	$29,700	$13,773	$13,561	2.3346402	$31,659	$31,659
1982	42	$32,400	$14,531	$14,307	2.2128553	$31,659	$31,659
1983	43	$35,700	$15,239	$15,004	2.1100466	$31,659	$31,659
1984	44	$37,800	$16,135	$15,886	1.9928726	$31,659	$31,659
1985	45	$39,600	$16,823	$16,564	1.9113713	$31,659	$31,659
1986	46	$42,000	$17,322	$17,055	1.8563099	$31,659	$31,659
1987	47	$43,800	$18,427	$18,143	1.7449938	$31,659	$31,659
1988	48	$45,000	$19,334	$19,036	1.6631323	$31,659	$31,659
1989	49	$48,000	$20,100	$19,790	1.5997512	$31,659	$31,659
1990	50	$51,300	$21,028	$20,704	1.5291516	$31,659	$31,659
1991	51	$53,400	$21,812	$21,476	1.4741885	$31,659	$31,659
1992	52	$55,500	$22,935	$22,581	1.4020057	$31,659	$31,659
1993	53	$57,600	$23,133	$22,776	1.3900056	$31,659	$31,659
1994	54	$60,600	$23,754	$23,388	1.3536668	$31,659	$31,659
1995	55	$61,200	$24,706	$24,325	1.3015057	$31,659	$31,659
1996	56	$62,700	$25,914	$25,514	1.2408351	$31,659	$31,659
1997	57	$65,400	$27,426	$27,003	1.1724276	$31,659	$31,659
1998	58	$68,400	$28,861	$28,416	1.1141333	$31,659	$31,659
1999	59	$72,600	$30,470	$30,000	1.0553003	$31,659	$31,659
2000	60	$76,200	$32,155	$30,900	1.0000000	$30,900	$30,900
2001	61	$80,400	$32,922	$31,827	1.0000000	$31,827	$31,827
2002	62	$84,900		$32,782	1.0000000	$32,782	$32,782
2003	63	$87,000		$33,765	1.0000000	$33,765	$33,765
2004	64	$87,000		$34,778	1.0000000	$34,778	$34,778

Total Earnings in 35 Computation Years (Highest 35 Years to Age 65) - But for Termination	$1,113,823
Average Indexed Monthly Earnings (AIME) - But For Termination	$2,652
Primary Insurance Amount (PIA) - Age 65 and 6 Months Monthly Benefit (a)	$1,192
Age 65 Monthly Retirement Benefit	$1,152
Total Earnings in 35 Computation Years (Highest 35 Years to Age 65) - Given Termination	$1,108,065
Average Indexed Monthly Earnings (AIME) - Given Termination	$2,638
Primary Insurance Amount (PIA) - Age 65 and 6 Months Monthly Benefit (a)	$1,188
Age 65 Monthly Retirement Benefit	$1,148
Total Earnings in 35 Computation Years (Highest 35 Years to Age 65) - 1991 Start Date	$354,006
Average Indexed Monthly Earnings (AIME) - Given Termination	$843
Primary Insurance Amount (PIA) - Age 65 and 6 Months Monthly Benefit (with DD penalty) (a)	$317
Age 65 Monthly Retirement Benefit	$307

(a) Sources: Social Security Administration, "Social Security Bulletin," Vol. 63, No. 2, 2000, Table 2; and "Statistical Supplement, 2001," Table 2.A20. Also, see the Social Security Administration web site at http://www.ssa.gov

TABLE 4

Earnings But For Termination

Year	Age	Salary	Increase Factor	Salary With Increase	Discount Factor	Present Value
2000	60	$30,000	1.03000	$30,900	1	$30,900
2001	61	$30,000	1.06090	$31,827	1	$31,827
2002	62	$30,000	1.09273	$32,782	1	$32,782
2003	63	$30,000	1.12551	$33,765	0.952381	$32,157
2004	64	$30,000	1.15927	$34,778	0.907029	$31,545
						$159,211

Year	Age	SS Pension But For WT	SS Pension Given WT	Annual Pension Loss	Discount Factor	Present Value
2005	65	$14,698	$14,647	$51	0.863838	$44
2006	66	$15,095	$15,043	$52	0.822702	$43
2007	67	$15,533	$15,479	$54	0.783526	$42
2008	68	$15,999	$15,944	$56	0.746215	$41
2009	69	$16,479	$16,422	$57	0.710681	$41
2010	70	$16,973	$16,914	$59	0.676839	$40
2011	71	$17,483	$17,422	$61	0.644609	$39
2012	72	$18,007	$17,945	$63	0.613913	$38
2013	73	$18,547	$18,483	$64	0.584679	$38
2014	74	$19,104	$19,037	$66	0.556837	$37
2015	75	$19,677	$19,609	$68	0.530321	$36
2016	76	$20,267	$20,197	$70	0.505068	$36
2017	77	$20,875	$20,803	$72	0.481017	$35
2018	78	$21,501	$21,427	$75	0.458112	$34
2019	79	$22,146	$22,070	$77	0.436297	$34
						$578

Less the OASI FICA tax of 5.3% of Earnings	$8,438
Net Loss of Social Security benefits	($7,860)

TABLE 5

Earnings But For Termination

Year	Age	Salary	Increase Factor	Salary With Increase	Discount Factor	Present Value
2000	60	$30,000	1.03000	$30,900	1	$30,900
2001	61	$30,000	1.06090	$31,827	1	$31,827
2002	62	$30,000	1.09273	$32,782	1	$32,782
2003	63	$30,000	1.12551	$33,765	0.952381	$32,157
2004	64	$30,000	1.15927	$34,778	0.907029	$31,545
						$159,211

Wrongful Termination: SS Pension Loss With 11 Years of Covered Earnings

Year	Age	SS Pension But For WT	SS Pension Given WT	Annual Pension Loss	Discount Factor	Present Value
2005	65	$3,917	$0	$3,917	0.863838	$3,384
2006	66	$4,023	$0	$4,023	0.822702	$3,310
2007	67	$4,139	$0	$4,139	0.783526	$3,243
2008	68	$4,264	$0	$4,264	0.746215	$3,182
2009	69	$4,392	$0	$4,392	0.710681	$3,121
2010	70	$4,523	$0	$4,523	0.676839	$3,062
2011	71	$4,659	$0	$4,659	0.644609	$3,003
2012	72	$4,799	$0	$4,799	0.613913	$2,946
2013	73	$4,943	$0	$4,943	0.584679	$2,890
2014	74	$5,091	$0	$5,091	0.556837	$2,835
2015	75	$5,244	$0	$5,244	0.530321	$2,781
2016	76	$5,401	$0	$5,401	0.505068	$2,728
2017	77	$5,563	$0	$5,563	0.481017	$2,676
2018	78	$5,730	$0	$5,730	0.458112	$2,625
2019	79	$5,902	$0	$5,902	0.436297	$2,575
						$44,359
Less the OASI FICA tax of 5.3% of Earnings						$8,438
Net Loss of Social Security benefits						$35,921

TABLE 6

Earnings But For Termination: Young Person

Year	Age	Salary	Increase Factor	Salary With Increase	Discount Factor	Present Value
2000	40	$30,000	1.03000	$30,900	1	$30,900
2001	41	$30,000	1.06090	$31,827	1	$31,827
2002	42	$30,000	1.09273	$32,782	1	$32,782
2003	43	$30,000	1.12551	$33,765	0.952381	$32,157
2004	44	$30,000	1.15927	$34,778	0.907029	$31,545
						$159,211

Wrongful Termination: DB Unit Benefit Plan: Young Person

Year	Age	Pension But For WT	Pension Given WT	Annual Pension Loss	Discount Factor	Present Value
2005	45	$0	$0	$0	0.863838	$0
2006	46	$0	$0	$0	0.822702	$0
2007	47	$0	$0	$0	0.783526	$0
2008	48	$0	$0	$0	0.746215	$0
2009	49	$0	$0	$0	0.710681	$0
2010	50	$0	$0	$0	0.676839	$0
2011	51	$0	$0	$0	0.644609	$0
2012	52	$0	$0	$0	0.613913	$0
2013	53	$0	$0	$0	0.584679	$0
2014	54	$0	$0	$0	0.556837	$0
2015	55	$0	$0	$0	0.530321	$0
2016	56	$0	$0	$0	0.505068	$0
2017	57	$0	$0	$0	0.481017	$0
2018	58	$0	$0	$0	0.458112	$0
2019	59	$0	$0	$0	0.436297	$0
2020	60	$0	$0	$0	0.415521	$0
2021	61	$0	$0	$0	0.395734	$0
2022	62	$0	$0	$0	0.376889	$0
2023	63	$0	$0	$0	0.358942	$0
2024	64	$0	$0	$0	0.341850	$0
2025	65	$5,217	$3,000	$2,217	0.325571	$722
2026	66	$5,217	$3,000	$2,217	0.310068	$687
2027	67	$5,217	$3,000	$2,217	0.295303	$655
2028	68	$5,217	$3,000	$2,217	0.281241	$624
2029	69	$5,217	$3,000	$2,217	0.267848	$594
2030	70	$5,217	$3,000	$2,217	0.255094	$566
2031	71	$5,217	$3,000	$2,217	0.242946	$539
2032	72	$5,217	$3,000	$2,217	0.231377	$513
2033	73	$5,217	$3,000	$2,217	0.220359	$489
2034	74	$5,217	$3,000	$2,217	0.209866	$465
2035	75	$5,217	$3,000	$2,217	0.199873	$443
2036	76	$5,217	$3,000	$2,217	0.190355	$422
2037	77	$5,217	$3,000	$2,217	0.181290	$402
2038	78	$5,217	$3,000	$2,217	0.172657	$383
2039	79	$5,217	$3,000	$2,217	0.164436	$365
						$7,867

Deduction of Employee's Contribution @ 5% of Lost Earnings	$7,961
Net Loss	($94)