

Preliminary Report on the Impact of Amending the Defined Benefit Retirement Plan to the Cash Balance Pension on Older Employees

In re:

Phillip C. Engers, Warren J. McFall, Donald G. Noerr, and Gerald Smit, individually and on behalf of all others similarly situated, v. AT&T Corporation and AT&T Management Pension Plan
Civil Action No. 98-CV-3660 (SRC/CCC)
United States District Court
for the District of New Jersey (Newark)

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1. Introduction and Summary of Findings

This report is a preliminary analysis of the impact on older employees of AT&T's transition from the Defined Benefit Retirement Plan to the Cash Balance Pension (CBP) from 1997 through 2008.

- Section 1 contains the Introduction and a Summary of Findings.
- Section 2 describes the factors impacting benefits for employees during the transition between plans and explains the specific mechanisms through which the transition impacted older employees.
- Section 3 provides a graphical analysis of the elevated wear-away for older employees.
- Section 4 describes the method for calculating potential and actual damages from the periods of wear-away.
- Section 5 provides a conclusion.
- Section 6 lists the sources of data used in the report.
- Section 7 addresses my qualifications and compensation.

Context of the Analysis

This is a class action under the Employee Retirement Income Security Act of 1974, as amended (“ERISA”), 29 U.S.C. § 1001 et seq., and a representative action under the Age Discrimination in Employment Act of 1964, as amended (the “ADEA”), 29 U.S.C. § 621 et seq. Plaintiffs claim that defendants have violated the ADEA and ERISA by amending a defined benefit retirement plan in a manner that freezes the benefits of older, longer-service employees during a “wear-away” period, and thereby provides no additional benefits during that period.¹ I have been retained by the plaintiffs to conduct statistical analyses of the impact of age on retirement benefits for the class.

This analysis of wear-away and other impacts of the plan transition relies on two sources of data provided by defendants. Spreadsheets were produced, providing detailed pension records for 59,979 AT&T employees, including 24,069 opt-in class members. The database provided was sufficient to calculate wear-aways and damages for most employees.² The data from these sources was combined and used to calculate the wear-away period and other impacts of the plan transition using spreadsheets produced by actuary Claude Poulin. The data compiled from these sources and the individual results of all the computations are included in electronic Attachment 1 (which contains personal identifiers subject to the Protective Order and therefore is to be treated as confidential filed under seal).

There is one particularly important omission in the data supplied by AT&T. Data was not supplied for individuals who have been hired by AT&T after January 1, 1998 and who have participated in this Pension Plan. Those individuals would not have any benefit losses from wear-aways of their previously-earned benefits, but would receive all of the benefits earned under AT&T's cash balance formula. If those

¹Class Action Complaint, page 1.

²There was adequate information to perform the computations for 51,015 of the 59,979 employees. Of the employees with incomplete data, 6,886 were employees who transferred from “occupational” (bargaining unit) positions to management. The data was also incomplete for 312 highly-paid executives whose Opening Cash Accounts could not be reconciled with their previously-earned benefits.

individuals are primarily younger persons, their inclusion in this analysis would show even stronger relationships between the presence of wear-aways and age.

Summary of Findings

The results of this study demonstrate that the conversion to the CBP by defendants adversely impacted older employees and resulted in substantial loss in benefits for older employees. My central findings are:

1. While all employees were negatively impacted by the change to a cash balance plan, the plan is structured in such a way that older employees are more negatively impacted by the plan conversion than are younger employees.
2. Older employees spend on average a longer time accruing no additional benefits (*wear-away* period) than do younger employees, resulting in an adverse impact on older workers.
3. Age impacts the length of the wear-away period both directly through structural features of the plans and indirectly, by means of its strong relationship with all the other factors that impact the length of the wear-away period.
4. When the lost benefits from the periods of wear-away are compared, older employees have lost much larger amounts than younger employees.
5. AT&T could have foreseen the impacts of the plan conversion on older workers using information available at that time, and therefore could have modified the plan design in order to reduce those impacts.
6. If multivariate regression is used, the statistical significance of the effect of age on wear-away is found to be so extreme (over 17 standard deviations) that it rules out the possibility that the impact is due to chance.
7. Losses in future benefits as a result of the transition structure are quite steep for all but the youngest employees. For example, employees who were between 50 and 55 suffered on average over \$100,000 in lost benefits.
8. Over 92 percent of damages were borne by older employees.

These findings provide strong evidence that older employees suffered a systematic cessation in earning additional retirement benefits as a result of the pension plan transition that AT&T designed and implemented.

2. Transition to AT&T Cash Balance Plan

Effective January 1, 1998, AT&T converted its traditional defined benefit pension plan into a “cash balance” plan. A cash balance plan attempts to mimic the behavior of a defined contribution plan, even though it is still regulated as a type of defined benefit plan. Employees under a cash balance plan have an “account balance” which is expressed as a dollar amount. The accounts were established with opening balances derived in part from the traditional accrued benefits. The initial balance failed to include the full value of the substantial early retirement benefits and the interest rates implicit in the conversion factors adopted by AT&T further reduced initial balances.

For many employees, the opening value of the cash balance plan was substantially lower than the value of the prior plan benefit. Benefit accruals in the cash balance account are made through hypothetical pay

credits, which are a function of age and compensation up to and over the Social Security Wage Base. Interest credits are established for each year. In contrast, the prior plan benefit was “frozen” at its amount at the time of transition. Employees retiring after the transition would receive the benefit derived from the higher of the two formulas. This type of transition plan is denoted a “greater-of” plan. Since the cash balance plan account value was lower for many employees, it would not be used in computing the actual benefit until it caught up. This “greater-of” transition results in a period of years during which the value of the actual retirement benefit ceases to grow at all. This phenomenon is called “wear-away.” Generally speaking, the duration of the wear-away period will increase as a function of the size of the gap between the cash account value and the value of the frozen benefit and the rate at which the employee is catching up. This phenomenon could be avoided by using an “A plus B” transition in which the cash balance credits are added to the frozen benefits.

The report of Actuary Claude Poulin details the design of AT&T’s “greater-of” transition plan.³ By its construction this plan systematically subjected older employees to longer wear-away periods and greater losses of future benefits. Mr. Poulin describes alternative “A plus B” or “sum of” designs for plan transitions which are routinely used to avoid subjecting older employees to greater wear-away and damages. In fact, Mr. Poulin points out that the “A plus B” transition plan is statutorily required for all cash balance conversions after June 2005 by the 2006 Pension Protection Act.⁴

The “greater-of” design of the AT&T transition is one prerequisite for the existence of wear-aways. The second precondition is that the value of the frozen benefit under the prior plan is greater than the value of the cash balance account, which requires a wear-away period for the cash account to catch up to the value of the frozen benefit.

Design of the Transition Resulted in Systematic Impact on Older Employees

The AT&T transition included features which in combination with the greater-of formulation guaranteed that the burden of these negative impacts are borne disproportionately by older workers. Three factors detailed in Mr. Poulin’s declaration caused the greater impact on older employees:⁵

- AT&T excluded the value of previously-earned early retirement benefits, which was greater for older employees because of their proximity to retirement;
- Conversion factors used by AT&T to determine cash balances were based on higher discount rates for older employees. The effect of these conversion factors in combination with the exclusion of early retirement benefits was to reduce their initial accounts as much as 50 percent relative to the value of the prior plan’s benefits.
- Monthly benefits under the new plan are also reduced relative to the prior plan. Accruals for older employees are reduced more, resulting in more years of wear-away before the value of the cash balance plan reaches parity with the prior plan.

The fact that these disproportionate impacts are built into the structure of the plan indicates that they were not random, nor would they have been unexpected. At any time prior to implementing the new plan, an analyst with the details of the plan and a few basic assumptions could have estimated the impact on AT&T employees and recognized that the impact would be borne primarily by older workers.

³Claude Poulin Declaration, ¶26-29.

⁴Claude Poulin Declaration, page 9, citing P. L. 109-280, Section 701(a) (adding ERISA Section 204(b)(5)(B)(ii)-(iv)).

⁵Claude Poulin Declaration, pages 10-13.

3. Wear-Away Duration Strongly Associated with Age

Calculation of Wear-Away

The plaintiffs have retained actuary Claude Poulin, who has made a detailed analysis of the former and new benefit plans sponsored by AT&T.⁶ Mr. Poulin produced three spreadsheet calculators that were used in our analyses. Each spreadsheet computed values for a different analysis: (1) potential wear-away and damages; (2) actual length of wear-away and damages; and (3) the loss to employees affected by the 6% per year reduction in the previously-earned benefit for commencing benefits before age 55.

In most instances of putative employment discrimination, the only way to determine whether employment decisions have a discriminatory impact is through observing the impact on employees. This case is different. The impact of the plan transition is *predetermined* and can be *calculated* from the age, prior plan benefit amount and salary. Therefore, we can evaluate the *systematic impact resulting from the design of the plan transition*. In other words, we know from its construction that the plan transition was not age neutral. The impact was known by defendants in advance of implementation. The monetary losses to the putative class could be calculated in advance, resulting in a substantial reduction in pension expenses on defendants' financial statements.

Many Employees Leave Without Ever Earning Benefits Again

Using Mr. Poulin's spreadsheets, we report the potential and actual wear-away period computed under the cash balance plan. This wear-away period is the number of years during which the cash balance account is less than the now frozen monthly benefit under the prior plan. By their early 60s wear-away terminates for all employees, and the benefit accruals would resume.⁷ However, since few employees remain at AT&T into their 60s, most older employees will never recommence earning benefits after wear-away.

To analyze the full impact of the wear-away established by the plan transition, the potential wear-away is reported as well as the actual wear-away. Potential wear-away is the number of years before the employee would begin earning benefits again if the employee continued to be employed. Actual wear-away is the number of years the employee actually did not receive additional benefits prior to leaving AT&T.

Potential Wear-Away Increases with Age

The existence and length of wear-away can be calculated from four values for each employee: age, 1997 salary, opening cash balance account balance, and the higher of the benefit established by the Special Update or the Frozen Accrued Benefit.⁸ Applying AT&T's pension data to the spreadsheet developed by Mr. Poulin demonstrates convincingly that the duration of the wear-away period and resulting losses of future benefits are strongly associated with age. During the wear-away period, employees are accruing no additional benefits. Older employees spend on average a longer time accruing no additional benefits than do younger employees, resulting in an adverse impact on older workers.

Chart 1 compares the average potential wear-away duration for employees 40 and over to younger

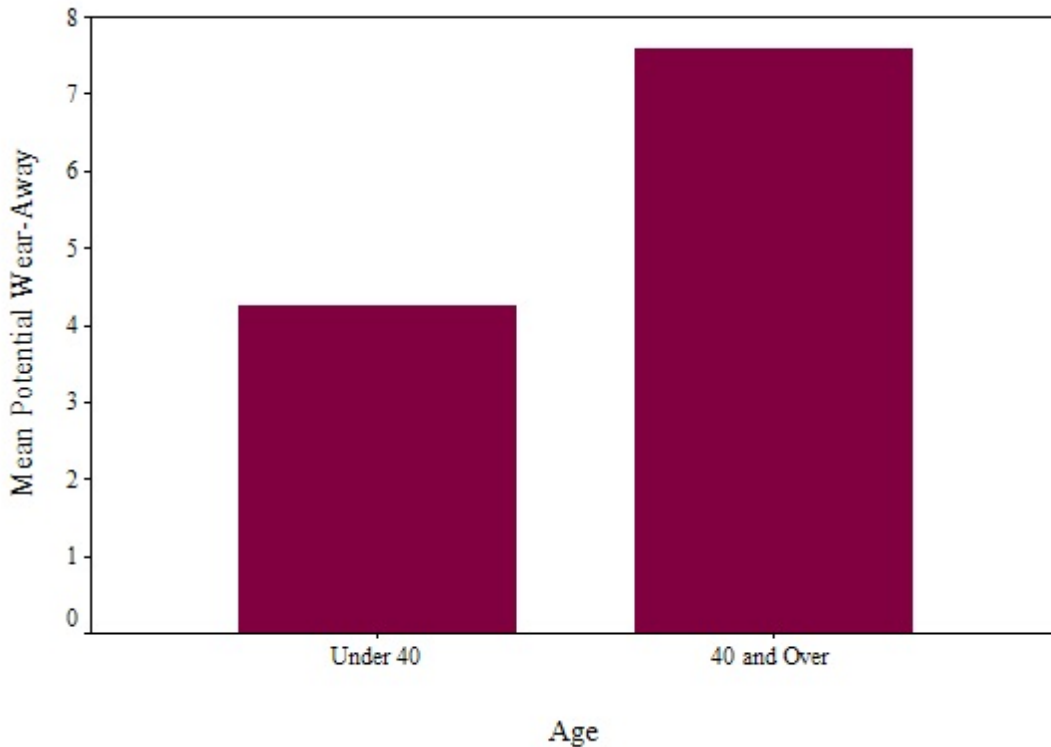
⁶Claude Poulin Declaration, pages 14-15.

⁷This is demonstrated by the AT&T tabulation of wear-away by years of service and age, which shows no wear-away after age 63: *Number of Years to Crossover of Cash Balance Over Transition Benefit* [ATTENG000040].

⁸The Special Update, was a plan amendment adopted December 19, 1997. Effective August 1, 1997, the amendment updated the pay base averaging period from 1987-92 to 1994-96, and added up to one year to active participants' years of credited service as of December 31, 1996.

employees. This chart shows the strong relationship between age and length of wear-away, and the sizeable impact on older employees. The transition resulted in employees 40 and over waiting on average almost eight years while they earned no additional benefits, versus just over four years on average for employees under 40. The average wear-away for older employees was 7.6 years, versus 4.3 for younger employees, so that older employees had on average 177% the potential wear-away of younger employees.

Chart 1: Duration of Potential Wear-Away By Employee Age

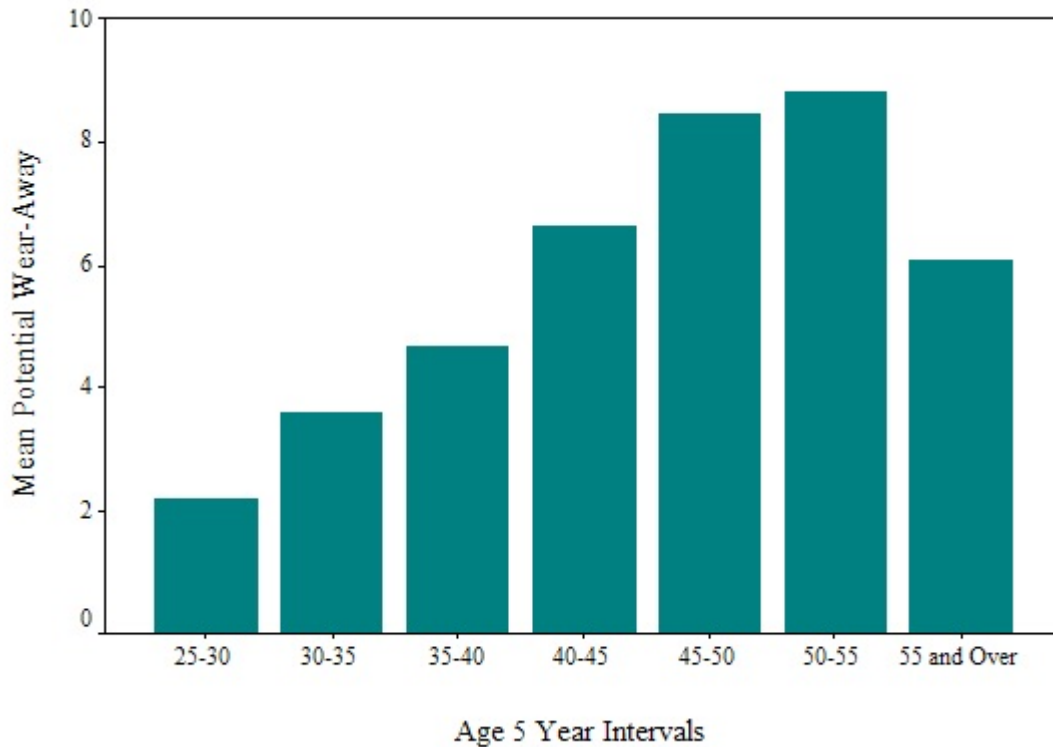


Potential wear-away is similarly elevated for ERISA and ADEA class members. ERISA class members experience 7.8 years of potential wear-away on average, versus 3.5 for non-members. ADEA class members experience 7.9 years of potential wear-away, versus 3.9 for non-members.

Chart 2 shows that, except for the truncation of wear-away as employees near retirement age, age is strongly related to longer wear-away periods. For every five year increase in the employee's age, the potential wear-away period on average becomes one and one-third years longer.

The impact gradually starts to decline between ages 55 and 60. But AT&T's payroll and pension data show that very few employees work many years past 60. In fact, less than 2 percent of the active participants in AT&T's Plan are over age 60.

Chart 2: Duration of Potential Wear-Away by Five-Year Age Intervals



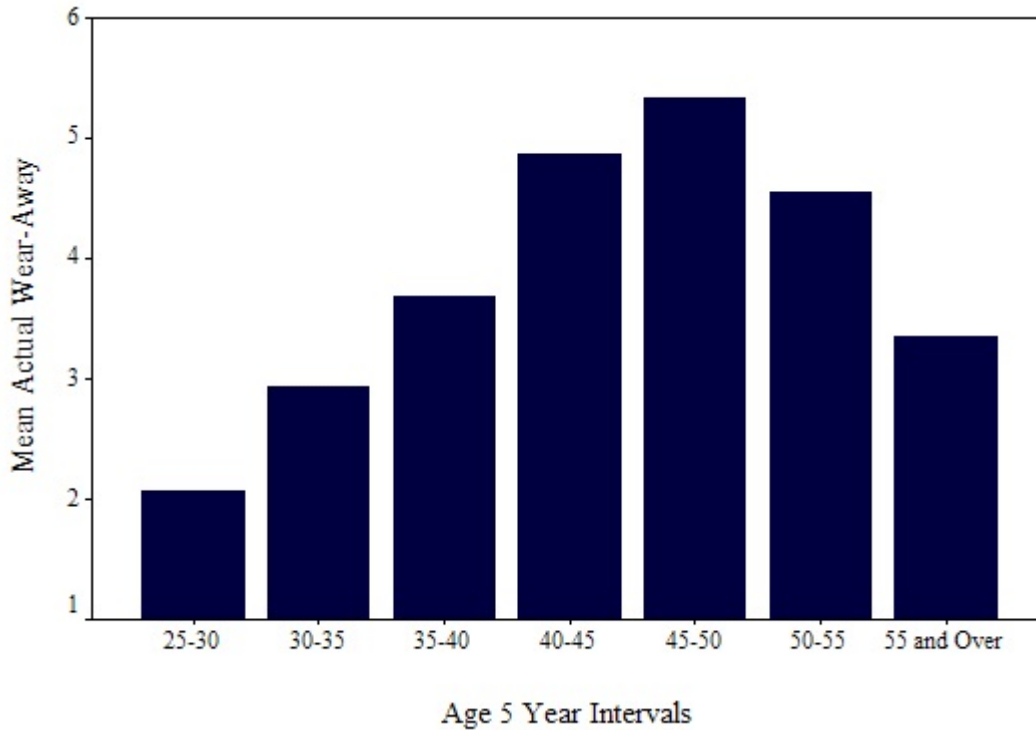
Actual Wear-Away Impacts Older Employees

The AT&T transition resulted in a similar relationship between age and length of *actual* wear-away as for potential wear-away. The average actual wear-away for employees 40 and over was 4.6 years, versus 3.4 for younger employees, so that older employees had on average 134% the actual wear-away of younger employees. Actual wear-away is also elevated for ERISA and ADEA class members. ERISA class members experience 4.7 years of potential wear-away on average, versus 2.9 for non-members. ADEA class members experience 4.7 years of potential wear-away, versus 3.1 for non-members. Chart 3 shows that, except for the truncation of wear-away as employees near retirement age, age is strongly related to longer actual wear-away periods.

The periods of actual wear-away for older employees are greatly impacted by early retirement incentive and other force management programs. AT&T had an early retirement incentive program in 1998 (the VRIP) that induced 15,500 managers to leave AT&T in 1998 and 1999, 88 percent of whom were older employees in their 40's and 50's. When the employees who left under the VRIP are not included, the average period of actual wear-away for employees 40 and over rises to 5.4 years.

The periods of actual wear-away for the younger employees are also impacted by the fact that AT&T has not provided data for employees who were hired after January 1, 1998, none of whom would have any actual wear-aways of prior benefit amounts.

Chart 3: Duration of Actual Wear-Away by Five-Year Age Intervals



Age Is Central Determinant of Wear-Away

The existence and length of wear-away can be calculated from four values for each employee: age, 1997 salary, opening cash balance account balance, and the higher of the benefit established by the Special Update or the Frozen Accrued Benefit. Age is positively correlated with years of wear-away: as age increases, the years of wear-away also increase. Service is a factor only through its impact on the amount of the Special Update or the Frozen Accrued Benefit. Service, salary, cash balance account, and the amount of the prior benefits are all positively correlated with age: as age increases, each of these tends to increase.

Since these factors are all positively correlated with age, the age of employees has a strong impact on the existence and length of wear-away. Age is the necessary antecedent of higher values of the other variables. As such, age is the necessary if not sufficient condition through which any of them impacts wear-away. This relationship between age and the other variables means that each of these variables will mediate the impact of age, tending to act as a proxy for age in their impact on wear-away.

For example, while an employee age 50 can have 25 years of service, it is impossible for an employee who is age 30 or 40 to have that many years of service. Similarly the level of the now-frozen benefits that could be acquired by an employee of age 50 would be unachievable for a 30 or 40 year old employee.

Multivariate Regression is Not Needed to Understand the Impact of Age on Wear-Away

In this case there is no need to use statistical tools like correlation analysis or multivariate regression. These tools are designed to investigate patterns that are not already known. For example, multivariate regression estimates the way each of a group of factors impacts an outcome. These tools are inappropriate in this case, since *we already know the precise relationship between each of the factors and wear-away*. We can use a

tool like Mr. Poulin's spreadsheets to *compute* the impact of age on wear-away. There is no need to estimate the impact.

In any case, regression analysis does show the key role of age in lengthening the period of wear-away for older employees. This is a strong relationship because the underlying relationship between age and wear-away was built into the transition plan by defendants.

Multivariate regression evaluates the size of the effect of age on wear-away, while controlling for other variables. Age is found to be a primary and statistically significant factor in length of wear-away. A regression model including all the variables used in Mr. Poulin's calculations of wear-away⁹ indicates that wear-away for employees is affected by their age, and that the impact is statistically significant at the levels far exceeding the prima facie threshold of 0.05. In fact, the statistical significance of the effect of age on wear-away is so extreme that it rules out that the impact is due to chance. The age disparity in potential wear-away was over 77 standard deviations, and over 17 standard deviations for actual wear-away. To illustrate, consider that the likelihood that age is not a factor in the length of actual wear-away is less than the chance of winning a six-number lottery nine times in a row, each time with only one ticket.

If age were not a significant factor in wear-away, we would expect that controlling for other factors would reduce the age effect to statistical insignificance. But here, controlling for the significant effects of other variables leaves a highly significant effect of age.

4. Calculation of Lost Retirement Benefits and Damages

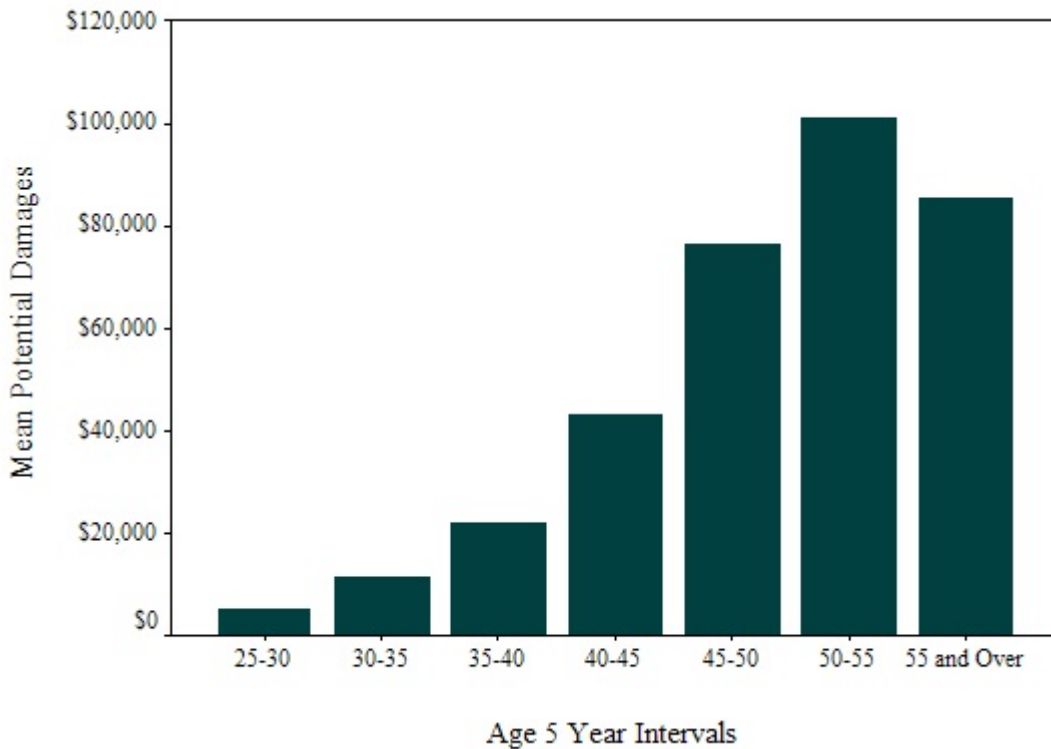
In addition to calculating wear-away, the spreadsheets Mr. Poulin developed calculate the lost benefits and damages resulting from the plan transition. As employees continue to work after the date of transition to the cash balance plan, most experience some period of time during which they do not accrue any benefits due to the wear-away effects discussed previously. Pay and interest credits are allocated to their cash balance account but those pay and interest credits do not translate to any real additional retirement benefit. When the wear-away period ends, the employees may begin to accrue benefits again, but at a slower rate than under the previous plan. This section compares average potential and actual benefit losses by age, and the total potential and actual damages by age.

Potential Losses in Retirement Benefits Disproportionately Impact Older Employees

The average loss in potential benefits by age group is shown in Chart 4. As with potential wear-away, potential damages reflect the losses that an employee at AT&T would see if he or she continued to work through the end of wear-away. The losses are quite steep for all but the youngest employees. Employees who were between 50 and 55 were looking at an average loss of over \$100,000 in future benefits. The youngest employees on average have the smallest reductions in benefits.

⁹The model used age, salary, cash balance account value and the frozen prior benefit.
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Chart 4 : Potential Damages by Five-Year Age Intervals



Early Commencement Penalty In Greater-of Formula Had Larger Impact on Older Employees

In addition to the loss of future benefits, the greater-of transition provision in the new plan included an actuarially excessive reduction for commencement of benefits before age 55 which resulted in substantial additional losses of previously-earned benefits. The amended retirement plan¹⁰ provided for a one-half percent per month reduction in the frozen traditional benefit, or 6 percent per year, for commencing benefits before age 55.¹¹ The spreadsheets provided by Mr. Poulin were used to compute this early retirement penalty for all 25,407 individuals with early separation dates. Mr. Poulin's spreadsheets were then applied to compare those reductions with actuarially-equivalent reductions and to compute the value of the lost benefits.

The results show that older employees suffered higher losses due to AT&T's 6 percent per year reduction in retirement benefits for early commencement than did younger employees. The 6 percent reduction in benefits per year had the net effect of taking away part of the value of the Special Update Benefit for older employees, especially those whose employment ended shortly after the cash balance conversion.

Actual Damages Greater for Older Employees

Employees lost benefits due to the plan transition from wear-away periods during which they earned no benefits, and from the early commencement penalty just discussed. Therefore, actual damages for employees were the sum of benefit losses due to both of these causes. Chart 5 depicts the average actual damages by

¹⁰Section 4.06(a)(ii)(A)(2).

¹¹Claude Poulin Declaration, pages 14-15.

age group as the sum of these benefit losses. This chart demonstrates that employees 40 and over experienced almost four times the loss as younger employees.

Chart 5: Actual Damages Sum Early Retirement and Wear-Away Losses

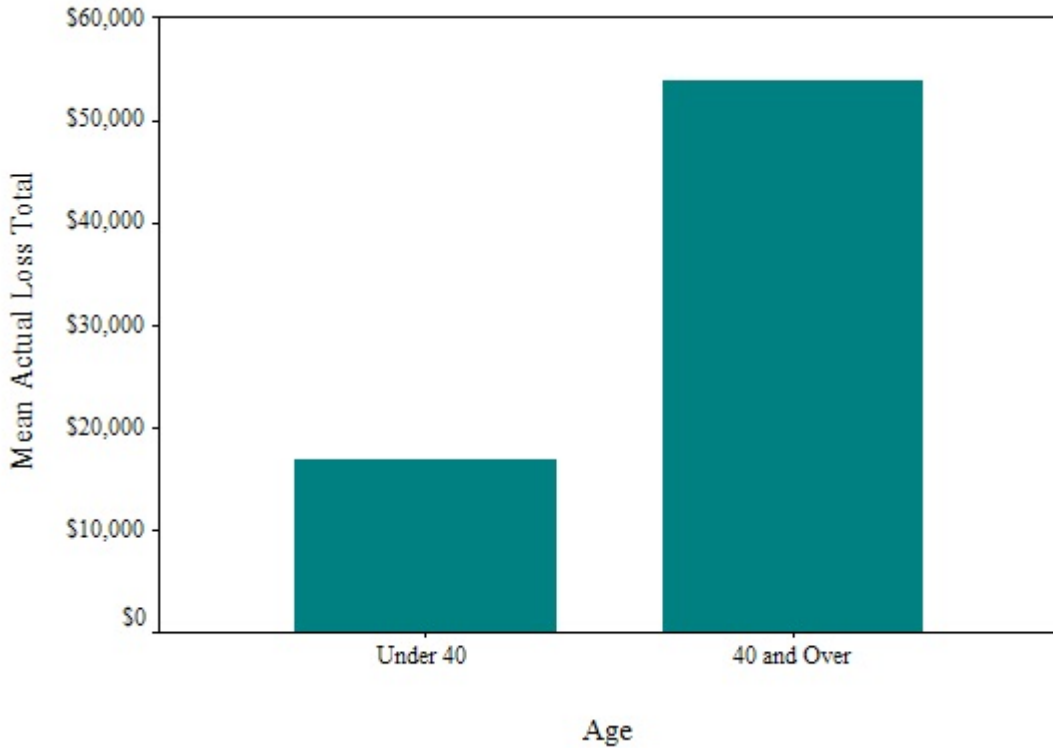
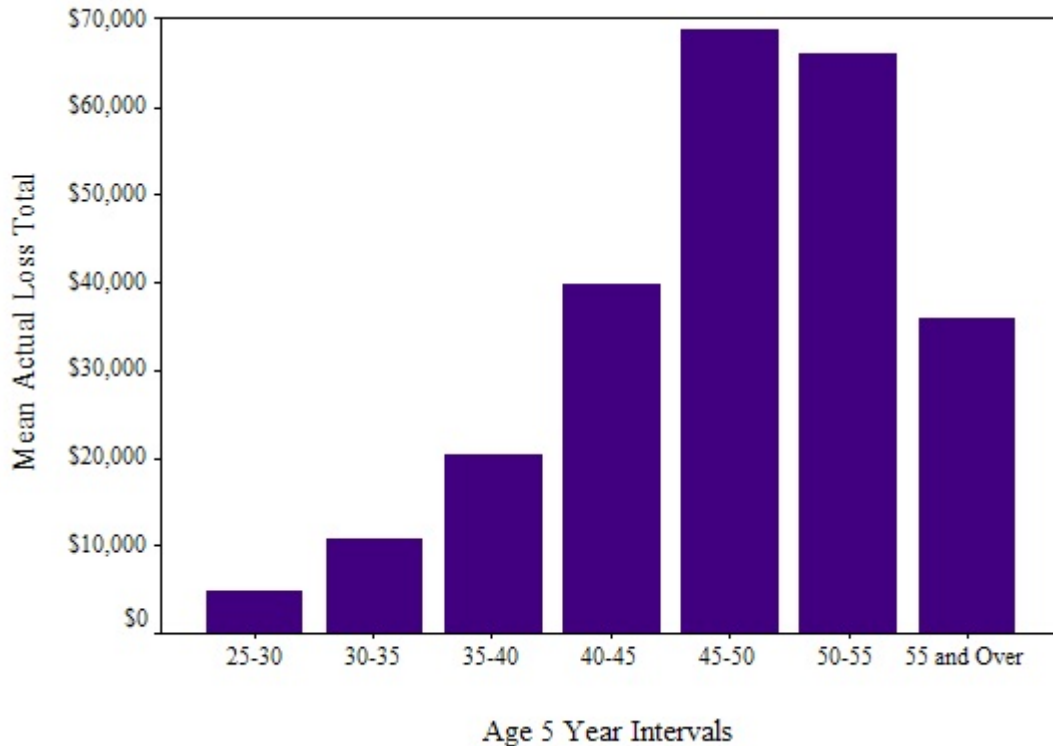


Chart 6 uses the same technique to display the sum of average actual early retirement and wear-away losses for five-year age groups. This chart shows the same pattern of age-related actual damages, with employees' losses increasing with age to almost \$70,000 before they decline as a result of the truncation of wear-away and early retirement penalties as retirement age is approached.

Chart 6: Actual Damages by Five-Year Age Intervals



Older Employees Lost Disproportionate Amounts of Future Retirement Benefits

The average loss in future retirement benefits by age group is shown in Table 1. The losses are substantial for all but the youngest employees. Employees who were between 50 and 55 had on average over a \$100,000 loss in potential future benefits. The youngest employees on average have the smallest reductions in benefits.

Table 1 : Average Loss in Retirement Benefits By Age on Transition Date				
Age Interval	Potential Loss in Future Benefits	Actual Retirement Benefit Losses		
		Wear-Away	Early Retirement	Total
20-30	\$5,761	\$4,969	\$389	\$5,066
30-35	\$12,225	\$9,661	\$2,789	\$10,974
35-40	\$22,387	\$17,339	\$6,644	\$20,618
40-45	\$43,445	\$31,471	\$18,347	\$40,116
45-50	\$76,662	\$45,166	\$48,453	\$69,069
50-55	\$101,668	\$43,116	\$48,332	\$66,243
55 and Over	\$85,890	\$33,667	\$12,651	\$36,166

Table 1 includes actual benefit losses from two sources: the loss of future retirement benefits due to wear-away, and the loss of early retirement benefits from the early commencement penalty.¹²

Damages Calculations Reveal Older Employees Suffered Over 90% of Losses

Totaling the damages for each employee with adequate data provides a calculation of the total damage resulting from the transition of the AT&T pension plan. The estimated damages are shown in Table 2. This table shows that over 92 percent of the damages were borne by older employees.

Table 2: Total Losses in Retirement Benefits By Age on Transition Date				
Age Interval	Potential Loss in Future Benefits	Actual Retirement Benefit Losses		
		Wear-Away	Early Retirement	Total
Under 40	\$192,691,477	\$152,924,012	\$26,988,124	\$179,863,247
40 and Over	\$3,111,221,693	\$1,559,198,118	\$614,341,996	\$2,171,707,074
Total	\$3,303,913,170	\$1,712,122,130	\$641,330,120	\$2,351,570,320
Under 40	5.8%	8.9%	4.2%	7.6%
40 and Over	94.2%	91.1%	95.8%	92.4%

5. Conclusion

This report provides incontrovertible evidence that older employees were adversely impacted by the pension plan transition engineered by AT&T. This report is based on the data produced to date. This report may be amended or a supplemental report submitted as a result of subsequent production by defendants. Section 1 lists detailed conclusions under the Summary of Findings.

6. Data and Information Sources Used

This is an analysis based on documents received to date. This report may be revised and a supplemental report submitted if additional information is provided. I have used the following information in this analysis:

Data and Documentation

1. The AT&T Management Pension Plan, amended and restated January 1, 1998.
2. Copies of resolutions adopted by the Board of Directors of AT&T Corporation at a meeting held on April 16, 1997, amending the AT&T Management Pension Plan to provide the Special Update effective August 1, 1997 and to establish hypothetical cash balance accounts as of January 1, 1998.
3. The Summary Plan Description of the 1998 AT&T Management Pension Plan.

¹²The total column does not necessarily equal the sum of the other columns because each is an average of the age group, and losses from each cause vary by individual.

4. The Fourth Amended Class Action Complaint and Demand for Jury Trial.
5. A Fact Sheet, dated April 28, 1997, on the changes to the AT&T Management Pension Plan.
6. Excel spreadsheets prepared by AT&T actuaries showing Crossover periods by Age and Service and showing Accrual Rates decreasing with Age.
7. A letter dated April 28, 1997 from Harold Burlingame, AT&T Executive Vice President, to employees announcing changes to the AT&T Management Pension Plan.
8. A 1998 article by Harold Burlingame and Michael Gulotta, AT&T's Enrolled Actuary entitled "Case Study: Cash Balance Pension Plan Facilitates Restructuring the Workforce at AT&T" about AT&T's cash balance design and the features that effected older employees.
9. Excel spreadsheets of benefit data provided by AT&T for 59,979 plan participants.
10. Declaration of Claude Poulin.

Books

11. Norusis, Marija J., *SPSS for Windows: Base System, Release 6.0*. SPSS, 1993.

7. Consultant Background

I have been retained as an expert witness in this case. I possess a Ph.D. in Mathematical Statistics and have been endorsed as an expert in the field of statistics. I have been retained by plaintiffs and defendants to perform statistical evaluation of discrimination in a variety of contexts, and have testified as an expert in the area of statistics and the statistical evaluation of discrimination in United States District Court for the District of Colorado, United States District Court, Nevada, and the Circuit Court of the Sixth Judicial Circuit, Pinellas County, Florida. My Curriculum Vitae is attached. Cases in which I have testified as an expert at trial or by deposition within the preceding four years are indicated on my Curriculum Vitae in bold and are bulleted (▣). My publications in the previous ten years are listed in my Curriculum Vitae.

My hourly rates are \$350 per hour for testimony and preparation, \$250 for consultation and research.

Robert A. Bardwell, Ph. D.



Attachment 1: Electronic Files Including Data Compiled and Processed by Plaintiffs

Provided separately in electronic form.

Attachment 2: Curriculum Vitae of Robert A. Bardwell, Ph. D.

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EDUCATION:

University of Colorado, Boulder	Ph.D.	Mathematics	1985 – 1989
University of Colorado, Denver	B.A.	Philosophy	1981 – 1982
University of Chicago			1969 – 1971

PROFESSIONAL EXPERIENCE:

Statistical consulting	1989 – present
University of Colorado instructor and teaching assistant	1985 – 1989
Research, consulting and statistical programming	1976 – 1986

PUBLICATIONS:

- Bardwell, Robert A., Paul Klite, and Jason Salzman. “Local TV News: Getting Away with Murder.” *Harvard International Journal of Press/Politics*, 2(2): 102-112 (1997).
- Max, Wendy, Dorothy P. Rice, Eric Finkelstein, Robert A. Bardwell, Steven Leadbetter. “The Economic Toll of Intimate Partner Violence against Women in the United States.” *Violence and Victims*, 19 (3) (June 2004).

RESEARCH, CONSULTING, AND STATISTICAL PROGRAMMING:

- ☐ Joseph M. Sellers, Cohen, Milstein, Hausfeld & Toll P.L.L.P., New York, 2008 -
Retained and testified in deposition for plaintiffs regarding the impact of underwriting on black applicants in re Patricia Amos, et al. v. GEICO Corporation, et al., Civil Action No. 06-cv-1281 (RHK/JSM), United States District Court, District of Minnesota.
- Nichols Kaster & Anderson, PLLP, Minneapolis, Minnesota, 2007-8
Retained to identify potential Muslim class members using custom Muslim name identification program.
- Stephen R. Bruce, Washington, D.C., 2007 -
Retained as expert witness for plaintiffs claiming violation of the ADEA and ERISA by replacing a defined benefit retirement plan with a cash balance plan in a manner that freezes the benefits of older, longer-service employees during a “wear-away” period, in re Wayne Tomlinson, et al. v. El Paso Corporation and El Paso Pension Plan, Civil Action No. 4-cv-02686-WDM-CBS, United States District Court, for the District of Colorado.
- Minami Tamaki LLP, San Francisco, CA 2007-8
Retained as expert witness for plaintiffs in race discrimination in hiring class action, in re Albert Crews et al. v. Cisco Systems, United States District Court, Northern District of California.
- Hagens Berman Sobol Shapiro LLP, Los Angeles, 2007-
Retained as expert witness by plaintiffs in California overtime employment class action, to testify regarding the appropriate use of sampling to estimate damages and provide evidence of commonality in re Randall et al. v. Costco Wholesale Corporation, Case No.: BC 296369, California Superior Court.
- REKO LLP, Toronto, Ontario, 2007-
Retained as expert witness by plaintiffs in nationwide overtime employment class action, to design a stratified random sample to estimate damages and provide evidence of commonality in re Fresco v. Canadian Imperial Bank of Commerce, File No. 07-W-334113PC2, Ontario Superior Court, Canada.
- Institute for Environmental Solutions, Denver, 2007 -
Retained as sampling and research design consultant on *The Tree Project*, a community-scale research program to assess the environmental impact of urban tree cover. Assisted

with the integration of available scientific tools, and the development of new measurement protocols, and consulted on the design of the spacial sampling plan for the initial survey in Golden, Colorado.

- FIMAC Solutions, Inc., Denver, 2007 -
Retained to research and develop econometric analysis of core deposits for banking institutions. Developed a suite of analytic tools that, (1) provide less conservative projections of the decay rate of non-maturity deposits than those provided by regulatory agencies; (2) generate more accurate forecasts of account balances; and (3) include an index to evaluate risk form core deposit decline. These analytic tools employ appropriate times series and hazard rate analyses.
- Arius Energy, LLC, Denver, 2006 -
Designed and developed web-based tool for individuals and communities to track their carbon footprint and energy consumption.
- Federal Election Commission, 2006-7
Designed and developed sampling program used by the Federal Election Commission to monitor contributions and expenditures for all Federal elections. Program was developed as a web-based application that can also run on auditors' notebook computers. Program designs, draws and evaluates samples of transactions for audit. All results were tested against the American Institute of Certified Public Accountant statistical auditing programs.
- John Robert Holland, Denver, Colorado, 2007
Retained as expert witness by plaintiffs to evaluate the adverse impact of treatments for bed bug infestations on persons with disabilities in re Charlotte McConnell, Willard McConnell and John McConnell v. The Tower at Speer, LLC, Marcy Payne, and Libby Burney, District Court, City and County of Denver, Colorado.
- Nichols Kaster & Anderson, PLLP, Minneapolis, Minnesota, 2006-7
Retained as expert witness by plaintiffs to evaluate the adverse impact of hiring, compensation, discipline and terminations decisions on Hispanic employees in re Mendez et all v. Faribault Foods, Inc. and The Work Connection, United States District Court, Minnesota.
- Cornish and Dell'Olio, Colorado Springs, Colorado, 2006-
Retained as expert witness by plaintiff to evaluate the disparate impact of testing and terminations decisions on the women in the training academy for the Colorado Springs Fire Department, in re Karyn S. Palgut v. The City of Colorado Springs, Civil Action No. 06-cv-01142-WDM-MJW, United States District Court, Colorado.
- Legal Aid Society of Minneapolis, Minneapolis, Minnesota, 2006
Retained as expert witness by plaintiffs to evaluate the adverse impact of alternative pre-employment tests on Minneapolis Fire Cadet Selection Process; demonstrated adverse impact and proposed the remedy which was implemented, of augmenting pool of Stage II candidates with 55% additional protected class applicants.
- Killmer, Lane & Newman, LLP, Denver, Colorado, 2006-
Retained as expert witness by plaintiffs to evaluate the impact of gender on utilization, hiring and promotions at Car Toys, Inc., in re Monica Britton, et al. v. Car Toys, Inc., and Bruce Cameron, Civil Action No. 05-CV-00726-WYD-PAC, United States District Court, Colorado.
- ☐ Shores, Williamson & Ohaebosim, LLC, Wichita, Kansas, 2006
Deposed as expert witness by plaintiffs to evaluate the impact of gender on workforce utilization, promotions, terminations, and compensation at The Fresh Market, Inc., in re Terrence Mcfadgon, Terra Mukes, Gloria Keith, and Starika Smith v. The Fresh Market, Inc., Case No.: 05-2151, United States District Court, Western District of Tennessee.
- University of Colorado Health Sciences Center, Denver, Colorado, 2005-
Member of research team for *A Study of Immigrant Housing Conditions in Commerce City, Colorado*, to assess housing-related health risks affecting recent immigrant families with

children. Responsible for construction of housing inventory and GIS profile of the study area; construction of the sample frame; design the sample of participating households; supervision of survey analysis, compilation of survey estimates, and contribution to resulting publications.

- ▣ McKenna Long & Aldridge LLP, Denver; Seyfarth Shaw LLP, Washington, D.C., 2005-
Deposed as expert witness for defendants on the impact of age on separations at the Hershey Company, in re Montagne, et al. v. The Hershey Company, Case No.: 04-cv-1881-WYD-BNB, United States District Court, Colorado.
- ▣ The Carey Law Firm, Colorado Springs, Colorado, 2005-
Retained as expert witness by plaintiffs to estimate attorneys fees retained by the Colorado in Supplemental Security Income (SSI) Reimbursements, 1997 - 2005, in re Chad Martinez and Larry King v. Colorado Department of Human Services and Otero County Department of Human Services, Case No.: 02 CV 1066, District Court, City and County of Denver, Colorado.
- Cayman Islands Real Estate Brokers Association, Grand Cayman, Cayman Islands, 2005-2006
Retained to conduct an econometric analysis of the impact of stamp duty rates on real estate transaction volume and value in the Cayman Islands from 1990 through 2004.
- Shores, Williamson & Ohaebosim, LLC, Wichita, Kansas, 2005-
Retained as expert witness by plaintiffs to evaluate the impact of gender on workforce utilization, promotions, terminations, and compensation at Wichita Police Department in re Greta Semsroth, et al. v. City of Wichita, and Chief Norman Williams, Case No. 04-1245-MLB, United States District Court, District of Kansas.
- ▣ King & Greisen, LLP, Denver, Colorado, 2005-
Deposed as expert witness by plaintiffs to evaluate race discrimination in layoffs in re Freeman, et al. V. Roxanne White, et al., Case No.: 05CV164, United States District Court, Colorado.
- Burr & Smith, LLP, Tampa, Florida, 2005-6
Retained as expert witness by plaintiffs to design a stratified random sample of nationwide class to estimate damages and provide evidence of commonality in re Kent Dunwiddie, Grant Lincoln, and Edward Gotowala, et al. v. Central Locating Service, Ltd., Corporation, Case No.: 5:04CV315-OC-10GRJ, United States District Court, Middle District of Florida.
- Bennett Bigelow & Leedom, P.S., Seattle, Washington, 2005
Retained regarding health care regulatory dispute, to evaluate the application of non-linear regression model in calculating demand for kidney dialysis facilities.
- ▣ Strindberg Scholnick & Chamness, LLC, Salt Lake City, Utah, 2005
Deposed as expert witness for plaintiffs regarding race discrimination in workforce utilization, concentration and underrepresentation, in re Terry H. Fullwiley v. Union Pacific Corporation and Union Pacific Railroad Company, Case No. 2:04-CV-671DB, United States District Court, District of Utah, Central Division.
- White O'Connor Curry & Avanzado LLP, Los Angeles, California, 2005
Retained as expert witness for defendants to evaluate alleged age discrimination in terminations in re Harold Moore Hennesy, et al. v. Infinity Radio Inc., Arbitration No. 77116Y0035804 BEAH, American Arbitration Association, Denver, Colorado.
- ▣ Colorado Center on Law and Policy, Denver, 2004
Testified as expert on computer systems and statistical modeling for plaintiffs, assessing adequacy of project management, testing, and preparation for release of the Colorado Benefits Management System (CBMS), which was designed to integrate administration of six Colorado and Federal benefit programs for all Colorado counties. Developed and presented model of caseload backlog resulting from CBMS implementation in re Valerie Imani Hawthorne-Bey, et. al., v. Karen Reinerstson, Executive Director of the Colorado Department of Health Care Policies and Financing, et. al., Case No. 04-CV-7059, District Court, City and County of Denver, Colorado.

- Newman & Newman, LLP, Seattle, Washington, 2004 –
Retained as expert witness for plaintiffs to design a sample of all Internet domain name registration changes over a two year period and to create an econometric model of the impact of the Internet domain name Wait Listing Service to be implemented by defendants in re Registersite.com et al. V. Internet Corporation for Assigned Names and Numbers, Verisign, Inc., and Does 1-10, Case File No. CV04-1368 ABC (CWx) 02-RB-2104 (CBS), United States District Court, Central District of California.
- King Clexton & Feola, Denver, Colorado, 2004 – 2005
Retained as expert witness for plaintiff to analyze the impact of race and national origin on promotions and compensation in re Medhanie Gebreluel Werede v. Allright Holdings Inc., Civil Action No. 01-WM-1167, United States District Court, Colorado.
- Hale Hackstaff Friesen, LLP, Denver, Colorado, 2004 – 2005
Retained as expert witness for plaintiff to design and conduct a door-to-door survey of voters and voting behavior to determine the impact of disparate treatment of absentee ballots and to analyze evidence of voting rights violations in re Jeffrey Vigil v. Carol Snyder, County Clerk, Adams County Colorado, Case File No. 02-RB-2104 (CBS), United States District Court, Colorado.
- ▣ Nichols Kaster and Anderson, Minneapolis, Minnesota, 2003 – 2004
Deposed as expert witness for plaintiff regarding race discrimination in utilization, and terminations in re Jarvis Jones v. St. Paul Companies, Inc., Case File No. 02-1305, United States District Court, Minnesota.
- ▣ Nichols Kaster and Anderson, Minneapolis, Minnesota, 2003 – 2004
Deposed as expert witness for plaintiff regarding gender discrimination in utilization and salary and other compensation in re Susan M. Veeder v. Cargill, Incorporated, Civil No. 02-1711 (PAM/RLE), United States District Court, Minnesota.
- ▣ Killmer and Lane LLP, Denver, Colorado, 2003 – 2004
Testified for defendant regarding expert report analyzing race, ethnic, and age composition of the Juror Pools and bias in jury selection process in re People of the State of Colorado v. Dante Lamar Owens, Case No. 98-CR-2729, District Court, Arapahoe County, Colorado.
- ▣ DeFranco & Allen, LLC, Boulder, Colorado, 2003 – 2004
Testified for defendant as expert witness regarding race, ethnic, and age composition of the Juror Pools in Arapahoe County, Colorado. Constructed model of jury selection process revealing systemic bias in re People of the State of Colorado v. Trevon Washington, Case No. 98-CR-2459, District Court, Arapahoe County, Colorado.
- ▣ Thomas Feldman, Denver, Colorado, 2002 – 2004
Testified as expert witness for plaintiff to evaluate discrimination in layoffs related to filing worker's compensation claims in re Denise J. Welsch v. Sundyne Corporation, Civil Action No. 02-Z-468 (BNB), United States District Court, Colorado.
- ▣ Nichols Kaster and Anderson, Minneapolis, Minnesota, 1998 – 2003
Deposed as expert witness for plaintiff to evaluate race and ethnic discrimination in hiring, utilization, promotions, and salary in re Maria Garcia, et al. V. Viratec Thin Films, Inc., Civil Number 01-1978 MJD/JGL, United States District Court, Minnesota.
- ▣ King Clexton & Feola, Denver, Colorado, 2002 – 2003
Deposed as expert witness for plaintiffs to analyze the impact of race and national origin on promotions and compensation in re Solomon Goitom, Amune D. Meskele, Fowsi Ali, and Omar Nur v. Allright Holdings, Inc., Civil Action No. 01-WM-1353 (CBS), United States District Court, Colorado.
- ▣ Johnson, Blakely, Pope, Bokor, Ruppel & Burns, P.A., Tampa, Florida, 2001 –
Testified as expert witness for plaintiff to evaluate the impact of race on the quality of education and the relative impacts of poverty and race in re William Crowley v. The Pinellas County School Board, et al., Case No.00-005667-CI-021, Circuit Court of Sixth Judicial Circuit, Pinellas County, Florida.

- ▣ Tegtmeier, Frank & Jones, LLC, Colorado Springs, Colorado, 2001

Testified regarding expert report for defendant analyzing race, ethnic, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Rice, United States District Court, Colorado.
- ▣ Gerash, Prugh & Gerash, L.L.C., Denver, Colorado, 2001

Testified regarding expert report for defendant analyzing race, ethnic, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Carl Kenneth Kabat, Case No. 00-CR-385-N, United States District Court, Colorado.
- Research Triangle Institute, Research Triangle Park, North Carolina, 2000 – 2001

Center for Disease Control, Washington, D.C.

Retained to lead project to analyze large and detailed national probability sample and compute statistical estimates and variances for incidence, prevalence, and total costs in *Cost Study of Intimate Partner Violence Against Women* being prepared for congress, and to conduct independent evaluation of the cost report.
- Register Machine Learning Technologies, Inc., Littleton, Colorado, 2000 – 2001

Retained to develop algorithms applying probability theory to improve performance of advanced genetic programming computer application.
- ▣ Kummer Kaempfer Bonner & Renshaw, Las Vegas, Nevada, 2000 – 2004

Deposed and testified as expert witness for plaintiff on the impact of race in hiring and promotions in re Jordan v. County of Clark and Clark County Department of Aviation, Case No. CV-S-99-0688-HDM (RJ), United States District Court, Nevada.
- Gerash, Prugh & Gerash, LLC., Denver, Colorado, 1999 – 2001

Prepared expert report for defendant analyzing race, ethnic, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Lawrence Sposato et al., Case No. 99 CR 232-S, United States District Court, Colorado.
- U. S. Equal Employment Opportunity Commission, Denver District Office, Colorado, 1999 – 2001

Retained to analyze the existing model used to estimate labor market availability for a large number of store locations, and to design a corrected model; evaluated the impact of racial discrimination in hiring, and the estimated the resulting damages.
- ▣ Zarlengo & Kimmell, LLC, Denver, CO, 2000

Deposed as expert for plaintiff on the impact of race on compensation and promotions at PacifiCare between 1997 and 1998 in re Antoinette Ingram v. FHP Health Care/PacifiCare, Case No. 98 BP 2795, United States District Court, Colorado.
- ▣ Holland & Hart LLP, Denver, Colorado, 2000

Deposed as expert for defendant to evaluate alleged age discrimination in layoffs in re Hennesy, et al. v. Gates Rubber Company, Civil Action No. 99-M-1787, United States District Court, Colorado.
- Goldstein and Dodge, Denver, Colorado, 2000

Submitted report assessing the bias in Division Independent Medical Examinations performed for the Division of Workers Compensation.
- Isaacson, Rosenbaum, Woods & Levy, P.C., Denver, Colorado, 1999 – 2000

Retained as expert witness for plaintiff to evaluate ethnic and gender discrimination in hiring, promotions and terminations in re Nuvia Rodriguez v. Greyhound Lines, Inc., Civil Action No. 99-N-1596, United States District Court, Colorado.
- The Leventhal Law Firm, P. C., Denver, Colorado, 1999

Submitted affidavit for plaintiff testifying to the limitations of the studies relied upon by defendant experts who discounted the possibility that injury resulted from rear-end collision, in re Czeslawa Sosnowska v. Kimberlee Hrbek Smith, Case No. 97CV1400, Denver District Court, Colorado.
- Feiger & Collison, P.C., Denver, Colorado, 1999 –

- Retained as expert witness for plaintiff to evaluate gender discrimination in promotions and terminations in re Blasio, et al. v. United Parcel Service, Case No. 98-M-1709, United States District Court, Colorado.
- Pacey Economics, Boulder, Colorado, 1999
Retained to design and analyze samples of properties to be appraised in south Globeville neighborhood to estimate total property value for settlement of damages from heavy metals pollution from smelter.
 - Collect America, Ltd., Denver, Colorado, 1999
Retained to design and analyze samples of collections to be audited for approval of IPO.
 - Nichols Kaster and Anderson, Minneapolis, Minnesota, 1998 –
Retained as expert witness for plaintiff to evaluate race and ethnic discrimination in promotions and salary in re Augustine C. Crawford et al. v. Ceridian Corporation, Computing Devices International and General Dynamics Information Systems, Civil Number 97-2634, United States District Court, Minnesota.
 - Center for Policy Research, Denver, Colorado, 1998 – 2000
Retained as consultant on survey execution, weighting, and estimation for a large and detailed national probability sample for the National Violence Against Women survey; conducted sensitivity analyses and theoretical explication of the impact of sample weighting and revised methodology report throughout review by the Center for Disease Control.
 - ▣ Curtis L. Kennedy, Denver, Colorado, 1997 – 2000
Testified and deposed as expert witness for plaintiffs concerning alleged age discrimination in re James R. Henry v. US WEST, Inc. et al., Civil Action No. 96-N-724. United States District Court, Colorado.
 - Boulder Police Department, Boulder, Colorado, 1998 – 1999
Retained to evaluate probability associated with physical and circumstantial evidence, resulting in an unprecedented technique for identification of shot-shell pellet evidence in Case No. P83-7907, homicide of Sidney Wells.
 - ▣ Mohr, Hackett, Pederson, Blakely, Randolph & Haga, P.C., Phoenix, Arizona, 1997 – 1999
Deposed as expert witness for plaintiffs concerning alleged age discrimination in re Jeney v. Quaker Oats, Civil Action No. CIV 96-0822-PHX-RCB. Retained as expert witness concerning age discrimination in re Gentile v. Quaker Oats, Coleman v. Quaker Oats, Tallariti v. Quaker Oats, and Russell v. Quaker Oats and Christenson v. Quaker Oats.
 - Miller, Lane, Killmer & Greisen, LLP. Denver, Colorado, 1998
Retained as expert witness for plaintiff to evaluate race and ethnic discrimination in employment decisions in re Visor et al, v. Sprint/ United Management Company, Case Number 96-K-1730, U.S. District Court, Colorado.
 - Johnson, Blakely, Pope, Bokor, Ruppel & Burns, P.A., Tampa, Florida, 1997
Retained as expert witness for plaintiff to evaluate gender discrimination in allocation of stock option plan in re Gosche v. West Publishing Company, Case No. 97-Z-1954, U.S. District Court, Colorado.
 - Johnson, Blakely, Pope, Bokor, Ruppel & Burns, P.A., Tampa, Florida, 1997 –
Retained as expert witness for plaintiff to evaluate gender discrimination in allocation of stock and constructed econometric model of resulting losses in re Patricia Winn Carter and Maxine M. Jones, et al. v. West Publishing Company, Case No. 97-2537-CIV-T-26A, U.S. District Court, Middle District of Florida.
 - ▣ Colorado Lawyers Committee, Denver, Colorado, 1997
Testified as expert witness for plaintiffs concerning residency in land title dispute in re Espinoza v. Taylor, Case No. 81-CV-5, Culebra County District Court.
 - Jefferson County Department of Human Services, 1997
Retained to review the implementation of the NAOMI computer system at the Jefferson County Department of Human Services in response to persistent failures in prior launch of the system; the NAOMI system was used by most or all caseworkers in Jefferson County

to do CWEST submissions only, but had been designed to integrate casework for multiple programs related to child welfare. Authored report analyzing failures in the prior launch of NAOMI, and submitted recommendations for disciplined implementation.

- Colorado Department of Human Services, 1997
Retained to develop computer programs to analyze recidivism and issues relating to the quality of child welfare using data in CWEST, the Child Welfare information system for Colorado.
- Roman, Benezra, & Culver, Denver, Colorado, 1997
Retained as expert witness for plaintiffs concerning gender and ethnic discrimination claim resulting from terminations in re Chacon v. Public Service Company of Colorado.
- ▣ Fox & Robertson, P.C., Denver, Colorado, 1997
Deposed as expert witness for plaintiff to design and conduct a public survey to project number of persons who use wheelchairs that are denied access to retail stores in re CCDC et al. v. Campbell-Ritter Corp. et al., 96-WY-2490-AJ, CCDC et al. v. AnnTaylor Stores Corp. et al., 96-WY-2491-AJ, CCDC et al. v. Nine West Group, Inc. et al., 96-WY-2492-AJ, and CCDC et al. v. Hermanson Limited Partnership I, 96-WY-2493-AJ, United States District Court, Colorado.
- ▣ Holland & Hart, Denver, Colorado, 1997
Deposed as expert witness for defendant concerning alleged age discrimination in re Ronald Kirkland v. Safeway Inc., 96-CV-0264-J, United States District Court, Colorado.
- Roman, Benezra, & Culver, Denver, Colorado, 1996 – 2000
Retained as expert witness for plaintiffs concerning age discrimination claim resulting from layoffs in re Vaszlavik et al. v. Storage Technology Corporation.
- Peacock & Myers, Albuquerque, New Mexico, 1996
Retained in trademark infringement litigation to construct an econometric model of variable costs associated with production in re Rogers, et al. v. Legin, et al.
- Holland & Hart, Cheyenne, Wyoming, 1996
Retained as expert witness for defendant concerning computation of lost earnings and age discrimination claim resulting from reduction in force in re David Moffat v. Amoco Corporation, Civil Action No. 95-CV-242-D, United States District Court, Wyoming.
- Mineral Management Services, U. S. Department of Interior, Denver, Colorado, 1996
Retained to develop sampling plan, statistical algorithms and software to audit target selection and estimate royalty underpayment for statistical billing, and to compute median weighted gas valuation index.
- U. S. Department of Justice, District of Colorado, 1996
Retained as expert witness for defendant concerning claim of age and gender discrimination in promotions in re Edward F. Craig, Jr. v. Hazel R. O’Leary, Civil Action No. 93-K-1828, United States District Court, Colorado.
- Gerash, Robinson & Miranda, P. C., Denver, Colorado, 1995
Prepared expert report analyzing ethnic, gender, and age composition of the Qualified Jury Panel and bias in jury selection process in re U.S.A. v. Hampton, 95-CR-253-M, United States District Court, Colorado.
- ▣ Holland & Hart, Cheyenne, Wyoming, 1995
Deposed as expert witness for defendant concerning age and ethnic discrimination claim resulting from reduction in force in re Robert Nicol v. Amoco Corporation, Civil Action No. 95-CV-115-D, United States District Court, Wyoming.
- Plaintiff Employment Lawyers Association, Denver, Colorado, 1995
Conducted seminar on *Using Statistics to Prove Disparate Impact*.
- Jeffery Menter, Greenwood Village, Colorado, 1995
Computed present value of lost earnings in re Michael Marsh v. Delta Air Lines, Inc.
- ▣ Bart Rice, P.C., Englewood, Colorado, 1995

Deposed as expert for plaintiffs regarding age bias in severances in re Mary Fields et al. v. Information Handling Services Inc., Civil Action No. 95-B-516, United States District Court, Colorado.

- Mineral Management Services, U. S. Department of Interior, Denver, Colorado, 1995
Programmed method for aggregating transactions and computing median weighted gas valuation index; designed weighted, multi-stage, proportional sampling strategy for validating index using ratio estimation.
- Colorado Department of Social Services, Implementation Assistance Committee, 1995
Retained to evaluate sampling strategy and survey analysis for measuring compliance with settlement agreement in re L.P.M., et al. by their next friend David Littman v. Roy Romer and Karen Beye, Civil Action No. 94-M-1417, United States District Court, Colorado.
- Mineral Management Services, U. S. Department of Interior, Denver, Colorado, 1995
Authored report on the application of statistical sampling to audit target selection and royalty billing; programmed automated routines for designing the required samples, randomly sampling royalty transactions, and computing estimated underpayment.
- Macon Cowles & Associates, Boulder, Colorado, 1995
Retained to analyze employee records for evidence of ethnic bias in promotions at the Denver Mint in re Joe Sanchez v. Lloyd Bensten, Civil Action No. 94-Z-1400.
- Mineral Management Services, U. S. Department of Interior, New Orleans, Louisiana, 1995
Presented findings regarding methods for measuring gas, oil, and mineral royalty payment compliance and billing royalty underpayments based on statistical sampling to State and Tribal Audit Committee Conference.
- Sears, Anderson & Swanson, Colorado Springs, Colorado, 1994
Evaluated disparities in salaries using multivariate regression.
- Holland and Hart, Denver, Colorado, 1993
Consulted regarding discriminatory impact of investigative stops in re Irvin v. Sungailia, et. al., Civil Action No. 93-M-1551.
- ▣ Paul A. Baca, Denver, Colorado, 1993 – 1994
Deposed regarding disparate impact of promotional practices of Denver Police Department in re Humphries v. Belo, Civil Action No. 93-N-2731.
- Teamsters Local Union No. 435, Denver, Colorado, 1993 – 1994
Analyzed discipline and termination policy and provided expert report for arbitration involving Supervalu Inc.
- Children's Legal Clinic, Denver, Colorado, 1993 – 1994
Consulted on survey design of judges and guardians ad litem, and designed program for monitoring guardian ad litem representation of children in dependency and neglect hearings in the Denver Juvenile Court.
- Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1993 – 1994
Retained as expert to analyze class-wide age discrimination in terminations at Martin Marietta Corporation Astronautics Group for consolidated cases in re Marvin Wilkerson, et. al. v. Martin Marietta Corporation, Civil Action No. 91-S-2078, United States District Court, Colorado.
- Donald P. MacDonald, Denver, Colorado, 1993 – 1994
Consulted concerning alleged age discrimination in terminations in re Ken Fortner v. Halliburton Energy Services.
- Reginald H. Martin & Associates, Denver, Colorado, 1993 – 1994
Retained to design statistical method for measuring gas, oil, and mineral royalty payment compliance for the Mineral Management Service of the United States Department of Interior, and to design and analyze methods for billing royalty underpayments based on statistical sampling.
- Serge L. Herscovici, Littleton, Colorado, 1993
Consulted concerning alleged gender discrimination in re Elizabeth Ponder v. Metromedia.

- Rothgerber, Appel, Powers & Johnson, Denver, Colorado, 1993
Retained as consultant on alleged age discrimination in terminations in re Backlund et. al. v. Gates Corporation.
- Pulmonary Consultants, Denver, Colorado, 1993
Reviewed analyses of two studies of dust exposure and pulmonary function.
- ▣ Colorado Lawyers Committee, Voting Rights Task Force, Denver, Colorado, 1993 – 1994
Conducted study of minority voting patterns in current and revised House District 60 using ecological regression and homogeneous case analysis; **deposed and testified** as expert witness in voting rights litigation in re Jennie Sanchez, et. al. v. Colorado, Civil Action No. 93-S-963, United States District Court, Colorado.
- Serge L. Herscovici, Littleton, Colorado, 1993
Retained as expert to prepare analysis of age discrimination in departmental terminations in re Mildred M. Pittman, et. al. v. Martin Marietta Corporation, Civil Action No. 92-M-1557, United States District Court, Colorado.
- World Gaming Corporation, Las Vegas, Nevada 1992 – 1994
Computed probabilities and payoffs for new casino game.
- ▣ Paul A. Baca, Denver, Colorado, 1992 – 1994
Deposed as expert on ethnic discrimination in promotions in re Rodriguez, et. al. v. Denver Sheriff's Department, et. al., Civil Action No. 92- -2335, United States District Court, Colorado.
- Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1992 – 1993
Retained as expert to prepare analysis of age discrimination in departmental terminations in re Marvin Wilkerson, et. al. v. Martin Marietta Corporation, Civil Action No. 91-B-2078, United States District Court, Colorado.
- Colorado Lawyers Committee, Foster Care Task Force, 1992 – 1994
Retained as expert consultant to analyze Foster Care Review database and prepared issues analysis in re L.P.M., et. al. by their next friend David Littman v. Roy Romer and Karen Beye, Civil Action No. 94-M-1417, United States District Court, Colorado.
- Causey, Demgen & Moore Inc., Denver, Colorado, 1992
Designed stratified sample of inventory for Tattered Cover Bookstore audit.
- ▣ Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1992
Deposed as expert concerning analysis of age discrimination in departmental terminations in re Alivan Rea, et. al. v. Martin Marietta Corporation, Civil Action No. 91-S-1242, United States District Court, Colorado.
- Kelly, Haglund, Garnsey & Kahn, Denver, Colorado, 1992 – 1993
Retained as expert and prepared offer of proof concerning congressional redistricting in re Martinez, et. al. v. Romer, Civil Action No. 91-C-1972, United States District Court, Colorado.
- ▣ Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1992
Deposed as expert in preparation of lost-earnings analyses for termination with alleged age and ethnic discrimination in re Chan v. Apache Oil Corporation, Civil Action No. 90-M-1898, United States District Court, Colorado.
- Lundy Foundation, Denver, Colorado, 1992
Designed and analyzed survey of AIDS/ARC service providers and users and authored survey report.
- Colorado Lawyers Committee, Voting Rights Task Force, Denver, 1992
Conducted model study of minority voting patterns in Denver Colorado using ecological regression. Designed Colorado State House District creating a minority opportunity district and prepared expert demographic analysis in re Reapportionment of the Colorado General Assembly, Case No. 92 SA 19, Supreme Court, State of Colorado.
- ▣ Robinson, Waters, O'Dorisio and Rapson, Denver, Colorado, 1991

Deposed as expert witness in preparation of lost earnings analyses for termination with alleged age discrimination in re Mark Bremmer v. Martin Marietta Corporation, Civil Action No. 90-Z-828, United States District Court, Colorado.

▣ David A. Lane, Esq, Denver, Colorado, 1989

Analyzed ethnic and age composition of the Qualified Jury Wheel and **testified** as expert concerning age bias in jury selection process in re U.S.A. V. Laymon, 89-CR-113, United States District Court, Colorado

▣ Colorado Professional Black Firefighters, Paul A. Baca, Esq., 1989

Analyzed results of Denver Fire Department promotional exam for racial or ethnic bias and **testified** as an expert witness at the preliminary injunction hearing in re Fuller V. Cisneros, United States District Court.