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ABSTRACT

Insuring Displaced Workers: Human Capital Losses and Severance Pay Design*

Displaced workers, especially long tenured workers, face large human capital losses. Private firms frequently offer insurance against this threat in the form of severance pay – scheduled benefits linked in expectation to the worker's human capital loss. We explore this linkage, first reviewing common severance benefit algorithms and then comparing them with simple models of capitalized job displacement losses on data from the Displaced Worker Surveys of 2000 and of 2004. The standard benefit formula of one week's pay per year of service offers payments roughly in proportion to expected capital losses, but with a proportionality factor of only one quarter of capitalized losses (at 9 percent). Despite the systematic relationship between tenure/age and displacement losses, these factors explain little of the total variation in displacement losses, raising obvious insurance efficiency concerns. Cross-sectional estimates from more complete models, however, uncover no admissible factors currently neglected in standard severance contracts, although the jump in earnings losses between displacements in the robust market of 1997-1999 and the difficult labor market of 2000-2003 does suggest conditioning benefits on market conditions.

JEL Classification: J65, J41, J33

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I. Introduction

Permanent job displacement threatens serious earnings losses in the United States, especially for long tenured workers.[1] These losses are partially insured in the United States by a mixture of public and private programs. The public unemployment insurance system best serves temporarily laid off workers, who, unlike permanently displaced workers, suffer no substantial reemployment wage losses.[2] As a consequence, firms frequently supplement public benefits for permanently displaced workers through severance pay. Coverage varies widely across occupations and industries, but, for example, in medium and large establishments in the goods-producing sector, almost two-thirds (65 percent) of full-time administrative and professional workers are covered, Bishow and Parsons (2004).

A displacing employer has little prospect of inexpensively tracking the *actual* earnings losses of permanently separated workers, so severance plan benefits are fixed sum or “scheduled”, presumably linked in expectation to actual earnings losses.[3] The efficiency of scheduled insurance benefits is directly related to the ability of the benefit algorithm to reflect these losses; a benefit schedule that perfectly tracked actual worker losses would of course be ideal, covering losses without inducing behavioral distortions. In the remainder of this paper, we examine the linkage between severance benefit algorithms and the magnitude of expected worker earnings losses.

We first characterize the typical plan’s benefit algorithm, and then estimate the capital losses from job displacement that the algorithm is presumed to mimic. No government agency collects usable information on the structure of private severance plans, although we know a great deal about such structures from private benefit surveys, Parsons (2005b). The primary

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[1] For excellent surveys of this literature, see Jacobson, LaLonde, and Sullivan (1993), Fallick (1996), Kletzer (1998), and Farber (2004, 2005).

[2] Katz and Meyer (1990) document the limited reemployment earnings losses of temporary layoffs (layoffs with recall). Ruhm (1991) and Daymont (2004), using the Panel Survey of Income Dynamics, report that reemployment earnings losses represent the bulk of job displacement losses.

[3] A review of severance benefit algorithms in the United States can be found in Parsons (2005b).

data sets for the capital loss estimates are the Displaced Worker Surveys of 2000 and 2004. The DWS has the advantage of having been used intensively to estimate reemployment wage losses, the principal component of total displacement costs.[4] For general descriptions and analyses of the DWS2000 data as well as cross-year comparisons, see Helwig (2001) and Farber (2004); for DWS2004, Farber (2005). The period covered by DWS2000 (1997-1999) was one of robust labor demand, that covered by the DWS2004 (2001-2003) much weaker, providing insight into business cyclical effects on the relationship between worker losses and benefits received.

The paper proceeds as follows. We first provide a brief theoretical discussion of insurance with scheduled benefits. Then, in Section III, we summarize severance benefit algorithms in the United States, which we can then compare with the pattern of expected losses. In Section IV we discuss the measurement of capitalized earnings losses in the Displaced Worker Surveys, and report simple capitalized loss distributions. We focus on one measure--the dollar value of discounted earnings losses *normalized* by pre-displacement weekly wages, essentially lost "weeks of pay," a key element in severance benefit functions.

In Section V, we report estimates on both the DWS2000 and DWS2004 of simple loss models that parallel benefit algorithms in severance plans--earnings losses as linear and quadratic functions of service (tenure) and age. The model estimates are surprisingly robust in structure. *Marginal* lost-earnings effects across service and age vary only modestly across occupation, union status, year-of-displacement relative to the survey (recovery time), and business cycle conditions, although business cycle conditions do induce a **mean** shift in losses in the expected direction. However, the unexplained variation in losses is large, and benefit targeting, as a consequence, poor. This targeting problem motivates a search for additional loss determinants that could plausibly be incorporated into severance contracts, Section VI. A more complete cross-sectional analysis uncovers no additional admissible factors, leaving us

[4] Again see the works cited in footnote 1.

with only the large business cycle shift as a potential additional conditioning factor in severance plans.

II. Displacement Insurance with Scheduled Benefit: The Design Issue

In designing severance pay benefit algorithms, the employer presumably wants benefits (*B*) to correspond in some fashion to the worker's job displacement losses (*L*), the capitalized sum of uncompensated unemployment losses and earnings losses on the "next" job(s):[5]

$$B = \hat{h}(L), \qquad \text{with } \hat{h}(0) = 0, \hat{h}' \geq 0.^{6} \tag{1}$$

The difficult of tracking the economic successes and failures of permanently separated workers resulted in the firm offering scheduled benefits only, benefits fixed at the time of separation. The firm must therefore construct a benefit function based on expected losses:

$$B = h(E\{L\}), \text{ with } h' \geq 0.^{7} \tag{2}$$

Benefits based on expected rather than actual losses have the obvious advantage that the displaced worker is not induced to vary her job search and acceptance strategies—that is, moral hazard is eliminated. There is, however, a potential loss of efficiency with *imperfectly* targeted scheduled benefits. Such plans lead to inadequate support for those who suffer long periods of unemployment and ultimately accept low paying jobs, and to excessive support among those fortunate enough to find good jobs quickly. If job tenure explains a large proportion of actual weeks-of-pay lost, for example, scheduled benefits based on job tenure would be a reasonable insurance algorithm. In the extreme, tenure or service might predict *all* of job loss and the first-best insurance system could be implemented as a scheduled, service-based plan.

Below we first estimate capitalized earnings loss models, normalized as weeks-of-pay

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[5] A formal derivation of the optimal contract can be found in Parsons (2005a).

[6] This statement holds true whether the firm is providing earnings insurance to the worker or trying to reduce morale effects on continuing workers, as surveyed managers often report, Bewley (1999).

[7] Strictly as a matter of insurance theory, it is not necessary that benefits be zero when the expected losses are zero.

lost (L_i/w_i), for the i[th] individual:

$$L_i / w_i = g(X_i) + \xi_i . \qquad (3)$$

where $g(X_i) = E(L_i / w_i \mid X_i)$. We report estimates of weighted least squares models (CPS DWS survey weights are used). The complete vector of determinants of job displacement losses (X) can be partitioned into two types of factors, those that can be used in employer severance formulas and those that cannot, say X_1 and X_2 respectively. The infeasible X_2 vector includes factors that the firm cannot reasonably observe or ones that it can observe but cannot include in a severance formula for legal or social reasons, for example race, gender, or age (as an adverse factor). The restricted model, employing only feasible covariates (X_1), leads to a benefit function of the following form for the weeks-pay model:

$$L_i / w_i = g^*(X_{1i}) + \xi_i^* . \qquad (4)$$

The X_1 vector presumably includes service (tenure) and age. In the next section we review the structure of severance benefit algorithms, before assessing their correspondence to expected capitalized earnings losses.

III. Severance Benefit Algorithms: Current Practice

About one-quarter (26 percent) of the full-time workforce is covered by a formal severance plan, with large coverage differentials by work hour status, firm size, occupation, and industrial sector, Bishow and Parsons (2004). Establishment size is a powerful determinant, with about 36 percent of all workers in medium and large establishments (one hundred or more employees) covered, but only 16 percent in small establishments. Occupationally, 42 percent of professionals and administrators are covered, but only 29 percent of clerical and sales workers, and 16 percent of blue-collar and service workers. Within occupations, coverage is substantially higher in the goods-sector for all but blue collar and service workers, and is especially so in medium and large establishments.

No government agency systematically reports information on the design of severance pay plans, so investigators are forced to rely on private sources, often management consulting firms with a special interest in upper-level management. Evidence gleaned from these studies suggests considerable stability of severance plan design over time and circumstance, Parsons (2005b). Early plans incorporated a bewildering mix of designs, with a large number of plans in the 1930s and 1940s offering small amounts at termination independent of length of service, "notice payments." More substantial job displacement insurance plans offered benefits that increased with service up to a benefit or service cap, and. less often, additional benefits for older displaced workers. Benefits were almost always increasing in service, although sometimes at an increasing rate, sometimes at a decreasing rate, but were less systematically related to age.

Over time a standard benefit algorithm emerged, one that offered benefits more or less in proportion to service, and, less frequently, age. The modal plan includes a linear service algorithm.[8] Benefit algorithms typically specify service minimums (S^{MIN}) for payout and often specified service or benefit maximums (S^{MAX}) beyond which additional benefits no longer accrue with tenure. The linear benefit function for displaced worker *i* (B_i) takes the form:

$$B_i = 0_i \,, \qquad \text{if } S_i < S^{MIN}; \qquad (5a)$$

$$B_i = \kappa w_i S_i \,, \qquad \text{if } S^{MIN} \le S_i \le S^{MAX}; \qquad (5b)$$

$$B_i = \kappa w_i S^{MAX} \,, \qquad \text{if } S_i > S^{MAX}; \qquad (5c)$$

where w_i is the i^{th} displaced worker's weekly wage, S_i her years of service or organizational tenure, and κ the benefit generosity factor. The linear severance plan is defined by the vector (κ, $\{S^{MIN}, S^{MAX}\}$).[9]

Over much of the last half century and certainly over the period covered by the DWS2000 and DWS2004, the typical benefit schedule offered one week of pay for each year of

8 Presumably for simplicity, many plans use categories and are only approximately linear.
9 For fixed κ, the service maximum can be equivalently expressed as a benefit maximum.

service, with a very short qualifying period, sometimes up to a service or benefit cap. For example, a recent survey of 925 organizations in 2001 was conducted by Lee Hecht Harrison, a "career services company specializing in outplacement…." They report that, in organizations which pay severance based only on service, and not for example on age or level of position, almost three-quarters of all nonexempt workers and two-thirds of exempt workers below the "executive" level are paid on a scale that offers one week of pay per year of service or less, Figure 1A.[10] Only at the level of officer or senior executive would the median employee receive two weeks of pay per year of service. In plans that involve more complex formulas, the bulk of both nonexempt and exempt employees below the executive level could expect to have such a service-linked plan, perhaps modified by age or title, Lee Hecht Harrison (2001, p.4). The basic pattern of these results is robust across establishment size, Figure 1B.

An equally ambitious survey of establishment severance practices was conducted by Right Management Consultants, Right (2002). In a departure from the Lee Hecht Harrison survey protocol, information on benefit algorithms is reported separately for involuntary and voluntary plans. Because a large share of plans limit benefits to involuntary separations while none offer benefits only to voluntary separators, the involuntary separation results are likely to be those most comparable to the total results reported for Lee Hecht Harrison. The generosity of the benefit formulas by occupation are reported in Figure 2A. The preponderance of plans offering one or two weeks of benefits per year of service is again clear, with sixty percent of respondents reporting one week per year of service in the "other" category and another thirty percent offering two weeks. The pattern of results is the same as among voluntary separations, Figure 2B. Age differentials in benefit calculations are uncommon.

[10] The terms "exempt" and "nonexempt" refer to categories of workers under the Fair Labor Standards Act of 1938. Various provisions, including government mandates for overtime premium pay, do not apply to exempt workers, basically "any employee employed in a bona fide executive, administrative, or professional capacity…, or in the capacity of outside salesman…," Fair Labor Standards Act of 1938, as amended (29 U.S.C. 201, et seq, p.17)

In March 2002, Mercer Human Resource Consulting surveyed separation benefit plans at a variety of organizations, and received 566 responses. Mercer does not report tabulations of the benefit generosity coefficient (κ) used in sample organizations, but does indicate that years-of-service *alone* is the most frequent benefit algorithm in all occupational categories: executive (177/513 or 35%), manager (302/516 or 59%), professional and technical (332/504 or 66%), clerical and technician (343/482 or 71%), and nonunion hourly (279/402 or 69%), with a combination of factors, including presumably years-of-service as well as grade and rank the second most frequent. For all but executives, about 10 percent report that benefits are calculated as a "flat amount".

The Mercer study focused on (i) minimum service requirements for benefit status, and (ii) service maxima on benefit calculations. Eighty-five percent of surveyed organizations report a minimum service requirement of a year or less; two-thirds of these or 57 percent of the total respondents report 9-12 months as the service requirement, Figure 3A. Mercer provides detailed information on the benefit cap in weeks of pay among those who report benefit caps of 2, 3, 4, 12, 26, or 52 weeks pay.[11] The occupations appear to cluster, with nonunion hourly workers and clerical workers and technicians subject to the most stringent caps; 35 percent report caps of 4 weeks or less, 55-60 percent caps of 12 weeks or less, Figure 3B. Conversely a majority of executives facing benefit caps report a maximum of 52 weeks. The cumulative cap distribution for managers and professional/technical personnel falls in between.

Collective bargaining contracts have the advantage of being formal and generally available, with most major U.S. agreements on file with Department of Labor (BLS). Severance provisions in major collectively bargained agreements have long been similar in form to those outside, Parsons (2005b). For example tabulations of collective bargaining contract provisions by Pita (1996) for 1970-1990 reveal the same structure as those more broadly available in the

[11] Presumably organizations that do not have benefit caps or have unusual caps are not included.

economy—a week's pay per year of service, although without obvious capping of service or benefits, Figure 4.

IV. The Capital Value of Job Displacement Earnings Losses: Measurement

To explore the logic of these benefit algorithms, we require capital loss estimates of job displacement. The economic losses from an involuntary, permanent job separation may extend for months or, in the case of reemployment wage losses, years, so it is essential that the losses be cumulated over time and appropriately discounted. We use the date of displacement as the benchmark (t=0) and discount all dollar values from that moment. Clearly the magnitude of the capital loss (or gain) is a function of the discount rate, say ρ on an annual basis, or equivalently $\hat{\rho}$ on a weekly basis, *where* $\hat{\rho} = (1+\rho)^{1/52} - 1$:

> *Assumption 0: the annual rate of discount is 9% or equivalently 0.1659% for weekly discounting.*

The qualitative results are robust to alternative discount rate assumptions, although the importance of large and long lasting reemployment wage effects insures that the distribution of capitalized values will shrink at higher discount rates.

The worker's private human capital losses (*L*) from a job displacement can be constructed as the difference between pre-displacement and post-displacement human capital adjusted for the capital value of any public insurance payments she receives:

$$L = H_0 - (H_1 + \beta)\,, \tag{6}$$

where H_0 and H_1 denote the worker's human capital without and with displacement respectively, and β denotes the capital value of public unemployment benefit payments (all evaluated at the instant of displacement). Of policy interest is the partition of the aggregate loss measure into two components, the net capital loss due to the spell of unemployment (L^U) and the loss due to the lower reemployment wage (L^W):

$$L \equiv L^U + L^W\,. \tag{7}$$

Identifying the locus of the job displacement losses provides an indication of whether additional unemployment insurance benefits are an effective policy response to job displacement losses. As noted above, Ruhm (1991) and Daymont (2004) both report, based on the PSID, that job displacement losses are largely the consequence of reemployment wage declines.

Each of the human capital measurements requires a number of assumptions, because the displaced worker is observed only for the early portion of her post-displacement work life, and not at all under the counterfactual that she was not displaced. Major difficulties in estimating these capital loss measures on the DWS include:

(1) The DWS provides estimates of weekly earnings only at the time of displacement and, if reemployed, at the survey date, which can be up to three years after displacement;

(2) There is no control group against which one can compare earnings under the counterfactual of no displacement;

(3) Respondents were not asked for usual hours on the job, but only whether the job was full-time or part-time, which restricts the analysis to changes in weekly earnings, not the preferred changes in hourly earnings.

(4) The measure of weeks until reemployment does not distinguish between weeks unemployed and weeks out of the labor force. We will use the more familiar word, unemployment, rather than nonemployment, but the latter is literally correct.

(5) The weeks of unemployment following displacement are known only for those who have become reemployed. The right censoring problem is especially important for workers who were displaced in the calendar year immediately preceding the survey.

(6) There is no precise measure of weeks reemployed at the survey date. The survey month is known, of course, as are the number of weeks unemployed following displacement, but only the year of displacement, not the day or even month, is recorded. We approximate the reemployment period prior to the survey by assuming the individual was displaced at the end of the 26th week of the displacement year, setting the reemployment period to zero if the estimated reemployment period is negative, as it can be for individuals displaced in the first half of the displacement year. *The effect of this measurement difficulty is likely to be small because the bulk of reemployment wage losses arise after the survey.*

(7) The survey contains information on unemployment insurance receipt following displacement and also on whether the respondent exhausted these benefits, but not on the exact amount of benefits, weekly or in aggregate, which we must approximate.

Although not immediately relevant for this investigation, we note the odd absence of information on severance pay receipt in the DWS.

Human Capital in the Absence of Displacement (H_0) . Consider first the calculation of each displaced worker's remaining human capital under the counterfactual that the worker was **not** displaced (*H_0*). Crucial to the calculation is Assumption 1:

> *Assumption 1: the earnings of continuously employed workers remain fixed as long as the respondent is in the labor force.*

This leads to the following estimate of remaining lifetime human capital under the counterfactual that the worker is not displaced:

$$H_0 = w_0 \sum_{t=0}^{\infty} \hat{\delta}^t S_t \Lambda_t \qquad (8)$$

where w_0 is the pre-displacement weekly wage, $\hat{\delta}$ is the weekly discount factor ($\frac{1}{1+\hat{\rho}}$), S_t is the probability the worker survives to period t, and Λ_t is the labor force survival probability to period *t,* that is the probability that, if living, the worker is in the labor force and by assumption employed at time *t*.[12] The two survival estimates are conditioned on age and sex only.

Individuals in the DWS sample are of course alive at the survey date so physical survival is a factor only after that date. Because we require a reemployment wage at the time of the survey, the sample also does not include any labor market attriters prior to the survey. When computing the discounted expected earnings after the survey date, we aggregate annually, assuming annual earnings are equal to 52 times weekly wages, because the physical survival and labor force survival measures are available on an annual basis.

Human Capital following Displacement (*H_1*). The calculation of the human capital of each displaced worker (*H_1*) requires more elaborate modeling and computation. We return to this issue shortly, but for the moment assume that the worker receives the same reemployment wage throughout her remaining work life:

> *Assumption 2: the reemployment weekly wages of displaced workers remain fixed as long as the respondent is in the labor force, $w_1(t) = w_1$ for $t \geq R$,*

[12] Physical and labor force survival probabilities were derived from sex specific age profiles for mortality and labor force participation in 1998, Center for Disease Control and Prevention (2001) and Bureau of Labor Statistics (2001) respectively. All observations were alive and in the labor force, working full-time, at the time of the DWS survey.

where w_1 is the reemployment wage observed at the survey date; t denotes time (t=0 is the time of displacement); and R denotes the reemployment date. The displaced worker's human capital value (H_1) can be computed in a manner analogous to that for the never displaced worker:

$$H_1 = w_1 \sum_{t=R}^{\infty} \hat{\delta}^t S_t \Lambda_t \,, \tag{9}$$

Again because the reemployed worker is by definition alive and in the labor force at the time of the survey, both survival factors are one in the unemployment period and the often brief reemployment period prior to the survey. As above, following the survey period, we aggregate earnings, survival probabilities, etc. on an annual basis to accord with the annual survival and labor force continuation probabilities.

The assumption that reemployment wages are fixed over the remaining work life is inconsistent with evidence from a variety of studies. The internal evidence on wage rate recovery is weak in the DWS, although the average recovery effects appear to be small for this sample of full-time to full-time displaced and reemployed workers; see below, Section VI. Farber (2004) reports a modest two-year average wage recovery rate (1.13%) over the nine DWS cohorts, with even the sign of the recovery process dependent on business cycle conditions--survey date weekly wages of those displaced the first year of the survey were higher than those of workers displaced in the third year only in relatively good times. To explore the sensitivity of our results to assumptions about the wage recovery process, we generate a second estimate of post-separation human capital (H_{1B}) on the DWS2000 fulltime to fulltime sample, one that assumes wage recovery following estimates by Daymont (2004) using data drawn from the PSID. Perhaps because of the discount rate we use (9 percent), the effect of introducing wage recovery is small. The algorithms and results are available in a data appendix from the authors.

Social Insurance Payments (*β*). The final element required for the estimation of the worker's *private* capital loss from displacement is the capital value of social insurance payments following displacement. As noted above, the DWS data set contains information only on whether the displaced worker received benefits and whether she exhausted benefits, so we are forced to approximate the magnitude of benefits using information on the time until reemployment for those who did not exhaust benefits. Although individual state programs vary in benefit formulas, the median state pays a benefit of one half recent weekly earnings for each week of unemployment up to a maximum amount [approximately $300 per week in early 2000, U.S. Department of Labor (2000)]. For all displaced workers who report receiving unemployment benefits we estimate the weekly unemployment insurance benefit amount (*b*) as:

$$b = \min(0.5 * w_0, 300). \tag{10}$$

For all others we assign a zero. It remains only to sum and discount this weekly flow across the weeks of unemployment between displacement and reemployment (*U*). At this time the median state paid benefits for up to 26 weeks following a one period waiting period, Department of Labor (2000), so that the capitalized value of unemployment benefits at the time of displacement can be calculated as:

$$\beta = b \sum_{t=1}^{\overline{U}} \hat{\delta}^t \ , \tag{11}$$

where $\overline{U} = \min(U, 27)$.

The substitution of Equation (10) into (11) and then Equations (8), (9), and (11) into Equation (6) provides the algorithm for estimating capitalized job displacement losses. The worker’s capital loss can also be partitioned into the unemployment loss and reemployment wage loss components:

$$\hat{L}^U = w_0 \sum_{t=1}^{U} \hat{\delta}^t - \beta \ , \tag{12}$$

and:

$$L^W = (w_0 - w_1) \sum_{t=R}^{\infty} \hat{\delta}^t S_t \Lambda_t \ . \tag{13}$$

Note that *both loss measures are potentially* negative, L^W frequently so, making share-of-total-loss calculations straightforward only for average calculations.

We follow the literature, i.e. Farber (2004), and focus on the DWS respondents who reported that they were employed full-time at both their pre-displacement jobs and their survey week (post-displacement) jobs.[13] This full-time restriction provides an adjustment, albeit a crude one, for the inability to assess the value of leisure time of workers who increase or decrease their work hours. As a test of the robustness of these estimates, we also estimate the models on a sample of full-time displaced workers who find *either* fulltime *or* part-time work. In the merged fulltime/part-time sample, the value of leisure of the part-time workers is effectively treated as of zero value, creating a plausible upper bound on the earnings losses of full-time displaced workers.[14] Variable definitions are reported in Table 1, means and standard deviations of all variables, including the capital losses, key components, and covariates in the analyses to follow are reported in Table 2.

Helwig (2001) and Farber (2004) report that full-time-to-full-time displaced workers in the DWS2000 suffered essentially zero losses in average weekly earnings at the time of the survey interviews.[15] The corresponding capitalized value of total losses (*L*), the sum of unsubsized unemployment losses and reemployment wage losses, are reported in Table 2, Column 1, are modestly positive, $17,965, with however a standard deviation of $164,080. Of this, almost $6,000 ($5,834) reflects unemployment period losses, more than $1,000 of which is offset by unemployment insurance benefits ($1,079). The average weeks of pay lost (*L*/*w*) in the DWS2000 sample is actually a gain (a negative loss) of about 25 weeks pay, although again

[13] Helwig (2001) imposes the same restriction, and one additional one, that the workers must have been laid off in the first two years of the survey period. The latter restriction reduces concerns about right censoring of the sample—ignoring those who have yet to find a post-displacement job. The similarity of results in the Helwig and Farber studies suggests that this is not a substantively important issue.

[14] The wage history of part-time job losers illustrates one problem with the assumption that the alternative uses of time have no value. Wage growth upon reemployment is strongly positive for this group, many of whom become reemployed at full-time jobs with corresponding earnings.

[15] Nondisplaced workers received substantial increases in earnings on average over the 1997-2000 period so displaced workers did suffer *relative* wage losses, perhaps on the order of 9 percent, Farber

with a very large standard deviation, (256 weeks).[16] Not surprisingly, average earnings losses are greater if part-time reemployed workers are included in the sample--by about $14,000 or 24 weeks pay, Column 2.

Average displacement losses were sharply higher in the less robust labor markets of 2001-2003. Unemployment related losses almost doubled, to $13,000, and total capitalized losses, unemployment plus reemployment earnings losses, to $55,000 among workers who made the full-time to full-time transition, Table 2, Column 3. Normalized by pre-displacement weekly wages yielded an average loss of about 21 weeks for these workers.

The full distribution of weeks of pay lost in the DWS2000 is illustrated in Figure 5A (frequency) and 5B (cumulative). Perhaps the two most striking features of the total capital effects are (i) the variability of the losses, and (ii) the large fraction of capitalized displacement losses that are negative (human capital rose with displacement). Almost six percent (5.7 percent) of all displaced full-time workers had capital *losses* that exceeded five years of pay, while almost ten percent had capital *gains* of the same magnitude! The labor market between 1997 and 1999 was unusually strong so it may not be surprising that many workers improved their economic conditions following job displacement, but the same is true, although less substantially, across the two decades covered by the DWS surveys, Helwig (2003). Although not reported here, the distribution of losses is broadly similar for males and females, with the female distribution slightly more concentrated around mean losses. The same figures illustrated the importance of the reemployment wage losses (L^W) rather than unemployment losses (L^U) in generating the full distribution of capitalized earnings losses is apparent in Figure 5A (frequency) and 5B (cumulative). Unemployment losses are sufficiently small in aggregate and sufficiently dispersed across the workforce that the distributions of total capital losses and of reemployment wage capital losses are essentially indistinguishable.

(2004).

[16] This difference in sign is a reflection of the asymmetries in the human capital distributions. The

V. Simple Models of Capitalized Earnings Losses

The question remains of how well the simple service/age benefit algorithms found in the typical severance package capture the observed, wide variation in displacement losses. Simple partitions of the loss distribution by service (tenure) are not encouraging. The distributions of displacement effects by tenure grouping, partitioning the sample into those who had less than ten years of tenure at the time of displacement and those who had ten years or more, are reported for full-time to full-time workers in the DWS2000 in Figure 6A (frequency) and B (cumulative). The right shift in the distribution of losses among high tenured displaced workers is transparent, but the remaining dispersion of outcomes within group is also striking. The large residual dispersions *within* tenure groups raise concerns that the simple weeks-of-pay-per-year-of-service algorithm may do a poor job of targeting actual displacement losses.

Before discussing the empirical results, it is useful to note the parallels between the capitalized weeks-of-lost-pay model and the relative wage change model of displacement (the ratio of the reemployment wage to the predisplacement wage) commonly estimated in the empirical literature. Recalling the definition of the capitalized displacement loss (Equation 5), the weeks-of-pay measure of loss is simply:

$$L / w_0 = H_0 / w_0 - (H_1 + \beta) / w_0 , \qquad (6')$$

The capital loss measures can be decomposed into wage and lifetime capitalization terms:

$$H_0 = w_0 \sum_{t=0}^{\infty} \hat{\delta}^t S_t \Lambda_t = w_0 \Omega_0 \text{, and} \qquad (8')$$

$$H_1 = w_1 \sum_{t=R}^{\infty} \hat{\delta}^t S_t \Lambda_t = w_1 \Omega_R , \qquad (9')$$

where Ω_0 and Ω_R denote the capitalization factor at the job displacement and reemployment dates respectively. If the unemployment period is not a major portion of the remaining life cycle and the corresponding capitalized sum of unemployment benefits small, then $\Omega_0 \approx \Omega_R \approx \Omega$, and

median losses were positive for both measures, $5,286 and10.1 weeks.

$$L / w_0 \approx (1 - w_1 / w_0)\Omega . \qquad (6'')$$

Capital losses in weeks of pay are the product of the relative wage loss and the capitalization factor Ω. Recall that in our study, Ω is a function of two factors only, age and sex, the latter through variations in lifetime mortality and labor force experience probabilities. It will not be surprising to find close parallels between the capitalized weeks-of-pay-lost regression models reported below and the wage change regression models in the literature.

The Basic Models: DWS2000. Consider simple models of weeks-of-pay lost that parallel severance benefit algorithms, with losses a function of (i) tenure or service and (ii) age. Estimates of the linear and quadratic models are reported in Table 3A for two DWS2000 samples: (i) full-time to full-time workers, and (ii) full-time to full-time *or* part-time workers. Again, the latter estimates provide an upper bound on the magnitude of earnings losses by placing zero value on the additional leisure implied by part-time employment. Identical model estimates are reported in Table 3B for the DWS2004.

The linear model estimates for the full-time/full-time DWS2000 sample suggest that complete severance insurance would require a benefit structure of approximately:

(i) 4.7 weeks of pay per year of service, and
(ii) 1.3 week's pay for each year of age.

The tenure and age gradient of losses in the DWS2000 sample that includes both full-time and part-time reemployed workers is similar, 5.2 weeks and 1.1 weeks respectively, although as noted earlier, base losses are greater when part-time reemployment is included. Obviously these loss gradients are substantially higher than the one week of pay per year of service and zero weeks of pay per year of age algorithms in the modal severance plan.

The frequent capping of benefits, typically through setting service maxima in the benefit formula, raises the possibility that displacement loss effects may be nonlinear. In Table 3A, Columns 2 and 4, we report estimates of a quadratic model for the two DWS2000 samples.[17]

[17] The addition of service-age interaction terms did not significantly increase the explanatory power of the

Although none of the individual terms are now significant, the increase in adjusted R-square for the full-time to full-time sample (Column 1 and 2) indicates that the fit of the model is significantly improved by the addition of the two quadratic terms. That does not appear to be the case for the full-time to full-time *or* part-time model, for which the linear model appears perfectly adequate, Column 4.

In Figure 7A the estimated service/age profiles of the displacement loss functions in the DWS2000 regressions are illustrated. Expected displacement loss profiles as a function of (service, age) pairs are computed for a worker who joins the firm at age 25 and remains with the firm until the designated separation time. In the linear forms, the addition of the part-time workers to the sample increases the expected earnings losses of the combined sample of all workers by about 25 weeks pay, although, as noted above, with little change in gradient: the additional losses implied by part-time work are largely independent of the worker's service or age.

The figures reveal the more substantial importance of the quadratic form in the full-time to full-time sample than in the full-time to full *or* part-time sample. Among workers who enter full-time reemployment, job displacement losses increase at a decreasing rate with service/age. For this group, the curvilinear structure is well fitted with a formula that offers five to six weeks of pay per year of service up to 25 years of service, after which benefits remain constant. The predictions of the marginal service and age effects in the linear and quadratic models are essentially identical, with the losses of the displaced who find either full-time or part-time work about 25 weeks pay greater than those who find full-time work only.

Business Cycle Effects: DWS2004. The years covered by the DWS2000—1997-99—were unusually good years in the labor market. The DWS2004, covering the less favorable 2001-03 interval, provides an opportunity to explore the impact of the business cycle on the

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model. At high levels of tenure, age and tenure are highly collinear, which makes precise estimation of such effects difficult.

structure of capitalized earnings losses as well as the general stability of functional form. As noted earlier, mean losses, whether measured in dollars or weeks of pay, were much higher in 2001-2003. The same linear and quadratic weeks-of-pay regressions with service and age as covariates were estimated on the DWS2004 sample for the two base samples: fulltime to fulltime workers and fulltime to fulltime *or* part-time workers, Table 3B.

The estimates reveal the same basic *shape* of the earnings loss functions in the more difficult labor market years covered by the DWS2004, Figure 7B. The predicted weekly pay lost for a hypothetical worker hired at twenty-five year and later laid off increases at a decreasing rate in service if the sample is limited to fulltime to fulltime workers, but more or less linearly in the broader sample that includes part-time workers at the survey date.

As intuition would predict, worker losses were substantially higher in the more difficult times covered by the DWS2004 than in the robust labor markets covered by the DWS2000, Figure 8. The marginal effects of service and age on capitalized losses however appear unchanged. The linear models suggest *marginal effects* of (service, age) pairs on lost weeks-of-pay for those displaced from fulltime jobs and reemployed full-time of 4.0 and 1.7, for the broader sample of fulltime displaced workers reemployed full- or part-time reemployed workers 4.0 and 1.5). The combined marginal effect of service and age on capitalized weeks-of-pay lost was roughly constant across labor market conditions and sample definitions--about six weeks of pay; the estimated marginal effect of a year of service alone was actually modestly lower in the more difficult times. The greater losses from job displacement in the low demand period, almost 50 weeks of pay at a nine percent discount rate, were more or less uniformly spread across workers of differing tenure and age.

Unlike the public unemployment insurance system, which since 1977 has offered automatic benefit duration extensions in difficult labor markets, the standard private plan does not offer severance benefits that vary with business cycle difficulties. These results would suggest that severance benefits should perhaps be more generously provided at low points in the business cycle, and in a specific way--business cycle benefit adjustments should be distributed independent of service or age.

Year-of-Displacement: Recovery Effects**.** Both the DWS2000 and the DWS2004 surveyed workers displaced in the three calendar years prior to the February survey date. By partitioning each sample by year of displacement relative to the survey year—[-3, -2, and -1]—it is possible to explore for internal evidence of earnings recovery. Those laid off in the first year would on average have more than 2.5 years to recover from the displacement, those in the last year only 0.5 years.

The usual service/age profile derived from the quadratic models are reported for the full-time to full-time sample in Figure 9A for the three displacement years in the DWS2000 sample, in Figure 9B for the DWS2004 sample.[18] The estimates from the DWS2000 sample are only partially consistent with a recovery process. The expected losses are sharply lower across service/age pairs among those displaced in 1997, who would have had an average of 2.5 years to recover, than among those displaced in the two later years, although the loss profiles for those who had 1.5 years to recover (1998 displacements) and those who had only 0.5 years (1999) are quite similar. The service/age profiles in the DWS2004 confirm the belief that the processes that shift the loss profiles year to year are dominated by factors other than "recovery": the service-age loss profiles of the most recent displacements (2003) are distinctly lower than those of earlier displacements, which, despite the unusual shape of the loss profile in the middle year (2002), are quite similar.

Occupational Effects. There is a common belief that job displacement losses are especially heavy among managers and professionals and perhaps other "white collar" workers. Private plans in the United States have historically reflected this presumption. Many firms limit coverage to white collar workers only, although plans that cover the entire work force are

[18] The earnings loss profiles by individual year-of-displacement are similar for the full-time to full-time or part-time samples in both years.

common. Among white collar workers, managers and professionals are also likely to have a higher service or benefit caps, Parsons (2005b).

It is of course possible to explore the loss structure across occupational groups in our data. We partitioned the data set into the occupational groupings common in severance pay plans: (i) managers and professionals (MANPROF), (ii) clerical and sales (CLERSALES), and (iii) blue collar and service (BCSERV), and calculated average losses for each for both the fulltime to fulltime samples and the fulltime to full- or part-time samples, Figure 10. Among fulltime to fulltime workers, estimates of average weeks of pay lost across occupations in the DWS2000 sample reveal only modest occupational differences, with losses of minus 21 weeks for managers and professionals, minus 30 weeks for clerical and minus 25 weeks for blue collar and service workers. As noted earlier, losses were higher on average in the more difficult years sampled in the DWS2004, but were especially so among managers and professionals, 67 weeks pay for managers and professionals versus 19 weeks and 25 weeks for the other two occupational groups.

The service/age profiles by occupation have familiar shapes in the DWS2000 sample, Figure 11A (linear model) and 11B (quadratic model), but with one noticeable distinction—manager and professional losses were higher among displaced workers with little service, but grew less with additional service. In the linear model, for example, the marginal impact of a year of service on lost pay was 2.3, 6.4, and 5.5 weeks among managers and professionals, clerical and sales workers, and blue collar and service workers respectively. The corresponding marginal age effects were more stable, 1.3, 1.8, and 0.9. Similar profiles for the DWS2004 sample are illustrated in Figure 12. The labor market difficulties apparently induced a sharp upward shift in service/age profiles for all groups, but especially for the managers and professions. In the linear model, the marginal effect of an additional year of service and age remained roughly the same as in the DWS2000 sample: (1.0, 5.4, 6.1) for service, and (2.1, 0.9, 1.5) for age. The displacement shock among managers and professions is more evenly spread across tenure groups.

Union Workers. Severance plans are much more common in collective bargaining agreements than outside them, at least among the blue collar and service workers most likely to be represented. The benefit algorithms, however, for those covered by collective bargaining agreements are similar, Section III above. That is somewhat surprising if displacement losses among union workers are greater than those suffered by those outside collective bargaining agreements, perhaps because union workers collect wage premiums. Union wage premiums would be maintained only if the next job is also a union job, which is unlikely.

Consistent with the union rent hypothesis, average capitalized displacement losses in the DWS2000 are systematically higher among union workers than among nonunion workers, on the order of an additional 30 weeks of pay, both in the fulltime reemployment sample and the fulltime/part-time sample, Figure 13. However, in the DWS2004 sample, average displacement losses among union workers were lower, although only modestly. The relative slopes of the service-age profiles are also unstable across surveys, with the union loss gradient flatter in DWS2000, and steeper in the DWS 2004 (not illustrated here). Of course the union sample in the DWS is small, about 9 percent of the total sample, and subject to considerable sampling variation.

VI. The Determinants of Job Displacement Losses: Additional Covariates

Although the estimated tenure and age effects on capitalized displacement losses are robust across the various subsamples, the large unexplained variance in these simple models is troubling. Indeed a large share of displaced workers at all tenure and ages hold higher paying jobs, often substantially higher, at the survey date. The R-squared of the quadratic models across surveys and sample definitions is approximately 2 percent, Table 3, which has obvious, negative implications for insurance efficiency.

The limits of a service-only benefit algorithm are apparent in a simulation of *universal* severance coverage. The impact on the cumulative distribution of job displacement losses of plans that offered one, two, three, or four weeks of pay per year of service are illustrated for the DWS 2000 sample in Figure 14A. Even at *four* weeks of pay per year of service, the shift in the cumulative distribution is not dramatic, and the vast bulk of displacement human capital risk remains. This modest effect, even of generous plans, arises in part because the standard last-in/first-out layoff system insures that most displaced workers are recent hires who leave with modest benefits. If we limit our sample to long service workers, say those with ten or more years of service, the impact on the locus of the net loss distribution is more obvious, Figure 14B. For workers in a one week per year of service regime the minimum payment is ten weeks of pay in this sample; in a four weeks of pay regime, the minimum payment is 40 weeks of pay. The leftward shift in the distribution of losses is substantial. Nonetheless, the distribution of losses remains wide. Even *generous* fixed-sum payments based solely on years of service will not eliminate job displacement risk.

With that in mind, we report below on efforts to maximize the predictive power of the model, considering more flexible functional forms for the key tenure and age variables, and introducing additional covariates from the DWS without concern that the covariates may be inappropriate for inclusion in a fringe benefit function. Separately, for the full-time reemployed sample and the broader full or part-time job finder sample, we report estimates of weighted least squares models of weeks-of-pay lost in the DWS2000 and the DWS2004, Table 4. We introduce tenure and age as a series of dummies. Among the additional covariates available in the DWS and introduced into the model are industry occupation, union membership, and government employment as well as demographics such as sex, race, age, and education. Also included is a set of shift dummies for year of displacement.

Given the close parallels of the capitalized weeks-of-pay model to earlier wage change models (see Section III above), it is not surprising that the DWS2000 results reported in Table 4 conform closely to those reported by Farber (2004) and Helwig (2001) for the determinants of relative wage change models on the same data set. There are however considerable differences in coefficient estimates across the two survey periods, which would make the corresponding covariates poor additions to a more or less permanent benefit algorithm. The basic profiles of tenure and age in the complete model are robust across samples and time periods, Table 4. The coefficients on the long-tenure dummies are absolutely large in magnitude, statistically significant, and imply a roughly linear relationship. Relative to a displaced worker with less than a year of tenure on the lost job, a worker with four to ten years suffered about sixteen weeks greater losses of pay; with eleven to twenty years 56 weeks; and a worker with more than twenty years of tenure, 76 weeks or a year and one half pay. Age effects appear to follow a step function, with workers released after age 29 losing about 40 weeks of pay relative to younger workers.

Echoing the earlier findings on the partitioned occupational and union samples, there is no evidence of differential occupational effects on weeks-of-pay lost in the DWS2000 sample (1997-1999), although managerial and professional workers suffered significantly greater losses in the DWS2004 (2001-2003). Union effects are small and of opposing sign across the two sample periods. Industry dummy coefficients, reflecting impacts relative to workers in the nondurable manufacturing sector, are somewhat more likely to be significant than chance would suggest—two of the eleven coefficients are significant at the 5 percent level in the DWS2000, four of the eleven in DWS2004, but vary erratically between the two periods in both sign and magnitudes in a way that makes industry a poor factor to embed permanently in a severance plan. The year-of-displacement dummies also vary in sign and magnitudes across the two years.

The estimated coefficients on the additional demographic variables are also insignificant and/or erratic in sign across years. Ceteris paribus, female respondents suffered modestly higher capital losses, but not significantly so. Nonwhites in the DWS2000 (good times) appeared to suffer significant losses, but not in the DWS2004 (bad times). This finding is contrary to the conventional wisdom that nonwhites suffer relatively more in difficult times. The educational attainment variables are consistently small in absolute magnitude and insignificant. Highly educated displaced workers do not suffer unusually large *relative* capital losses, certainly after controlling for occupation. It would appear that the cross-section evidence provides no promising additions to the variables found in current benefit algorithms.

VII. Conclusion

Even in the strong labor market of 1997-1999, almost six percent of all displaced full-time workers had uncompensated human capital losses exceeding five years pay.[19] Given the magnitude of these potential losses, it is not surprising that employers often provide insurance against displacement risk. The analysis of capitalized earnings losses confirms the robust correlation of losses with tenure, supporting the logic of the standard severance pay algorithm, which varies benefits in proportion to years of service (tenure), at least up to a benefit or service maximum.

The proportionality factor, however, is modest. The modal severance plan in both nonunion and union workplaces offers one week of pay for each year of service. Estimated losses are more than four times larger, approximately four to five weeks of pay per year of service. The benefit/loss imbalance may simply reflect a measurement problem in the appropriate discount rate—if the worker's discount rate exceeds 9 percent, expected marginal capital losses are correspondingly reduced. At a discount rate of 36 percent, benefits would accord nicely with capitalized losses. Such a rate seems implausible, suggesting that benefits are not designed to compensate displaced workers fully.

Better targeting of losses across individual workers would of course increase the efficiency of the benefit formula, but estimates from more complete models provide little practical guidance on ways to improve benefit-targeting. Few demographic variables in the DWS are highly correlated with earnings losses, and none that the employer can plausibly

[19] Uncompensated human capital losses are human capital losses less related public unemployment insurance payments. Earnings losses are discounted at 9 percent.

include in a severance plan. Although coefficient estimates for industry dummies are significant in individual years, they do not appear stable across years.

The large increase in job displacement losses between the robust labor markets of 1997-1999 and the leaner markets of 2001-2003 does suggest one possible design improvement, conditioning benefits on the business cycle. Unlike the public unemployment insurance system that automatically provides for extended benefits in poor labor markets, current severance plans provide no additional benefits in bad times. The capital loss evidence also indicates the form that additional benefits might take. The losses appear to affect workers more or less equally across tenure or years-of-service. This additional feature would reduce only modestly the problem of poor targeting of scheduled job displacement benefits.

The large dispersion of human capital losses, even after controlling for years-of-service and other observables, argues for actual-loss based insurance. Employers are in a poor position to monitor the reemployment wages of permanently displaced workers, so private employer wage insurance is probably not feasible. Public wage insurance, like public unemployment insurance, may be possible, although reasonably accurate hours-of-work measurement may be costly.[20] Nonetheless it may be worth exploring that approach. We are otherwise left with modest, poorly targeted severance benefits as the best available mechanism for insuring workers against job displacement losses.

[20] Hours of work measurement is required if the system is to distinguish low reemployment wage rates from low work activity, especially part-time work, Parsons (2000).

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Table 1
Variable Definitions

Variable	Definition
H_0	Total capitalized value of remaining life assuming no displacement
w_0	Weekly wage on lost job
w_1	Weekly wage upon reemployment
H_0	Total capitalized value of remaining life assuming no displacement
H_0_1	Capitalized value of remaining life assuming no displacement-- *unemployment period*
H_0_2	Capitalized value of remaining life assuming no displacement-- *reemployment period pre-survey*
H_0_3	Capitalized value of remaining life assuming no displacement-- *reemployment period post-survey*
H_1	Total capitalized value of remaining life, no wage recovery
H_1_1	Capitalized value of remaining life— *unemployment period*
H_1_2	Capitalized value of remaining life, no wage recovery, *reemployment period—pre-survey*
H_1_3	Capitalized value of remaining life, no wage recovery, *reemployment period post-survey*
β	Capital value of UI receipt
L	Dollars of capital loss
L/w_0	Weeks of pay lost
TENURE	Tenure in years on lost job
TEN 0	Years of tenure less than one
TEN 1-3	Years of tenure 1-3
TEN 4-10	Years of tenure l4-10
TEN 11-20	Years of tenure 11-20
TEN 21P	Years of tenure greater than 20
AGE	Age in years at survey date
AGE 20-29	Age in years 20-29 at survey date
AGE 30-39	Age in years 30-39
AGE 40-49	Age in years 40-49
AGE 50-61	Age in years 50-61
MAN/PROF	Manager or professional on lost job
SALES	Sales
CLER/TECH	Clerical and technical
BC/SERV	Blue collar and service
GOV	Government worker on lost job
UNION	Union member on lost job
AG	Agric. or forest—lost job
MINING	Mining—lost job
CONST	Construction—lost job
MFG ND	Nondurable mfg—lost job
MFG DUR	Durable mfg—lost job

TCPU	Trans, comm., public utilities—lost job
WHOLE	Wholesale trade—lost job
RETAIL	Retail trades—lost job
FIRE	Financial, insurance, real est—lost job
BUS SERV	Business services—lost job
PERS ENT	Personal, entertainment services—lost job
PROF SERV	Professional services—lost job
PUB ADMIN	Public administration—lost job
FEMALE	
NONWHITE	
ED LI12	Years of schooling less than 12
ED 12	Years of schooling equal 12
ED 13-15	Years of schooling 13-15
ED 16P	Years of schooling 16 or more
DSP -3	Year of displacement is three years before the survey year
DSP -2	Year of displacement is two years before the survey year
DSP -1	Year of displacement is one year before the survey year

Table 2
Means and Standard Deviations, DWS2000 and DWS2004
Full-time to Full-time (FT FT) and Full-time to Full-time or Part-time (FT FTPT)

Variable				
	DWS2000 FT FT	DWS2000 FT FTPT	DWS2004 FT FT	DWS2004 FT FTPT
	(1)	(2)	(3)	(4)
w_o	681.8221 (464.1253)	668.58 (466.34)	855.64 (569.60)	831.25 (564.28)
w_1	654.2997 (422.4455)	612.67 (423.88)	739.46 (513.98)	679.23 (523.36)
H_0	353,587.8 (234542.4)	347,061.2 (236458.5)	444,301.9 (291,999.8)	430,955.4 (288,612.5)
H_0_1	5,833.922 (11296.29)	6,020.727 (11762.45)	13,048.74 (22404.48)	13223.18 (22694.24)
H_0_2	40,426.21 (39300.46)	39.768.64 (40,630.96)	53,687.51 (53003.51)	51,288.6 (52180.6)
H_0_3	307,327.7 (205683.6)	301,371.9 (205921)	377,565.7 (245,705.7))	366,443.6 (242,713.2)
H_1	334,543 (210411.5)	313,623 (212,484.7)	374,374.1 (259,376.7)	343,221.3 (263,319.4)
H_1_1	0	0	0	
H_1_2	39,263.94 (36702.06)	36,937.84 (36,247.25)	46,192.66 (46,538.26)	42,258.97 (46296.55)
H_1_3	295,279 (187083.4)	276,685.2 (188,702.8)	328,181.5 (227,593.9)	366,443.6 (242,713.2)
β	1079.563 (2057.732)	1094.191 (2081.939)	2073.376 (2779.143)	2064.193 (2796.01)
L	17,965.28 (164080.1)	32,344 (180,180.1)	55,250.4 (207,757)	85,669.92 (219,617.7)
L/w_0	-25.14559 (259.5969)	-0.880 (272.815)	21.135 (250.395)	65.947 (266.305)
TENURE	4.597688 (5.733417)	4.638 (5.914)	4.919 (6.051)	4.911 (6.196)
TEN 0	0.2146084	0.2269	0.1778	0.1857
TEN 1-3	0.4224398	0.4128	0.4334	0.4351
TEN 4-10	0.2349398	0.2308	0.2545	0.2449
TEN 11-20	0.0978916	0.0968	0.0965	0.0947
TEN 21P	0.0301205	.0327	0.0378	0.0396
AGE	38.62199 (10.10451)	38.427 (10.185)	39.411 (10.208)	39.519 (10.439)
AGE 20-29	0.2176205	0.2269	0.2020	0.2071
AGE 30-39	0.310994	0.4128	0.3014	0.2922
AGE 40-49	0.3027108	0.2308	0.3064	0.2981
AGE 50-61	0.1686747	0.0968	0.1902	0.2025

MAN/PROF	0.2981928	0.2929	0.3369	0.3327
SALES	0.0963855	0.1051	0.0976	0.1015
CLER/TECH	0.1799699	0.1705	0.2043	0.2121
BC/SERV	0.4254518	0.4314	0.3612	0.3537
GOV	0.0331325	0.0346	0.0372	0.0373
UNION	0.0873494	0.0846	0.0954	0.0878
AG	0.0173193	0.0154	0.0068	0.0073
MINING	0.0173193	0.0173	0.0056	0.0055
CONST	0.1144578	0.1090	0.1100	0.1070
MFG ND	0.0978916	0.0962	0.0722	0.0742
MFG DUR	0.1686747	0.1583	0.1851	0.1752
TCPU	0.064006	0.0641	0.0468	0.0469
WHOLE	0.0625	0.0596	0.0446	0.0442
RETAIL	0.123494	0.1423	0.0954	0.0956
FIRE	0.0715361	0.0699	0.1281	0.1229
BUS SERV	0.0775602	0.0782	0.1490	0.1516
PERS ENT	0.0331325	0.0340	0.0728	0.0778
PROF SERV	0.1408133	0.1436	0.0677	0.0787
PUB ADMIN	0.0112952	0.0122	0.0158	0.0132
FEMALE	0.4058735	0.4173	0.3758	.3983
NONWHITE	0.125	0.1276	0.1484	0.1420
ED LI12	0.0828313	0.0904	0.0835	0.0851
ED 12	0.3433735	0.3333	0.3104	0.3127
ED 13-15	0.3192771	0.3263	0.3059	0.3031
ED 16P	0.2545181	0.2500	0.3002	0.2990
DSP -3	0.2628012	0.2647	0.3538	0.3491
DSP -2	0.3486446	0.3436	0.3296	0.3259
DSP -1	0.3885542	0.3917	0.3166	0.3250
SAMPLE SIZE	1328	1560	1772	2197

NOTE: Standard deviations of all nondichotomous variables are reported in parentheses.

Table 3
The Determinants of Human Capital Losses (Weeks of Pay)
Simple Functional Forms DWS2000 and DWS2004

Panel A: DWS 2000

	Fulltime to Fulltime		Fulltime to Fulltime or Part-time	
	(1)	(2)	(3)	(4)
CONSTANT	-100.603**	-193.510	-70.264	-68.166
	(35.639)	(133.956)	(37.347)	(138.973)
TENURE	4.740**	6.621	5.186**	5.655
	(1.110)	(3.705)	(1.052)	(3.383)
AGE	1.354	6.284	1.074	0.915
	(0.902)	(6.830)	(0.926)	(6.974)
TENURE SQ		-0.088		-0.021
		(0.139)		(0.128)
AGE SQ		-0.064		0.002
		(0.081)		(0.082)
Adj. R. Sq.	*0.0187*	*0.0198*	*0.0177*	*0.0177*
Sample Size	*1328*	*1328*	*1560*	*1560*

Panel B: DWS 2004

	Fulltime to Fulltime		Fulltime to Fulltime or Part-time	
	(1)	(2)	(3)	(4)
CONSTANT	-54.209	-230.058*	-19.610	-156.289
	(35.639)	(110.668)	(29.042)	(99.660)
TENURE	4.026**	4.152	4.026**	2.341
	(0.834)	(2.857)	(0.934)	(2.718)
AGE	1.725*	11.151*	1.545*	9.095
	(0.721)	(5.486)	(0.694)	(4.946)
TENURE SQ		-0.005		0.0714
		(0.103)		(0.105)
AGE SQ		-0.118		-0.095
		(0.064)		(0.058)
Adj. R. Sq.	*0.0187*	*0.0213*	*0.0162*	*0.0177*
Sample Size	*1772*	*1772*	*2197*	*2197*

The dependent variable is weeks of pay lost. Standard errors are reported in parentheses. A single asterisk indicates that the coefficient is significant at the five percent level, a double asterisk that it is significant at the one percent level.

Table 4
The Determinants of Human Capital Losses (Weeks Pay)
Weighted Least Squares DWS2000 and DWS2004

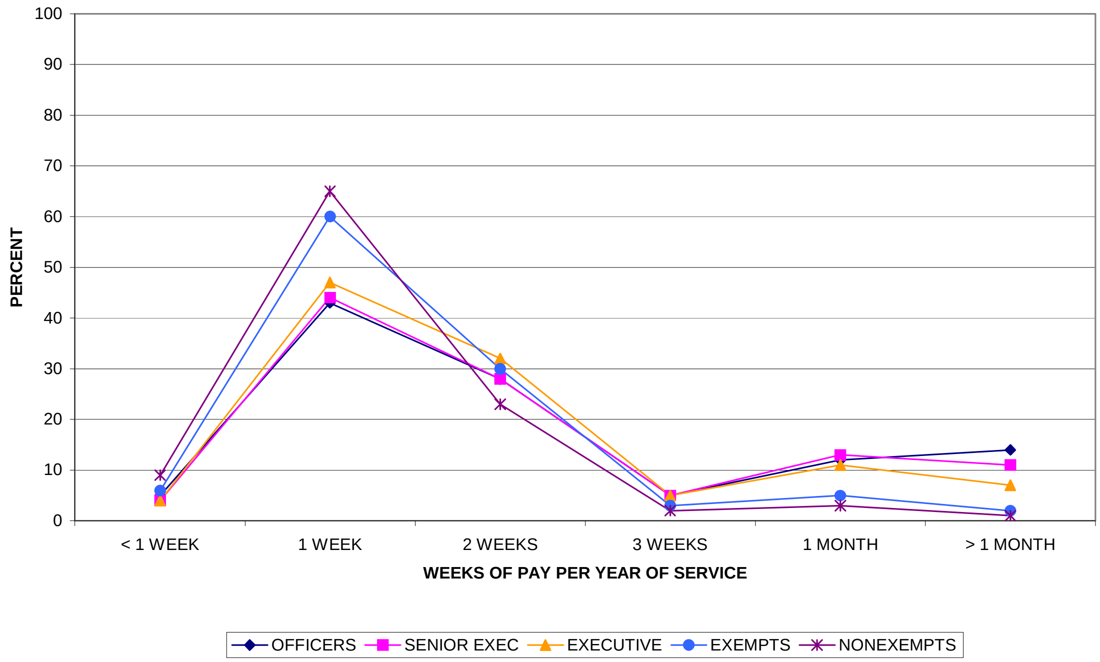
	DWS2000 FT FT	DWS2000 FT FTPT	DWS2004 FT FT	DWS2004 FT FTPT
	(1)	(2)	(3)	(4)
CONSTANT	-111.7*	-74.59	1.50	49.02
	(50.51)	(46.38)	(33.35)	(30.43)
FEMALE	28.17	37.14*	22.29	46.70**
	(16.93)	(18.14)	(14.16)	(13.71)
NONWHITE	46.19*	33.61	-3.85	0.86
	(19.52)	(18.69)	(22.39)	(20.55)
TEN < 1				
TEN 1-3	-14.87	-26.93	-0.072	-23.15
	(24.7)	(24.17)	((25.29)	(22.32)
TEN 4-10	16.27	15.95	16.48	-8.32
	(33.09)	(30.96)	(27.60)	(24.73)
TEN 11-20	56.18	53.45	61.69*	42.28
	(32.81)	(30.94)	(27.17)	(24.85)
TEN 21P	76.4*	89.54*	83.01*	82.15*
	(37.63)	(36.23)	(33.83)	(35.77)
AGE < 30				
AGE 30-39	45.96	27.83	20.71	25.13
	(26.27)	(26.01)	(23.36)	(22.72)
AGE 40-49	41.44	31.56	36.27	38.92
	(28.13)	(27.16)	(22.49)	(22.41)
AGE 50-61	44.09	32.13	33.31	39.35
	(28.91)	(27.88)	(22.48)	(22.97)
MAN/PROF	-15.97	-26.75	51.22**	-13.22
	(22.29)	(23.84)	(19.60)	(19.47)
SALES	2.64	18.40	12.64	15.15
	(30.87)	(35.67)	(37.47)	(32.65)
CLER/TECH	-20.57	-16.72	12.64	29.81
	(21.44)	(23.34)	(19.19)	(20.04)
BC/SERV				
GOV	-70.52	-48.37	8.21	9.42
	(78.39)	(74.65)	(28.36)	(27.70)
UNION	30.22	33.39	-20.07	-11.90
	(28.25)	(27.64)	(30.69)	(28.35)
AG	63.83	22.78	-88.72*	-63.15
	(50)	(46.55)	(42.57)	(80.05)

MINING	196.06**	195.64**	-32.44	-16.46
	(63.06)	(58.28)	(64.58)	(72.79)
CONST	27.2	17.91	-62.52*	-57.74
	(50.4)	(47.12)	(31.00)	(29.61)
MFG ND				
MFG DUR	72.03	52.99	-25.28	-26.77
	(37.01)	(34.61)	(20.19)	(21.18)
TCPU	46.52	47.13	-3.57	10.44
	(48.07)	(44.68)	(27.04)	(26.11)
WHOLE	94.21*	84.99*	4.98	-11.58
	(41.2)	(39.16)	(26.27)	(26.81)
RETAIL	17.43	15.09	-130.28**	-112.15**
	(43.34)	(44.35)	(36.86)	(33.24)
FIRE	34.15	39.07	-37.68	-30.83
	(39.37)	(37.75)	(24.15)	(24.67)
BUS SERV	35.54	45.49	-46.89*	-26.82
	(43.52)	(40.73)	(21.16)	(22.65)
PERS ENT	71.69	84.40	-67.40**	-63.83*
	(45.41)	(48.50)	(23.42)	(32.00)
PROF SERV	44.79	46.85	-34.01	-21.48
	(41.2)	(38.04)	(23.60)	(23.42)
PUB ADMIN	114.4	127.17	-74.35	-134.05*
	(92.05)	(88.20)	(45.56)	(60.69)
ED < 12	-53.38	-10.33	1.98	-21.67
	(44.75)	(39.12)	(29.26)	(28.22)
ED 12				
ED 1315	8.21	15.36	4.38	-0.47
	(18.81)	(21.22)	(17.95)	(16.26)
ED 16P	24.43	27.46	-11.08	-11.82
	(22.37)	(23.22)	(18.04)	(17.50)
DSP -1				
DSP -2	-10	-17.77	21.40	10.30
	(18.31)	(17.31)	(18.16)	(16.56)
DSP -3	-41.31	-52.82*	35.17*	12.58
	(21.4)	(22.70)	(17.93)	(16.66)
Adj. R. Sq.	*0.0501*	*0.0418*	*0.0537*	*0.0436*
Sample Size.	*1328*	*1560*	*1772*	*2197*

Source: DWS2000 and DWS2004. The dependent variable is weeks-of-pay lost. FT FT denotes full-time to full-time, FT FTPT Full-time to Full-time *or* Part-time. Standard errors are reported in parentheses. A single asterisk indicates that the coefficient is significant at the five percent level, a double asterisk that it is significant at the one percent level.

Figure 1
Panel A

WEEKS OF SEVERANCE PAY PER YEAR OF SERVICE IN PURE SERVICE-GRADIENT PLANS BY OCCUPATION, 2001 (LEE HECHT HARRISON)



Panel B

WEEKS OF SEVERANCE PAY PER YEAR OF SERVICE, NONEXEMPT WORKERS IN PURE SERVICE-GRADIENT PLANS BY ORGANIZATION SIZE, 2001 (LEE HECHT HARRISON) (MULTIPLE RESPONSES PERMITTED)

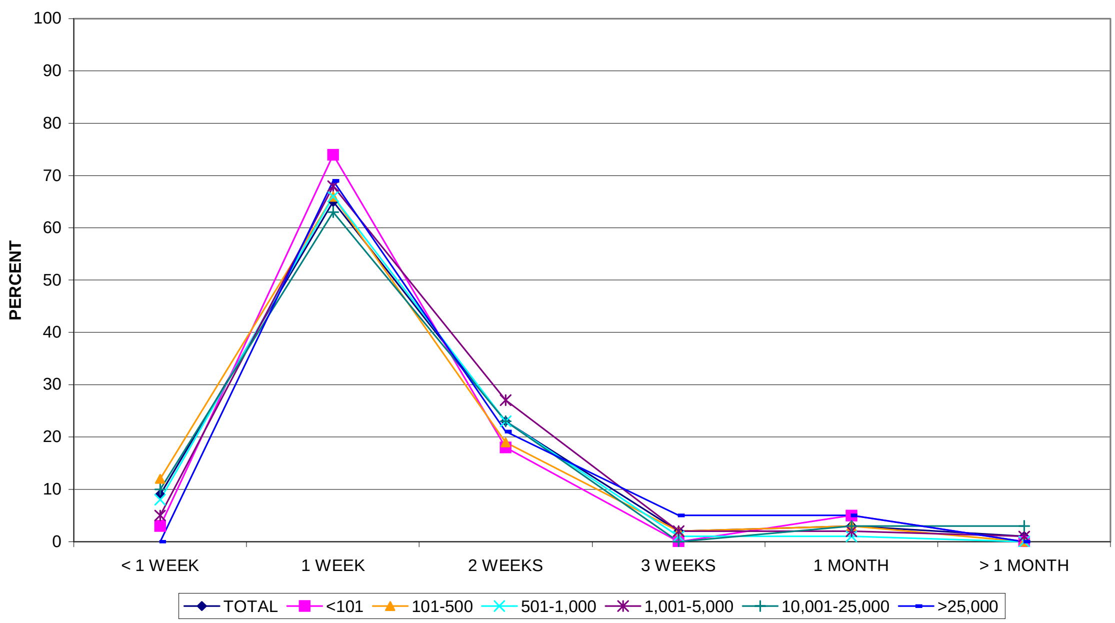
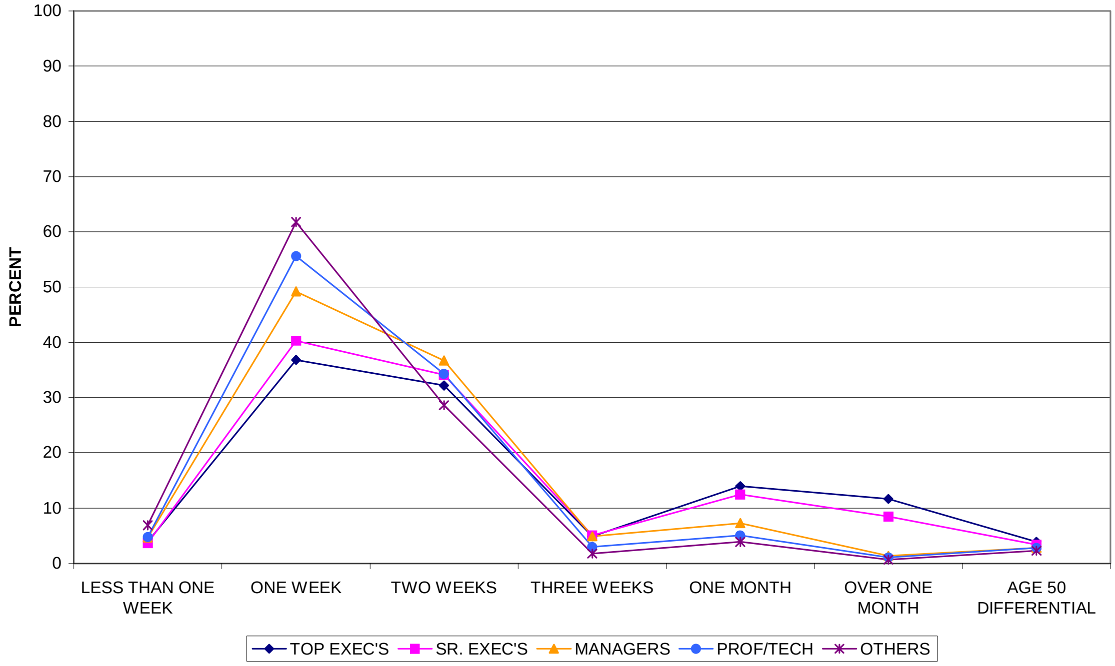


Figure 2
Panel A: Involuntary Separations

WEEKS OF SEVERANCE PAY PER YEAR OF SERVICE, PLANS WITH SERVICE FORMULAS INVOLUNTARY SEPARATIONS ONLY, BY OCCUPATION, 2002 (RIGHT)



Panel B: Voluntary Separations

WEEKS OF SEVERANCE PAY PER YEAR OF SERVICE, PLANS WITH SERVICE FORMULAS, VOLUNTARY SEPARATIONS, BY OCCUPATION 2002 (RIGHT)

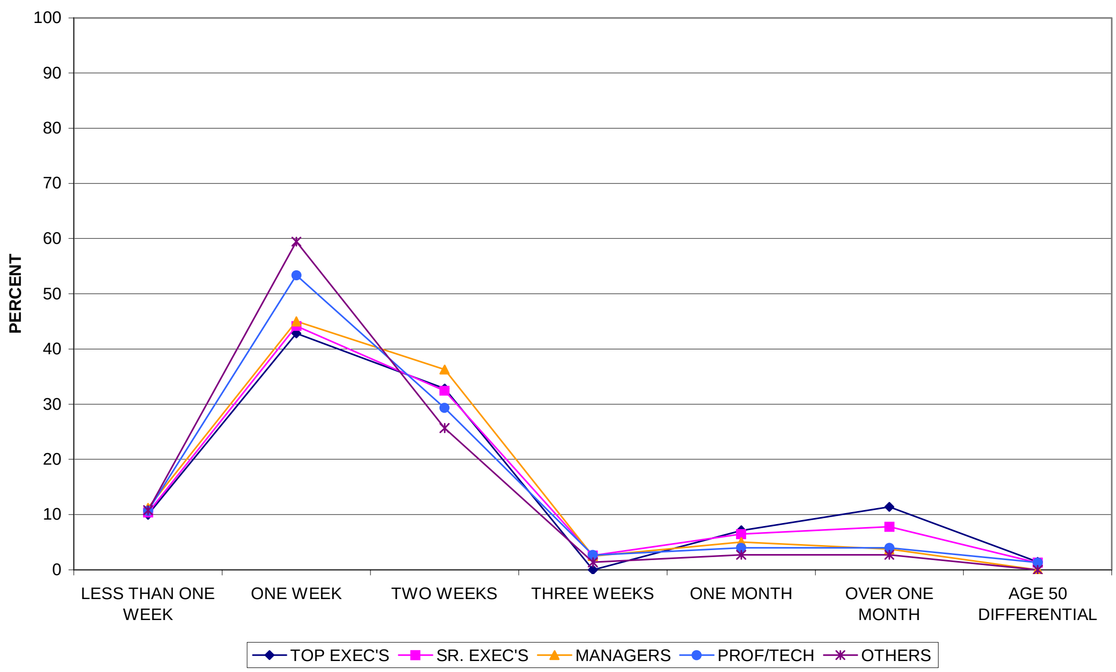
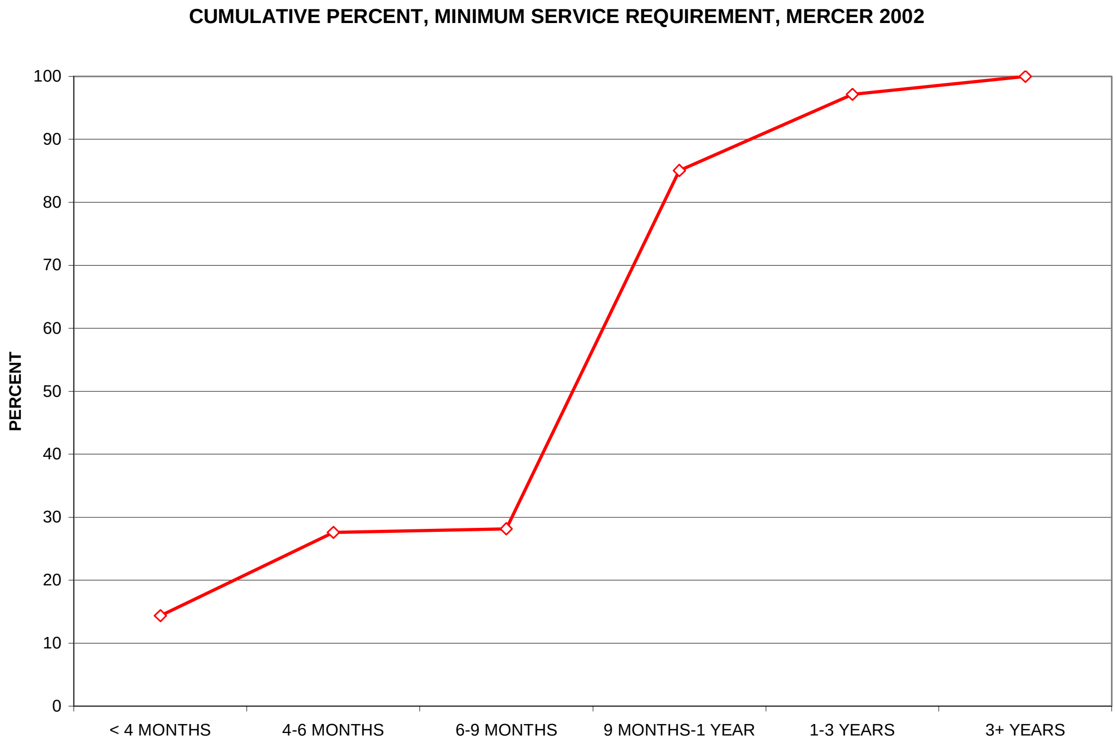


Figure 3: Minimum Service Requirements And Service Benefit Caps, Mercer (2002)
Panel A: Minimum Service Requirements



Panel B

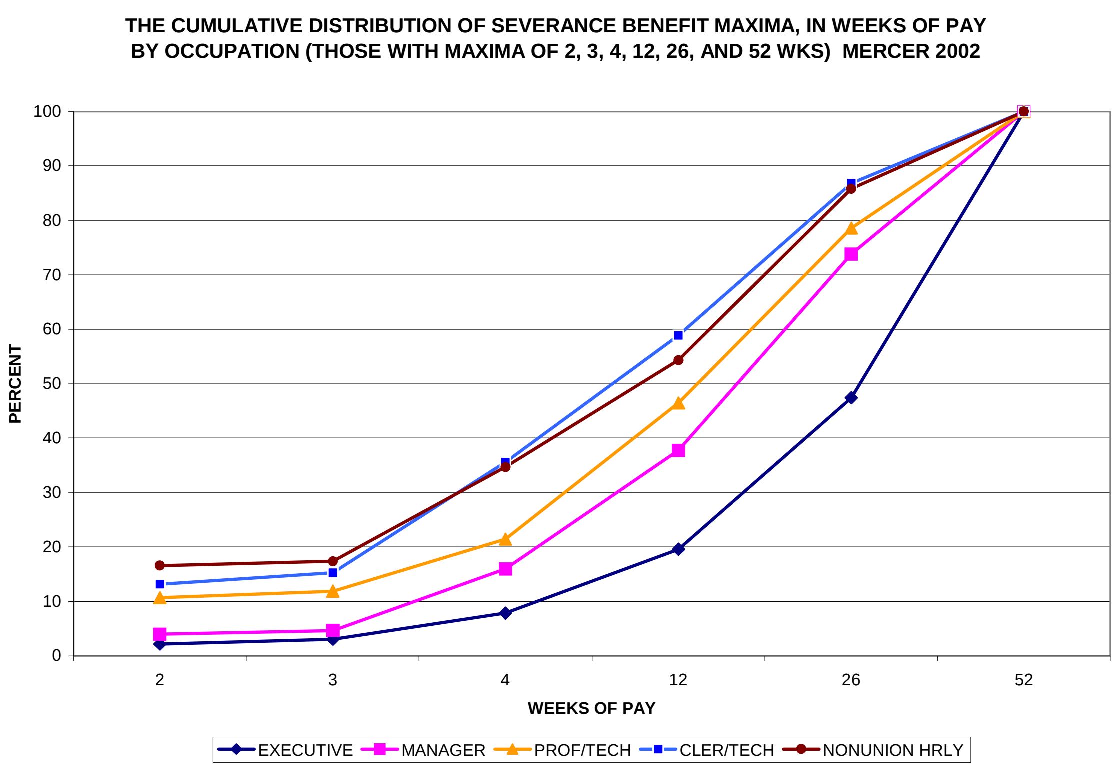


Figure 4

Severance Benefit Algorithms in Collective Bargaining Agreements, 1970-1990, Pita (1996)

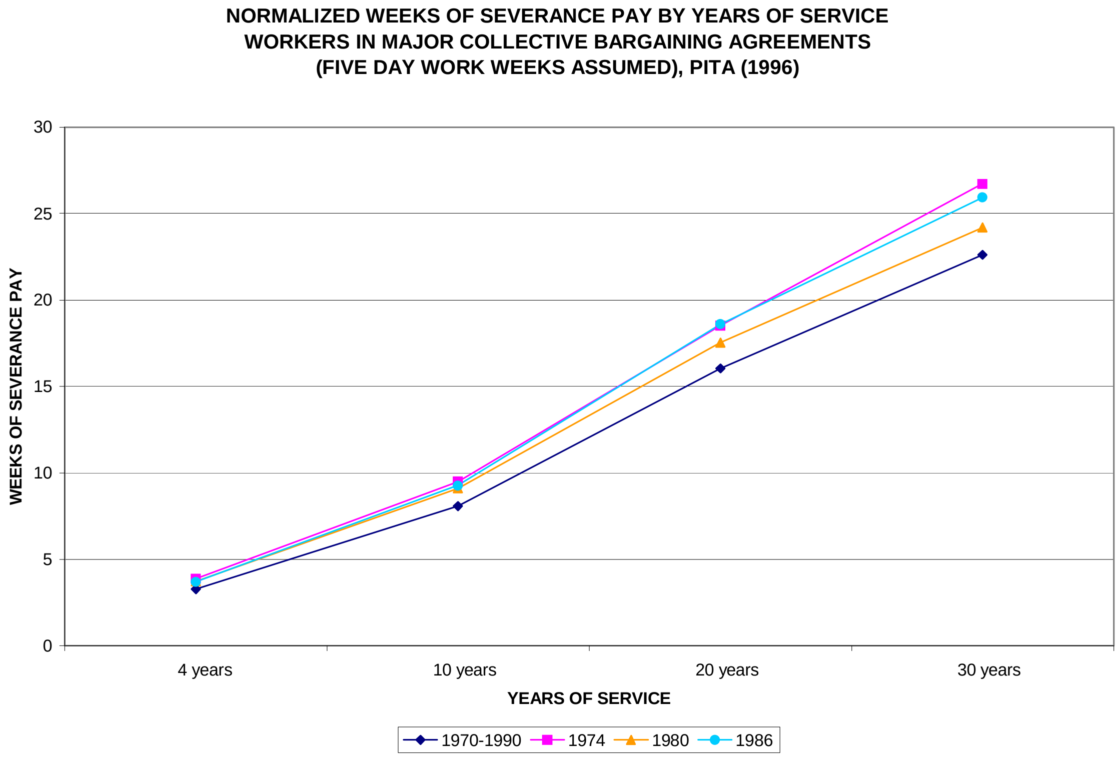
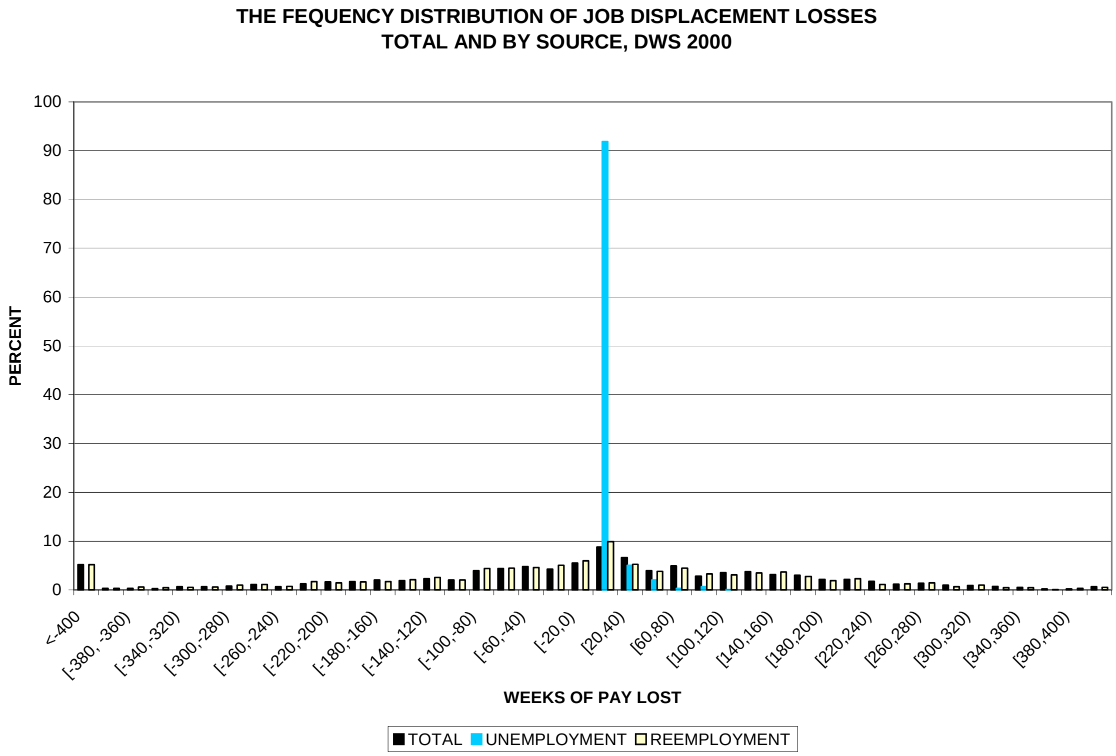


Figure 5: Job Displacement Losses (Weeks of Pay), In Total and By Source, DWS 2000
Panel A: Frequency Distribution



Panel B: Cumulative Distribution

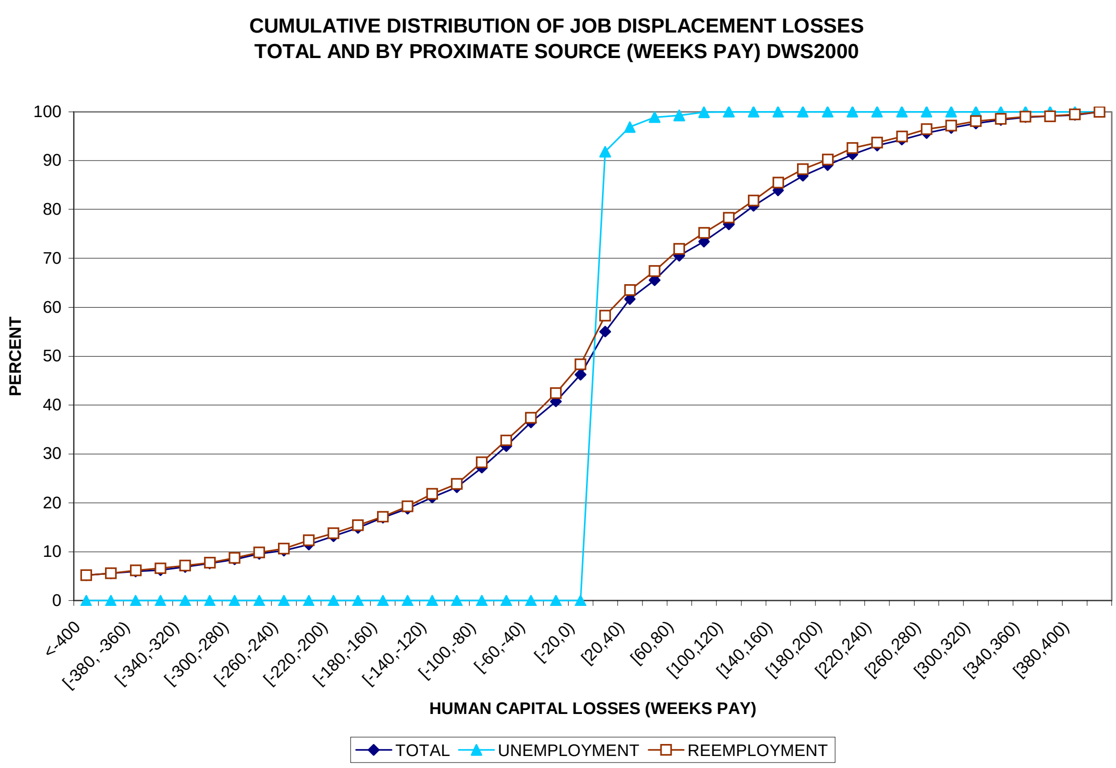
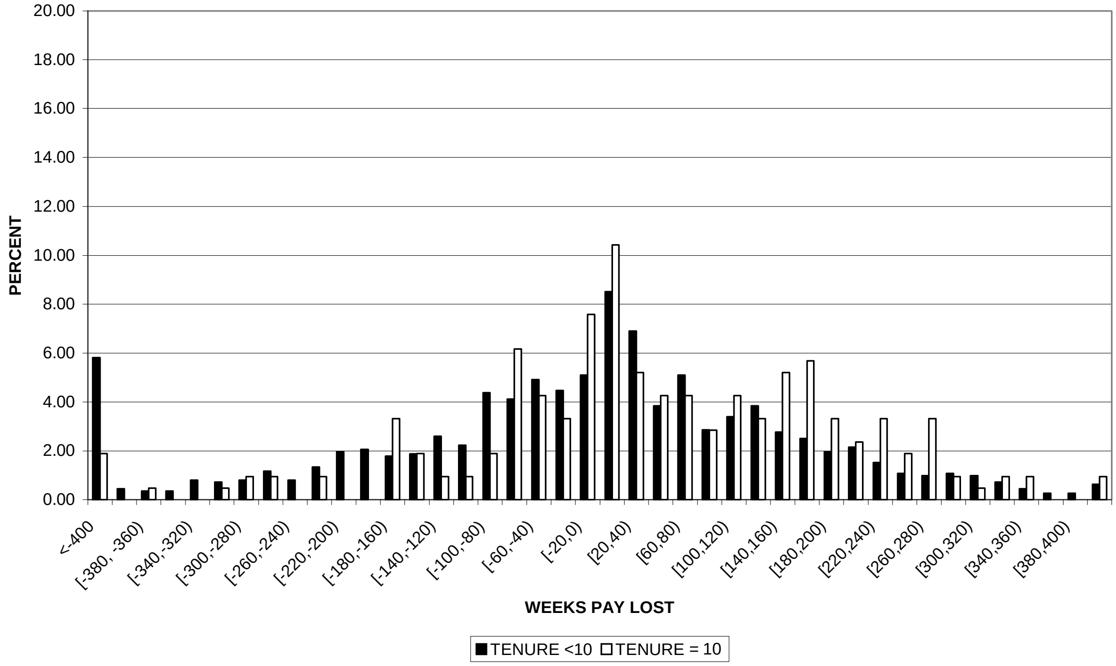


Figure 6: Job Displacement Losses (Weeks Pay), By Tenure, DWS 2000
Panel A: Frequency Distribution

**THE FREQUENCY DISTRIBUTION OF JOB DISPLACEMENT LOSSES (WEEKS OF PAY)
BY JOB TENURE DWS 2000**



Panel B: Cumulative Distribution

**CUMULATIVE DISTRIBUTION OF JOB DISPLACEMENT LOSSES
BY TENURE GROUP (WEEKS OF PAY)**

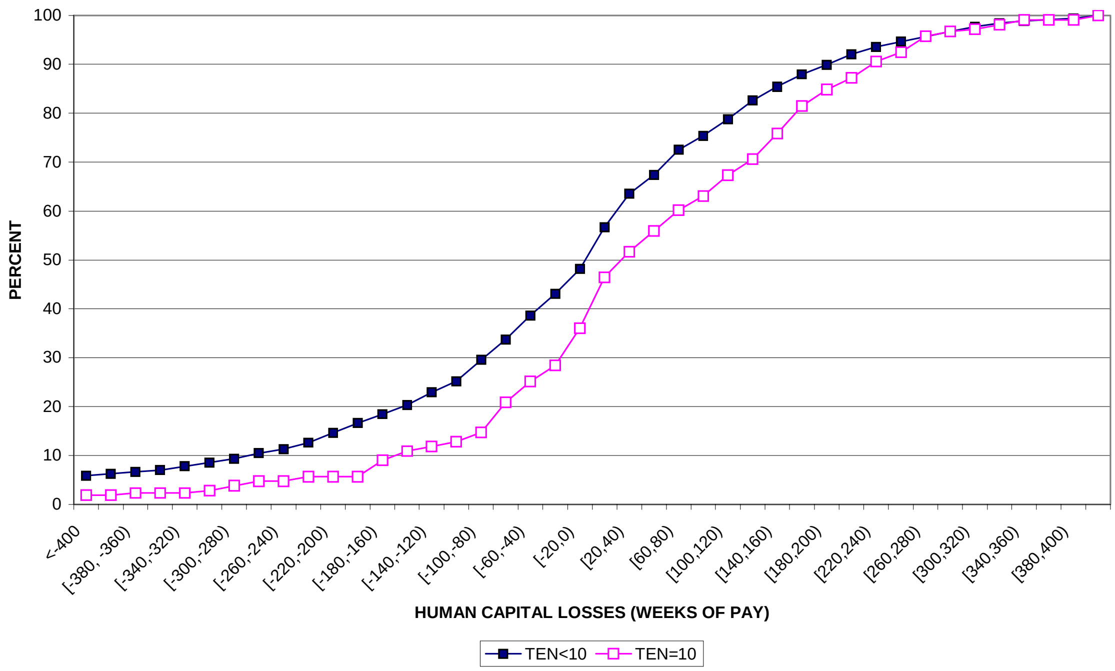
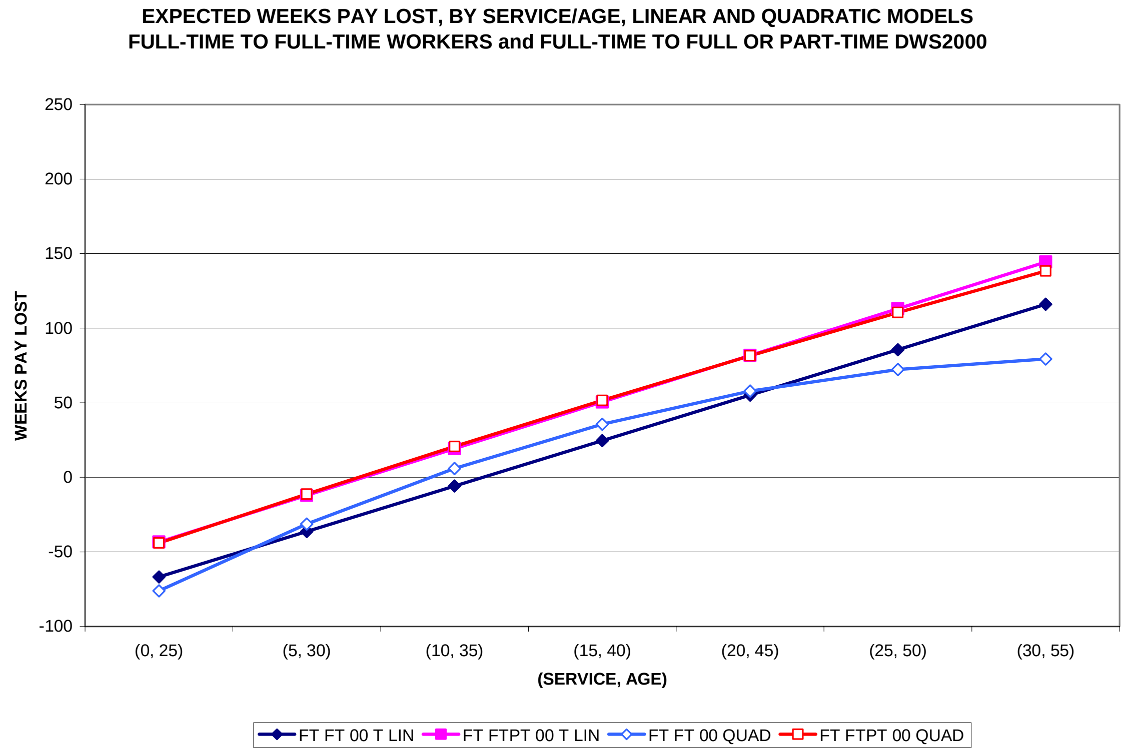


Figure 7

Panel A: DWS 2000



Panel B: DWS2004

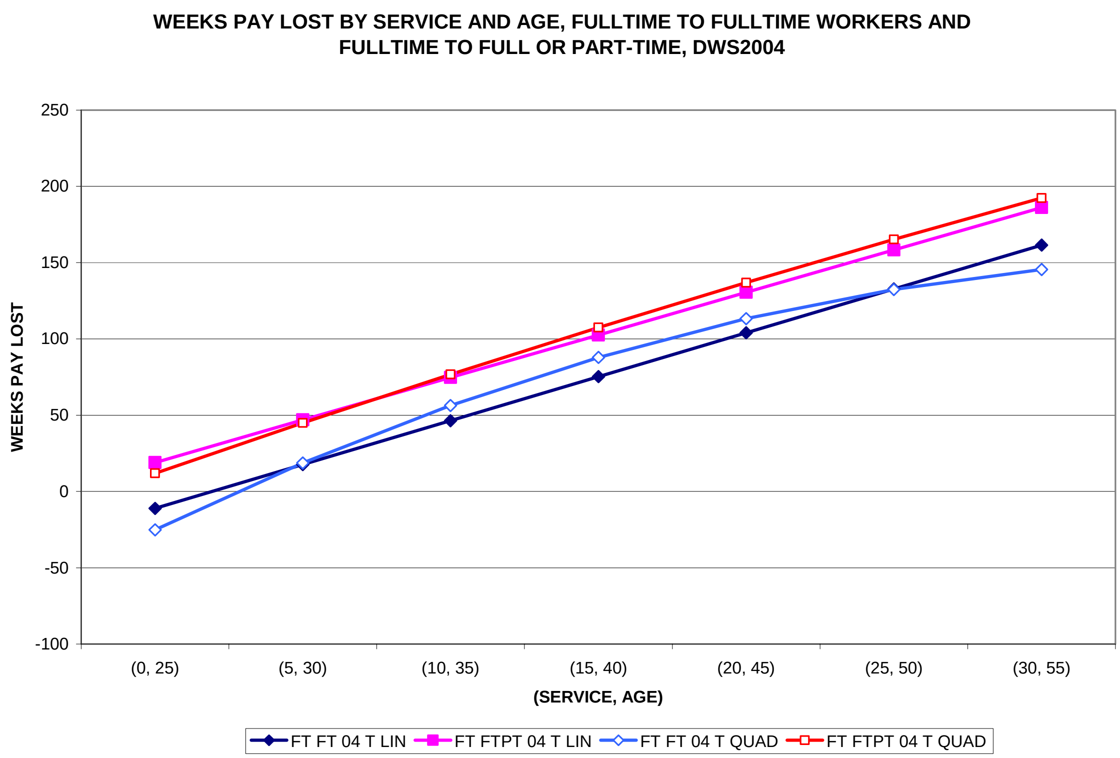
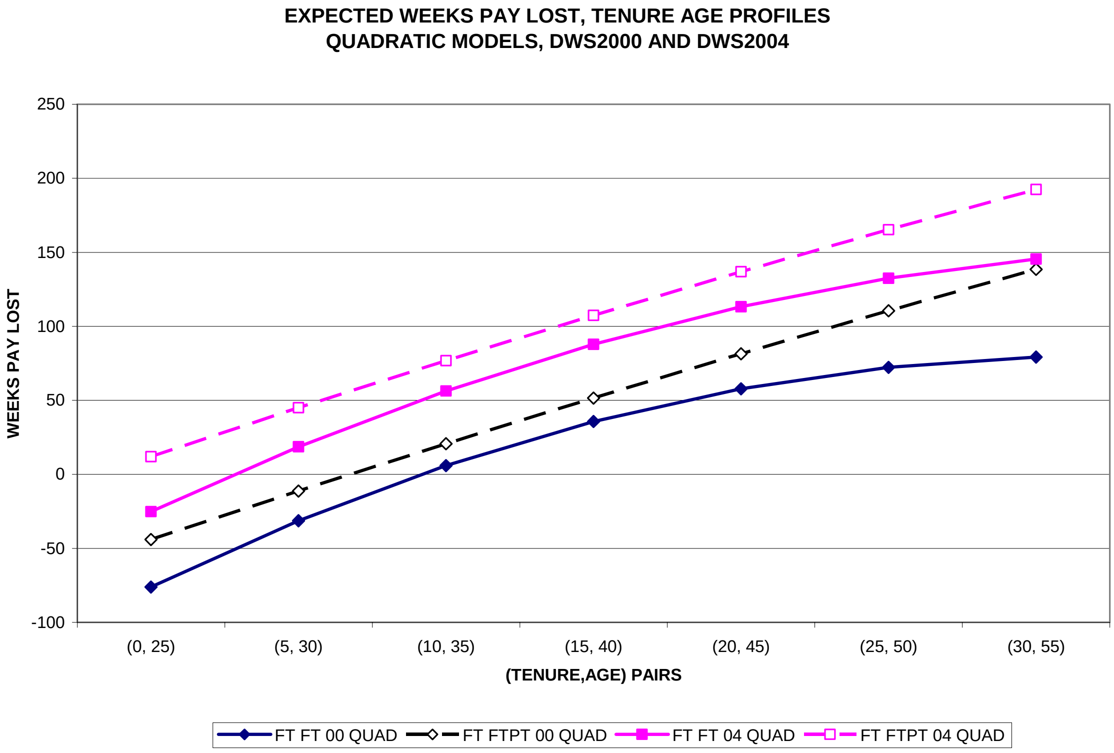


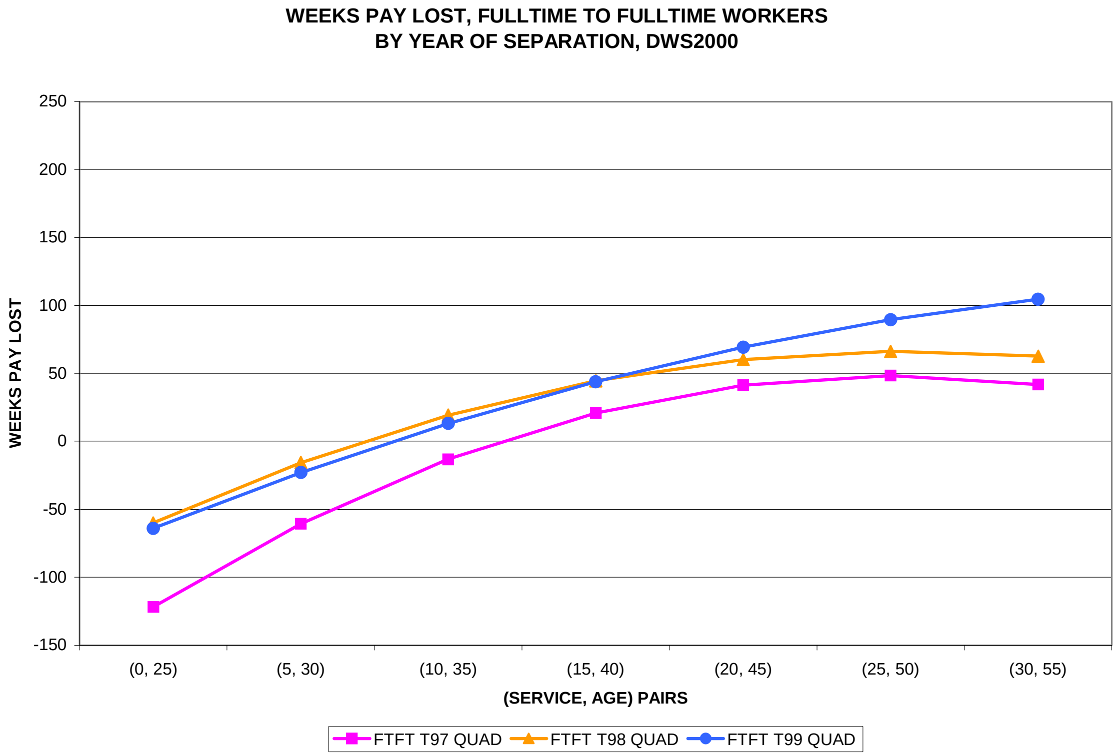
Figure 8



EXPECTED WEEKS PAY LOST, TENURE AGE PROFILES
QUADRATIC MODELS, DWS2000 AND DWS2004
WEEKS PAY LOST
250
200
150
100
50
0
-50
-100
(0, 25)
(5, 30)
(10, 35)
(15, 40)
(20, 45)
(25, 50)
(30, 55)
(TENURE,AGE) PAIRS
FT FT 00 QUAD
FT FTPT 00 QUAD
FT FT 04 QUAD
FT FTPT 04 QUAD

Figure 9

Panel A: DWS2000, By Year of Separation, FT to FT



Panel B DWS2004, By Year of Separation, FT to FT

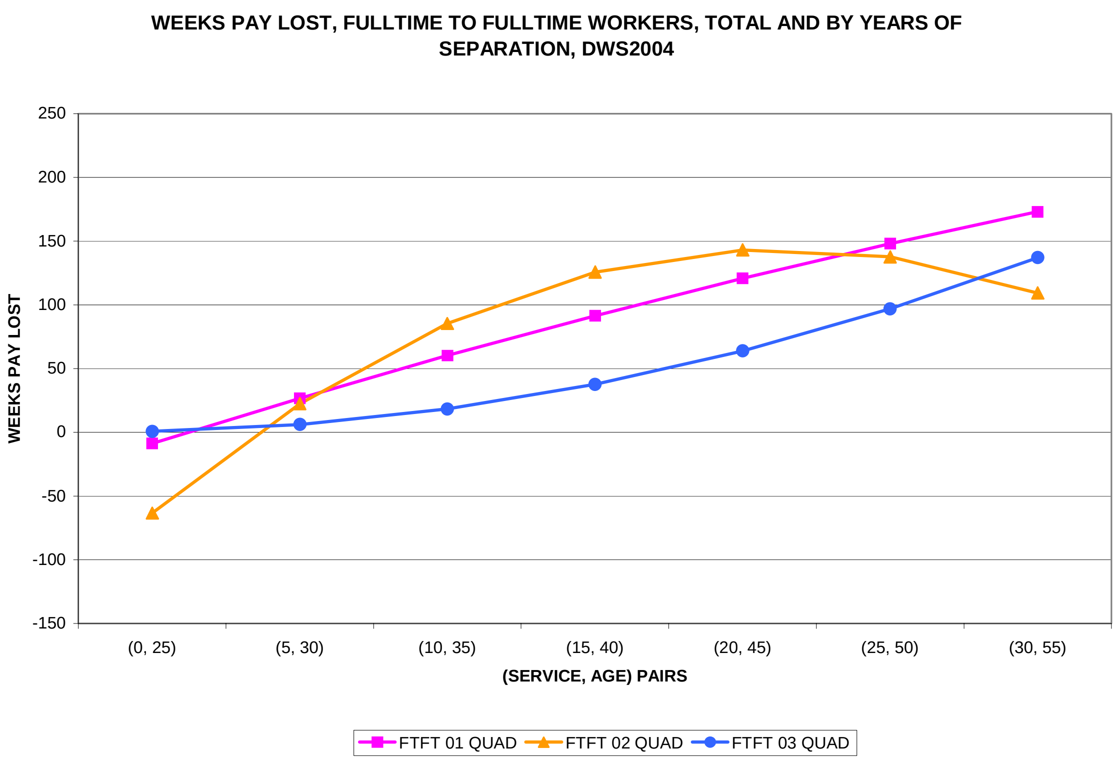


Figure 10
Average Weeks of Pay Lost, Fulltime To Fulltime And To Fulltime Or Part-time, By Occupation, DWS2000 And DWS2004

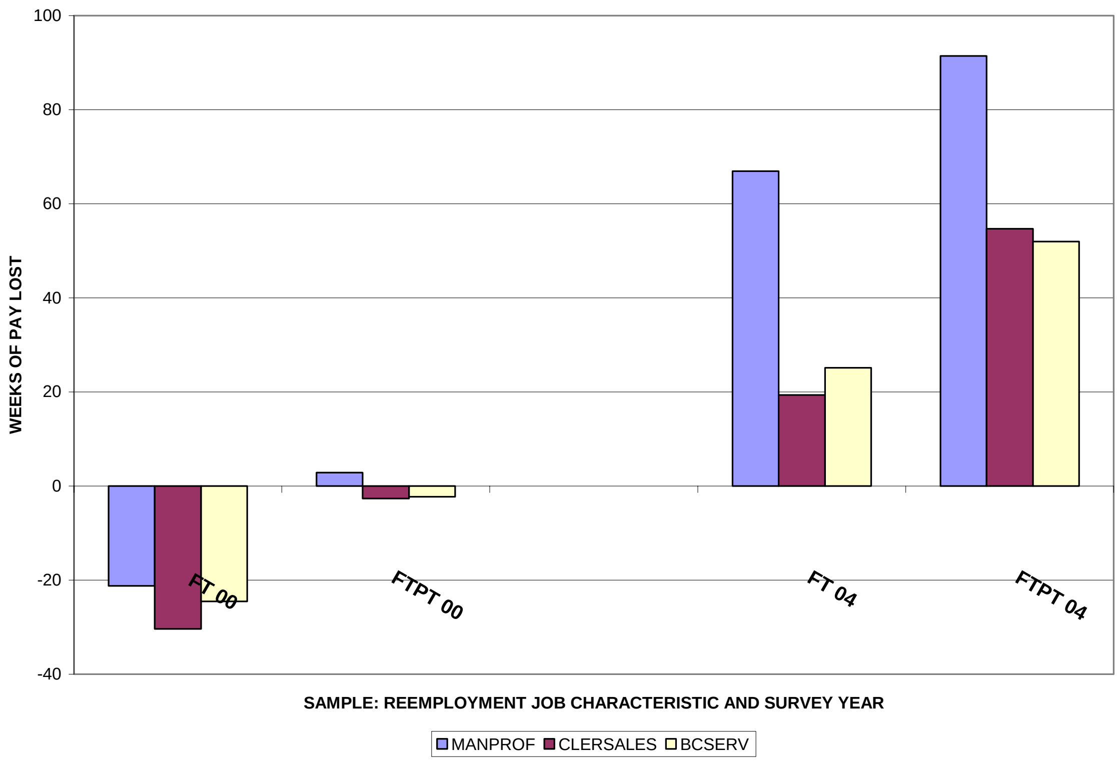
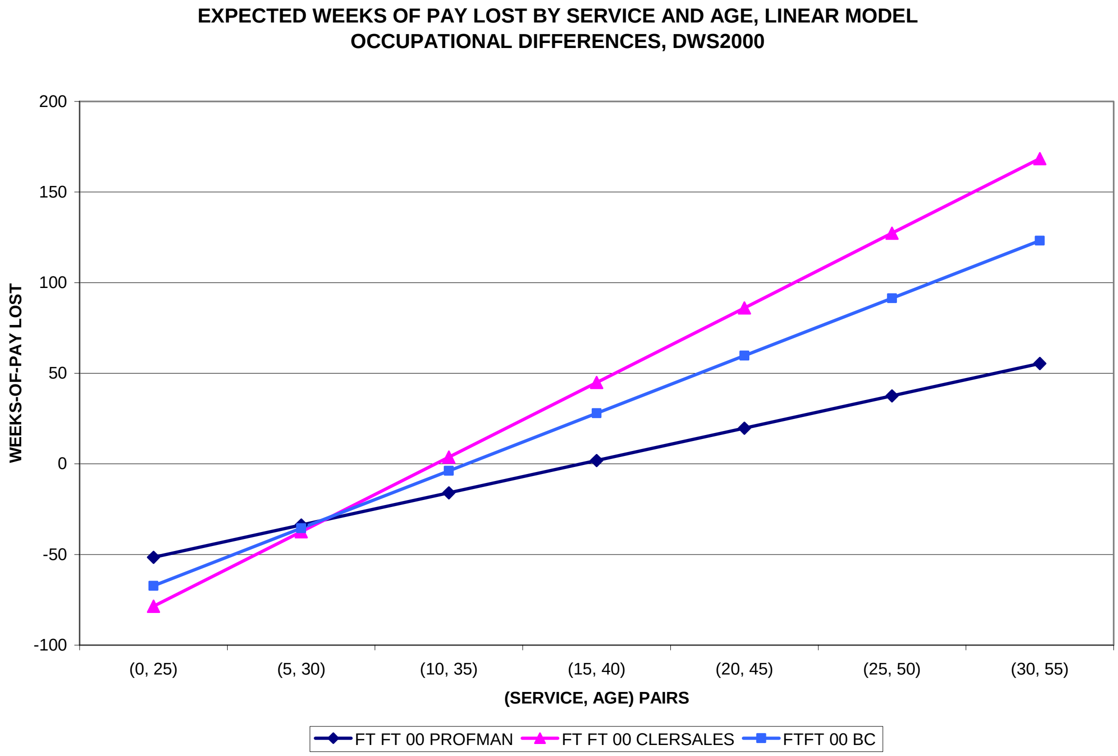


Figure 11
Service/Age Profiles of Expected Weeks Pay Lost among FT to FT Workers, DWS2000
Panel A: The Linear Model



Panel B: The Quadratic Model

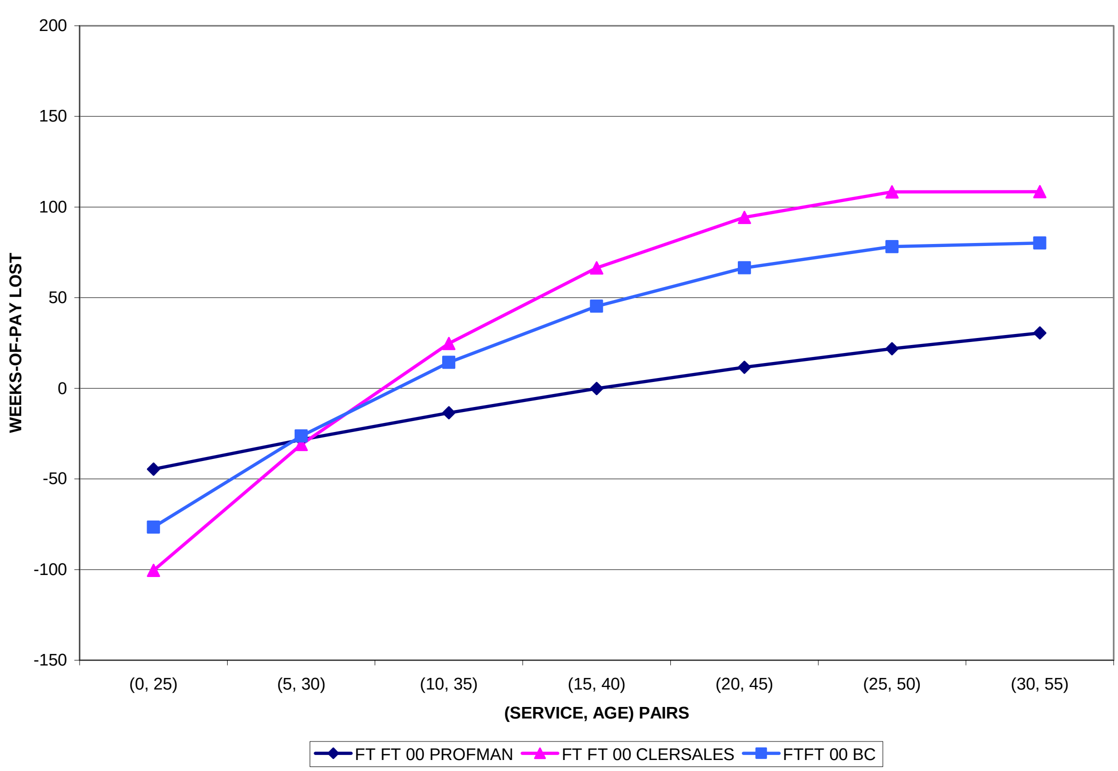
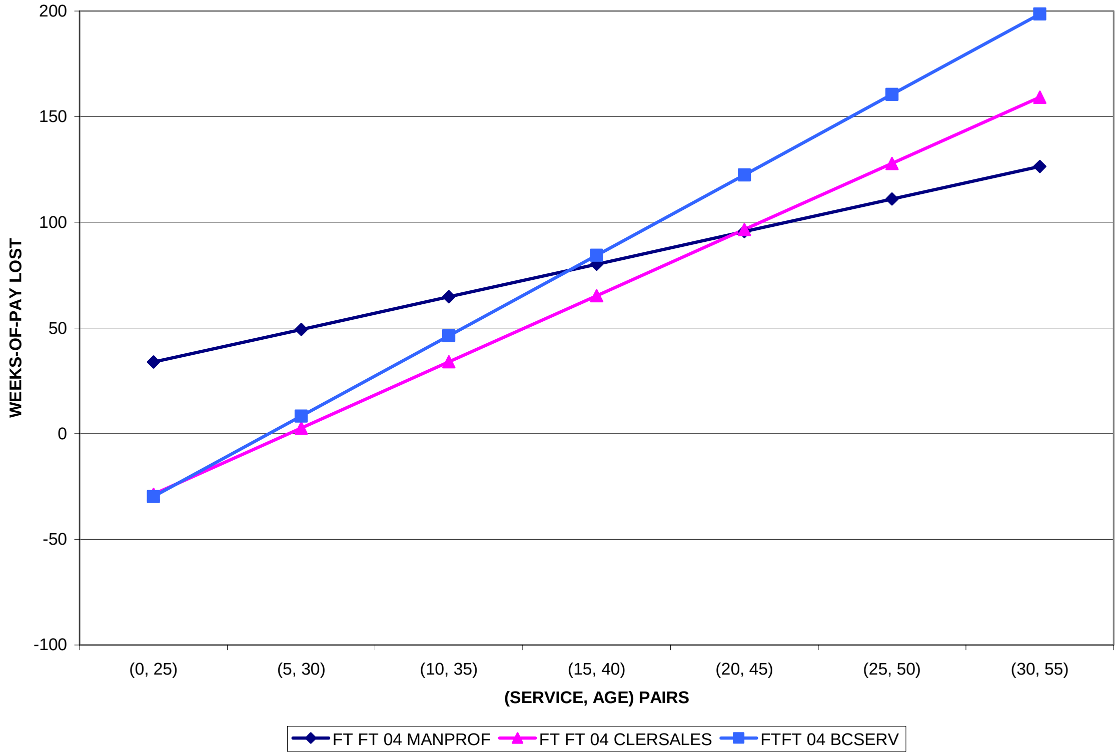


Figure 12
Service/Age Profiles of Expected Weeks Pay Lost among FT to FT Workers, DWS2004
Panel A: Linear Model



Panel B: Quadratic Model

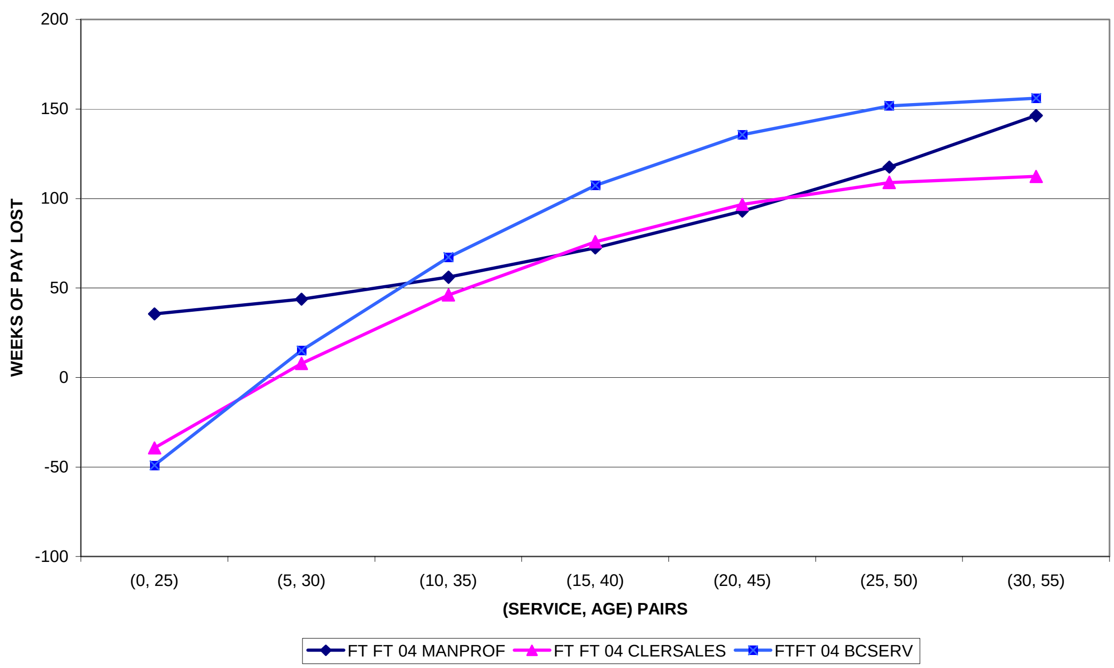


Figure 13

AVERAGE WEEKS OF PAY LOST, FULLTIME TO FULLTIME AND TO FULLTIME OR PARTTIME, BY UNION STATUS, DWS2000 AND DWS2004

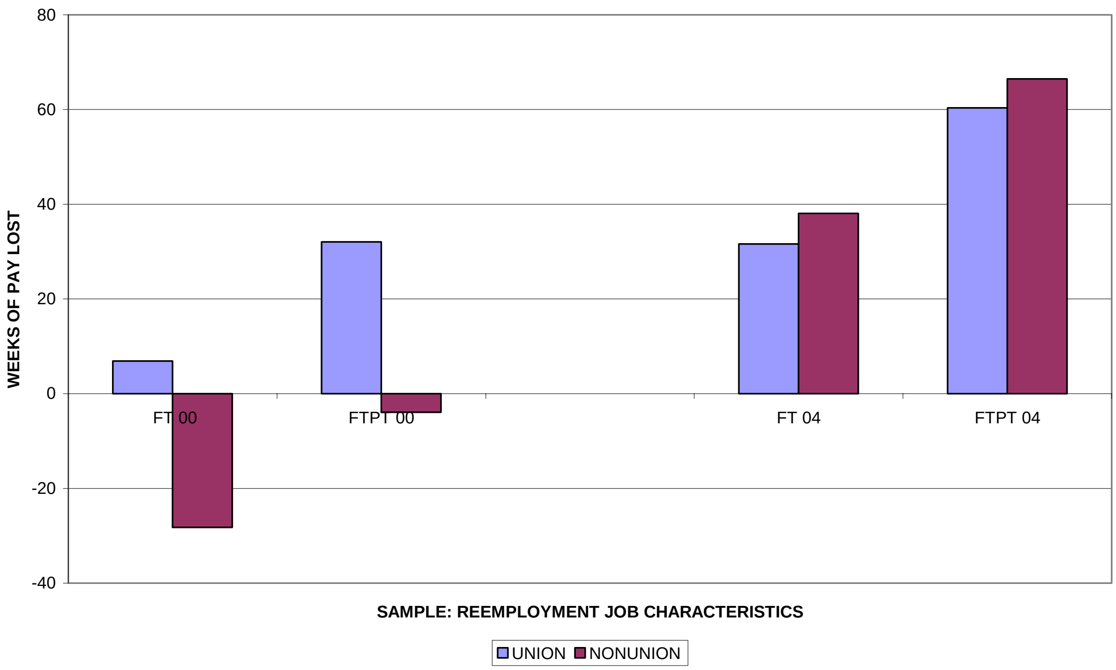
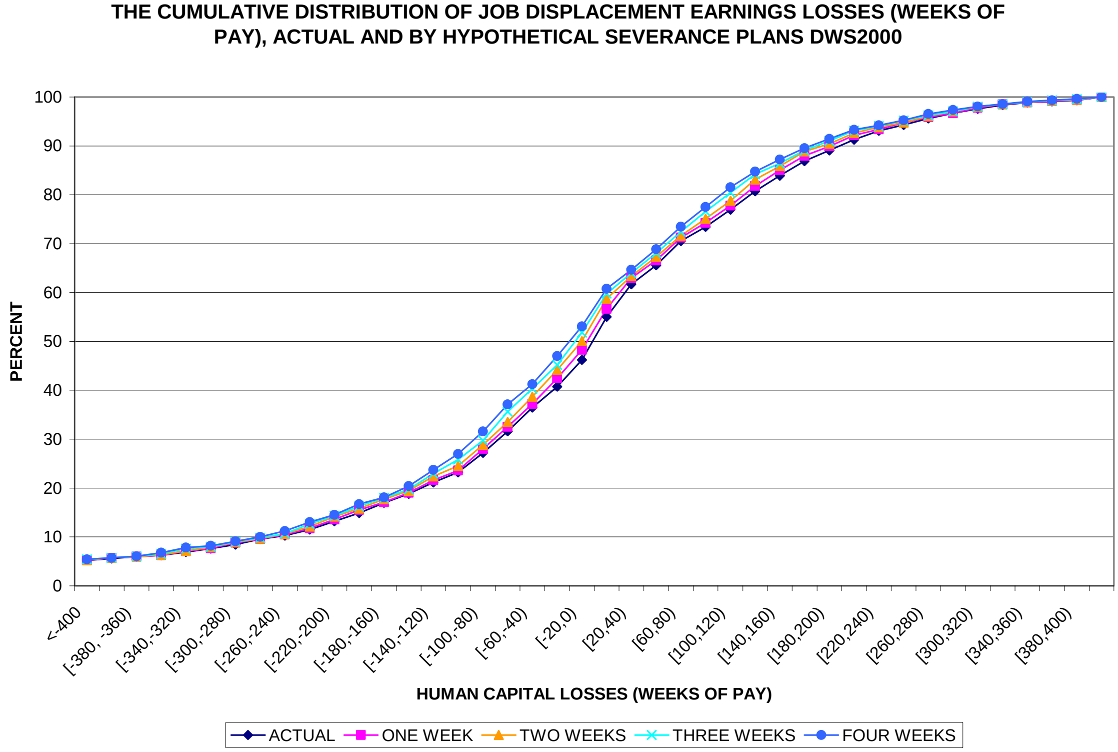


Figure 14: Cumulative Distribution of Job Displacement Losses (Weeks Pay)
Actual and By Hypothetical Severance Policies of Varying Generosity, DWS 2000
Panel A: All Workers



Panel B: Workers with Ten or More Years of Tenure