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Ann Huff Stevens

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ABSTRACT

This paper uses data from the Health and Retirement Study to examine the employment and retirement behavior of men aged fifty and above who have experienced an involuntary job loss. Hazard models for returning to work and for exiting post-displacement employment are estimated and used to examine work patterns for ten years following a job loss. The findings show that a job loss results in large and lasting effects on future employment probabilities, and that these effects vary with the age of the worker. Displaced workers in their fifties are estimated to have a three in four chance of returning to work within two years after a job loss, whereas for a 62-year-old job loser, the probability is less than a third. Once re-employed, men 50 and above face significantly higher probabilities of exiting the workforce than do workers who have not experienced a recent job loss; however, the direction of this effect gradually reverses over time. The net outcome of these entry and exit rates is a substantial gap between the employment rates of men who have and have not lost jobs, that lasts at least seven years.

Sewin Chan
Department of Economics
Rutgers University
75 Hamilton Street
New Brunswick, NJ 08901
sewin@rci.rutgers.edu

Ann Huff Stevens
Department of Economics
Box 208269
Yale University
New Haven, CT 06520
and NBER
ann.stevens@yale.edu

I. Introduction

The frequency of job loss among workers over the age of fifty has risen disproportionately in recent years.[1] The economic impact for these workers is potentially quite severe as older workers typically have high pre-displacement job tenure and are much less likely than younger workers to be re-employed.[2] However, despite these reasons for heightened concern, relatively little is known about the employment and retirement consequences of a late career job loss among recent cohorts of workers. Analyses of retirement behavior generally ignore the incidence and effects of involuntary job loss on the retirement decision, and studies of the effects of job loss often eliminate workers nearing retirement ages to avoid difficulties with disentangling the effects of displacement from retirement behavior.[3] This paper addresses these omissions and focuses on the employment and retirement patterns of workers who experience involuntary job separations late in their careers.

Specifically, we explore the effects of job loss due to plant closings or layoffs on the employment probabilities of men over the age of fifty using monthly labor market histories constructed from the Health and Retirement Study (HRS). We analyze the

[1] Farber (1996) shows that the three-year probability of job loss among workers 55 and over rose from 11 percent in 1981 to more than 16 percent in 1993. Between 1981 and 1993, workers 55 to 64 experienced the largest increase in job loss probabilities for any age group.

[2] The Congressional Budget Office (1993) find that workers aged 55 to 69 are more than twice as likely to be out of the labor force following a job loss than younger workers. Among workers over 60 years old, more than half have left the labor force following a job loss. One problem with such statistics, of course, is that many workers in that age range are withdrawing from the labor force in the absence of job losses. Our use of a control group of non-displaced workers helps to overcome this difficulty in interpreting post-displacement employment patterns.

[3] Even without explicit age restrictions, many studies eliminate workers who are out of the labor force for an entire year, which disproportionately eliminates older workers since they experience significantly longer periods of unemployment and non-employment.

probability and timing of returning to work as well as the durability of post-displacement employment, by estimating hazard models for both returning to work and for exiting employment. These transition rates are then used to describe employment patterns following an involuntary job loss. The effect of a job loss on long-term employment or retirement rates is *a priori* ambiguous. With their longer job tenure, displaced older workers may face substantial losses of firm-specific human capital or rents and the diminished earnings prospects may induce them to withdraw early from the labor force and accept a reduced level of consumption. Conversely, reductions in wealth and income that accompany job loss could increase years of work as households attempt to restore the value of their permanent income.

Our results show that a job loss at age fifty or above has substantial and long-lasting employment effects, and that these effects vary with the age at which job loss occurs. Displaced workers in their fifties are estimated to have a three quarter chance of returning to work within two years after a job loss, whereas for a 62-year-old job loser, the probability is less than a third. The post-displacement jobs, however, are often short-lived with displaced workers initially facing significantly increased probabilities of exiting employment. Thus, the fraction of displaced workers remaining employed is substantially less than the re-entry probabilities suggest: only 61 percent of displaced workers in their fifties are estimated to be still employed two years after a job loss. Over time, this previous displacement effect on exit rates declines and eventually becomes negative, with displaced workers who have been re-employed for six years or more being less likely to leave employment. As a result, the employment rates of men who lose jobs in their fifties

are estimated to eventually converge with those of non-displaced workers of the same age, as the latter retire at a rapid rate during their sixties.

A discussion of the expected effects of job loss on older workers should be closely related to recent dynamic models of retirement decisions which allow for uncertainty and continuous updating of expected returns to work and retirement. Prominent examples include Stock and Wise (1990a,b), who use an "option-value" approach: each period an individual decides to continue working or retire immediately depending on whether the expected lifetime utility from continuing work and retiring at some other later date is higher or lower than the expected utility of immediate retirement. Thus, individuals re-evaluate retirement decisions as additional information is revealed concerning future earnings and retirement benefits. Dynamic optimization approaches to retirement such as those by Rust and Phelan (1997), Berkovec and Stern (1991), Rust (1989) and Gustman and Steinmeier (1986) also have this key feature.[4]

What we know about the effects of job loss on workers (of all ages) suggests that displacement may result in significant changes in the expected future payoffs of continuing work with a new employer versus retiring. Probably the most widely studied effect of displacement on individual workers is that of reduced earnings. Jacobson, LaLaonde, and Sullivan (1993) find that a typical worker faces quarterly earnings reductions of up to 25 percent as much as six years after a job loss.[5] Furthermore, Stevens (1997) shows that displaced workers often face substantial employment instability, with repeated job losses

[4] See Lumsdaine, Stock and Wise (1992) for a discussion and comparison of structural approaches to the problem.

[5] Ruhm (1991), Stevens (1997), and Schoeni and Dardia (1997) also find persistent earnings reductions following job loss.

over the next several years. Thus, the job loss may produce a significant change in workers' forecasts of future earnings opportunities, even once they are re-employed. Focusing on older workers, Ruhm (1990) finds significant earnings reductions among those who leave career jobs for whatever reason, and Couch (1998) finds earnings reductions of 39 percent in the initial two years after a job loss among first wave respondents of the HRS.

Such effects on earnings and employment opportunities will affect the work-retirement decision by making retirement seem more advantageous than before the job loss. Other considerations particular to job loss and to older workers will compound this effect. Evidence of age discrimination or employer reluctance to hire workers nearing typical retirement age may intensify the search effort required and further worsen the trade-off between expected future earnings and retirement.[6] The job loss may also be symptomatic of worsening economic conditions in the region, and it may be particularly hard to find re-employment without relocation. If older workers are less mobile than younger workers this may be a particularly important consideration.[7] The availability of social insurance benefits at the time of job loss or at a future date also augments the attractiveness of retirement.

In addition to changing earnings opportunities, displacement may also affect the other side of the work-retirement trade-off -- availability of financial resources to be used

[6] Discrimination may occur due to the perceived higher cost of employing older workers. For example, Scott et al. (1995) find that the probability that a new hire was aged 55-64 was significantly lower in firms with health care plans than in those without, and was also significantly lower in firms with relatively costly plans than in those with less costly plans.

[7] Howland and Peterson (1988) find that even when displaced in a growing local economy, most older poorly educated blue-collar workers with long tenure at their pre-layoff job, suffered disproportionately large financial losses. Similarly, Carrington (1993) shows the importance of local labor market conditions to post-displacement worker outcomes.

in retirement. If pensions, health insurance, or other employer-provided benefits are lost or diminished with job loss, this could increase years of work as older individuals attempt to restore the value of their potential retirement income sources.[8] Similarly, long periods of job search following displacement may cause workers to draw down their asset holdings in the short-run and could potentially delay retirement.

For all of these reasons, we should expect job loss to affect the employment and retirement decisions of older workers. Empirical estimations of dynamic retirement models and analyses of retirement behavior in general, have usually ignored involuntary job losses by censoring or by implicitly treating them as voluntary exits from the labor force.[9] We begin to fill this gap by estimating reduced-form models of the overall effect of job loss on the employment patterns of older men; and thus, in implementation, our analysis is closest to the literature on post-displacement outcomes for older displaced workers, virtually all of which uses data from the 1970s and 1980s.[10] Given the changes in labor force participation and retirement rates that have occurred in the United States since the early 1970s, it is important to document more recent employment patterns. In taking a reduced-form approach, we view the literature on structural, dynamic retirement models as providing important guidance to the avenues through which displacement may affect employment and retirement.

[8] The latter effect has been emphasized by Scheiber (1992) who suggests that the option-value models of retirement be augmented to include "goal attainment": workers choose to retire only when the value of their retirement income (and leisure) meets a preconceived level needed to support an expected standard of living. Because job loss may impose substantial financial losses on the workers involved, late career job losers may need to work for longer than was previously planned.

[9] Analyses of retirement behavior have typically focused on the incentive effects of social security and private pension plans. Besides those already mentioned, examples include Samwick (1998), Ruhm (1996, 1995), Hausman and Wise (1985), and Burtless and Moffitt (1984).

An important difference between this study and some earlier investigations is that we focus on employment patterns, rather than self-reported retirement status. This is both because we can look at actual employment status over many months (but only observed self-reported retirement status at three points in time) and because actual employment over a long time period may be more informative about the worker's behavior and income prospects. We also improve on existing studies by allowing multiple transitions between employment and non-employment, instead of treating the first labor force withdrawal as permanent retirement,[11] and thus we provide a more complete picture of employment and retirement patterns following a late career job loss.

The remainder of this paper is organized as follows. Section II presents the data and section III describes the econometric strategy used to examine the employment and retirement prospects of older displaced workers. The results of the empirical analysis are examined in section IV and conclusions are given in section V.

[10] For example, Shapiro and Sandell (1987) and Diamond and Hausman (1984) find that older workers face long periods of unemployment and increased probabilities of retirement, using the National Longitudinal Survey of Older Men.

[11] Blau (1994) shows that older workers have more frequent transitions between labor force states than was previously known and Ruhm (1990) shows that one quarter of household heads re-enter the labor force after initially retiring. These multiple transitions may be particularly important for displaced older workers.

II. Data and samples

The data are drawn from three waves of the Health and Retirement Study (HRS), taken in 1992, 1994, and 1996.[12] The available employment information enables us to construct a continuous series of indicators, designating each individual as working or not working in each month, beginning in 1992. The initial survey also collects information on any pre-1992 job held for five years or longer, and we use this to contribute to our tracking of involuntary job separations prior to the survey period.[13] Information on the reason that jobs ended allow us to identify workers who have lost a job due to a "layoff" or because the "business closed"; these workers form our sample of displaced workers. We limit our attention to job losses that occurred from eight years prior to the first survey date up to the date of the third survey.[14] Additional information on various socioeconomic characteristics, including income and assets, pension eligibility, health and disability status, and retirement expectations is available for each of the survey dates.

A potential drawback of our constructed HRS work histories is that we do not have enough information to distinguish spells of unemployment from spells out of the labor force: we only know whether individuals were seeking employment at the three particular survey dates. Especially among our displaced sample, it is likely that individuals will move from unemployment and searching for work to out of the labor force or retired

[12] Some of the surveys were taken early in the following year; however, for simplicity, we will refer to the first year for each particular wave.
[13] Unfortunately, this history will be somewhat incomplete, since individuals are only asked about previous jobs held for at least five years. While it would be ideal to have information on all jobs held and lost, the loss of short-term jobs may be of less interest, since these losses may not reflect major wage or firm-specific capital losses.
[14] We did not want very early displacements to influence our results. The 1984 cutoff is somewhat arbitrary.

over the course of a non-employment spell. Peracchi and Welch (1994) note that unemployment status is among the strongest predictors of exiting the labor force, and question whether "the distinction between unemployment and being out of the labor force is meaningful for older workers." (p.230). Our analysis must necessarily combine these two states, and focus on the employment status of older workers. If the suggestion and findings of Peracchi and Welch are correct, this represents a minimal loss of information relative to the situation with a younger cohort of workers. Additionally, as noted above, because we can look at employment over a relatively long period of time, this may be more informative in terms of understanding the impact of displacement on workers' long-term labor force behavior.

Our analysis sample is restricted to men aged fifty or over at the time of the first wave survey month in 1992. Men must be in the survey as of the wave 1 interview and remain in the survey at least through the wave 2 interview.[15] Table 1 shows the age composition and the number of job losses that we observe at the end of the sample period. The overall sample contains 4973 men, each contributing an average of approximately 44 person-months to the sample, for a total of 217,435 person-month observations. As shown in Table 1, the sample is fairly evenly distributed across the age range we study, with 44 percent of the sample younger than age 60, and 40 percent between 60 and 65 by the end of the sample period. Of the 4973 men, 900 have at least one reported job loss sometime between 1984 and 1996, with 469 of these displacements occurring in 1990 or later. Just over 37 percent of displaced men report that at least one of the layoffs was due

[15]Sample attrition is relatively low: 90% of those eligible to give an interview in wave 2 did so. However, we note that some bias may occur due to selective attrition, for example, due to health status or mobility.

to a business closing. The age distributions of the displaced and non-displaced workers are not substantially different. As a summary of employment status, we show the probability that an individual is working at the end of the sample period, conditional on whether that individual has experienced a job loss sometime between 1984 and 1996. Among workers who have not experienced an involuntary job separation, 63 percent are working at the end of the sample period, whereas among workers who have lost jobs, just 55 percent are working at their last monthly observation. Interestingly, this gap in employment rates narrows with age.

Figure 1a shows the proportion of men re-entering employment in each month following an involuntary job loss. We can see immediately that relatively younger men are much more likely to re-enter. Similarly, Figure 1b shows the exit behavior of men who have been re-employed following a job loss. The horizontal axis can be interpreted as post-displacement experience. Initially, exit rates are similar for all ages, but eventually the older age groups exit faster, presumably because of higher retirement rates. The estimated hazard models that follow allow us to control more carefully for age and the time elapsed since the job loss. We will also examine the permanence of remaining out of work after an involuntary termination.

The lower panel of Table 1 points to some important differences between the displaced and non-displaced workers. There are large differences in non-pension wealth levels: the median value of non-housing assets at the end of our sample among the non-

displaced is $23,100, compared to $10,260 for displaced workers.[16] This appears to be a combination of displaced workers having fewer assets prior to any job loss and a negative effect on asset holdings of the job loss. Eligibility for any type of private pension is also slightly lower for the displaced workers, at only 70 percent, compared to 73 percent for the overall sample. Displaced workers have somewhat lower levels of education than workers not losing jobs.

III. Econometric Strategy

We estimate a series of reduced-form hazard models, similar to recent applications by Peracchi and Welch (1994) and Blau (1994). The estimated hazards will allow us to summarize the effects of an involuntary job loss on employment over the next several years, controlling for the age at displacement and the time elapsed since the job loss, along with other worker characteristics.

We begin with a hazard model for returning to work following a job loss, which will provide estimates of the average time spent out of work following a job loss at different ages. We model the hazards for returning to work using a discrete time model similar to that used by Nickell (1979) and Ham and Rea (1987) to study the duration of unemployment spells. The probability h^n of making a transition from non-work to work in

[16]The HRS allows "bracket" responses to the asset questions whereby respondents who did not reply with a dollar amount were asked if they had assets within certain dollar ranges. Many respondents responded in this manner, and our asset numbers were calculated based on the minimum of each range. Respondents who said they owned a certain type of asset or debt, but did not give a dollar amount or a bracket response are not reported in Table 1.

each month, given that the individual is still not-working, is represented with a standard probit functional form (Φ is the standard cumulative normal distribution):

(1) $h_{it}^{n} = \Phi(y_{it})$ where $y_{it} = f^{n}(age_{it}, X_{it}, months\text{-}not\text{-}working_{it}, prior\text{-}job\text{-}loss_{it})$

This hazard gives the probability that individual *i* returns to work in month *t*, conditional on *age*, months since the individual last worked and whether the individual has lost a job in the recent past. Additional controls *X* for human capital and demographic characteristics, as well as calendar years, are included. Interactions between *age*, *X*, *months-not-working* and *prior-job-loss* are included in the f^{n} function.

While we have chosen to model the monthly hazard using a probit functional form, alternative specifications such as a variant of the common proportional hazard model are also possible. Given sufficient flexibility in the age and time profiles of the hazard, the specific functional form is unlikely to affect our results. Using the discrete-time version allows for a straightforward interpretation of monthly transition probabilities in terms of the underlying latent variable *y*, defined so that a transition from not-working to working occurs if *y* is greater than zero, and no transition occurs otherwise.

The hazard is estimated on the entire sample at risk for re-entry, that is, all men in our sample who are not working in a given month.[17] Therefore, the coefficients for variables involving *prior-job-loss* will show the probabilities of returning to work relative to those who have left jobs for some other reason. We also control for health and disability status, factors that may also lead to relatively early withdrawal from work, but may be quite distinct from "voluntary" behavior.

While the rates of returning to employment are informative, a question that immediately arises concerns the persistence of employment for these older workers losing jobs. Given the evidence that many displaced workers go through a period of job-shopping and adjustment following re-employment, there may also be an effect of a recent job loss on older workers' probabilities of remaining employed. Estimating a second hazard h^w for the probability of going from working to not-working will allow us to ask whether older displaced workers leave their jobs at a differential rate from other workers of the same age who have not experienced a job loss. If post-displacement jobs are marginal or offer poor match quality, we will expect older workers to leave their post-displacement employment at a higher rate.

We thus estimate a second hazard of the form:

(2) $h_{it}^{w} = \Phi(z_{it})$ where $z_{it} = f^{w}(age_{it}, X_{it}, prior\text{-}job\text{-}loss_{it})$

This gives the probability of making a work to non-work transition, given the individual is still working, conditional on *age*, other control variables *X*, and *prior-job-loss* status. Again, the function f^{w} specification includes interactions between the component terms, and *z* can be interpreted an underlying latent variable that takes a value greater than zero if a transition from working to not-working occurs.

By assuming specific linear functional forms for f^{n} and f^{w}, we can write the latent variables as:

(3) $y_{it} = b_1^n(age_{it}) + b_2^n(X_{it}) + b_3^n(months\text{-}not\text{-}working_{it}) + b_4^n\ prior\text{-}job\text{-}loss_{it}$

$+ b_5^n(prior\text{-}job\text{-}loss_{it}, age_{it}) + b_6^n(prior\text{-}job\text{-}loss_{it}, months\text{-}not\text{-}working_{it})$

[17] This is somewhat different than some previous work on displaced workers, such as that by Diamond and Hausman (1984) in that it includes individuals who are not working for reasons other than an

$$+ \; b_7^n \; (\textit{prior-job-loss}_{it}, X_{it}) \; + \; e_{it}^n$$

(4) $$z_{it} = b_1^w (age_{it}) + b_2^w (X_{it}) + b_4^w \; \textit{prior-job-loss}_{it}$$

$$+ \; b_5^w \; (\textit{prior-job-loss}_{it}, age_{it}) + b_6^w \; (\textit{prior-job-loss}_{it}, \textit{months-working}_{it})$$

$$+ \; b_7^w \; (\textit{prior-job-loss}_{it}, X_{it}) + e_{it}^w$$

where the b (.) 's represent linear combinations of coefficients and variables. Equations (3) and (4) are estimated as random effects probit models where the error terms e^n and e^w follow the normal distribution. Random effects are included in the specification to account for the repeated observations of individuals across many months.

One of our primary concerns in specifying the hazard functions is to allow flexibility in the age patterns. We interpret these age patterns as capturing both a pure age effect, and the incentive effects of social security, pension and Medicare eligibility. For both the exit and entry hazards, we use a series of dummy variables in age to obtain $b_1^n (age_{it})$ and $b_1^w (age_{it})$. We also include other socio-economic variables such as race, marital status and education in $b_2^n (X_{it})$ and $b_2^w (X_{it})$. For the entry or return-to-work hazard, we include a polynomial for the length of time since the individual last worked, $b_3^n (\textit{months-not-working}_{it})$. This captures the expected negative duration dependence in the probability of returning to work.[18]

The final variables included are those relating to recent job losses. We define the *prior-job-loss* variable as equal to one in the months following an involuntary job loss that

involuntary job loss.

[18] There are two potentially comparable variables that could be included in the exit specification: labor market experience or job tenure. We do not have information on total labor market experience of the workers in our sample. Job tenure is not included since it is determined by the pattern of recent job losses, our primary variable of interest.

occurred after 1984. In both the entry and exit hazards, this will capture the effect of a previous displacement on employment transitions. Additionally, we want to measure the length of time over which the effects of a job loss produce different transition rates from those of not displaced workers. A polynomial in the entry hazard representing time since the individual's last job loss is included (the interaction of *prior-job-loss* and *months-not-working*), allowing for the time pattern of returning to work for displaced workers to be differentiated from the time pattern for workers who are not working for other reasons. Similarly, in the exit hazard we include a variable for displaced workers that represents time back in the workforce following the job loss (the interaction of *prior-job-loss* with *months-working*).[19] This allows for the effects of a prior displacement on exit from a new job to fade as time elapses since the beginning of the first post-displacement employment. We also allow interactions with age and various demographic variables.

IV. Results

A. Entry and Exit Hazards

Tables 2 and 3 show the coefficients from random effects probit estimation of the hazards for entering and exiting work. In addition, Table 4 shows the implied effects of our covariates on monthly transition rates: the first row of Table 4 shows predicted monthly entry and exit probabilities for a worker with the indicated "benchmark" set of

[19] We start counting this variable when a displaced worker returns to work, to avoid confounding the time back at work with the length of the worker's just completed unemployment spell. It is also possible to include an indicator for the length of the prior unemployment spell for many of our displaced workers, as is reported below. For some workers who were displaced prior to the wave 1 survey, this information is not available.

characteristics, while subsequent rows in Table 4 show the change in these probabilities that results from a deviation from this baseline to the indicated characteristic.

The first column of Table 2 reports the hazard for returning to work. The age variables show that the probability of returning to work begins to decline somewhat after age 55 (the omitted category is for ages 50 through 54). After age 60, return probabilities decrease even more. Marital status and race have insignificant and very small effects, and as expected, those who report having poor health or a disability that affects their ability to work are significantly less likely to return to employment.[20] As shown in Table 4, having very poor health, rather than excellent health, reduces the monthly entry rate into employment by roughly 50 percent while having a disability reduces the entry rate by approximately one-third.

Calendar year effects on rates of entry back into jobs deserve some mention here. The year effects for 1995 and 1996 are large and negative, suggesting monthly re-entry rates that are approximately half those in the earlier years. This may be due to the incomplete early release data from wave 3 of the HRS which omits information on the start and end dates of "interim jobs"--those starting *and* ending between waves 2 and 3. For individuals who report holding such an interim job, we are forced to censor their series of monthly observations at the wave 2 interview date.[21] Fortunately, a relatively small number of individuals are affected: just five percent of our sample. However,

[20] The variable for poor health is equal to one if the respondent reports his physical health as excellent and equal to a maximum of five if he reports physical health as poor. Although self-reported health measures have been criticized as endogenous, Bound (1991) finds that self reports perform surprisingly well in a study comparing self-reported to more objective measures of health.

[21] Note that this does not apply to individuals who change jobs between the waves and remain at the new job through the time of the wave 3 survey. This is the case for the majority of job changers between the waves and for these individuals we have and use the complete job history through wave 3.

because the analysis focuses on transitions, the censoring may have large effects on the number of transitions we observe in the years between the second and third survey waves. Thus, the incomplete data on interim jobs in wave 3 means that we disproportionately eliminate those with multiple job transitions in 1995 and 1996. We believe this is driving the large calendar year effects for the final two years in our entry hazard estimation. Once more complete wave 3 data is released we can better address this problem.[22]

The variables for a prior job loss show that displaced workers in their fifties return to work with significantly higher probabilities in each month than do workers who have not experienced an involuntary job loss. This is not surprising since many of the non-displaced group may have voluntarily retired. In addition, the effect of displacement on return probabilities varies substantially with age, as evidenced by the set of interactions between the prior-displacement variable and age categories. While the relatively small sample sizes of displaced workers make this estimation somewhat imprecise, we present this specification to capture potential differences in the rate of returning to work after job loss by age.[23] The general pattern of these results suggests that the more rapid return to work by displaced workers (relative to those out of work for non-displacement reasons) is limited to displaced workers aged 61 and younger. The interaction terms for having a prior displacement and ages 62 and 65 are significantly negative and far below the estimated magnitudes at the other ages. We cannot reject the hypotheses that the

[22] We are somewhat reassured that this treatment of the wave 3 data is not affecting our other coefficient estimates, because we have also estimated these models using only the wave 1 and 2 data. Our findings are similar if we ignore the early release wave 3 data altogether and focus on the more complete information from waves 1 and 2.

[23] We have also experimented with interacting prior-job-loss and polynomials in age, along with separate dummies to allow spikes at ages 62, 64 and 65; these specifications produced a similar pattern to the specification used here. The interaction terms were never statistically significant at ages 61 and below, and so the series of dummies presented is our preferred specification of the age effects.

displacement effects at ages 62 through 65 are equal to zero (i.e., the test that prior-job-loss plus prior-job-loss*age is equal to zero). This effect is most striking at ages 62 and 65, which correspond to the social security benefit eligibility ages of 62 for reduced benefits and 65 for full benefits (private pension plans often have similar age-eligibility profiles). The faster re-entry of displaced workers *not* occurring at these ages suggests an important role for benefit eligibility rules for workers who have lost jobs and are deciding between continued job search and employment or retirement. Another potential explanation for this pattern may relate to the provision of health insurance by employers and, eventually, through Medicare from age 65. Madrian (1994) and Rust and Phelan (1997) note the important role of health insurance in the retirement decision. If displaced workers lack health insurance, they may be particularly influenced by their proximity to the Medicare eligibility age.[24] Finally, for men over the age of 65, the effect of a displacement on the

probability of returning to work is again positive and significant, as was the case for those in their fifties.

To better illustrate age patterns in the monthly transition rates, Figure 2a shows the monthly entry probabilities implied by these probit coefficients by age and displacement status for a married, white worker with high school education, in the given age category in 1992, with no reported disability and in excellent health. The probabilities for displaced workers are calculated assuming that a worker is in his 12th or 24th month of non-work after displacement. The figure shows that the entry probabilities of displaced

[24] Unfortunately missing data does not allow us to test directly for the impact of employer-provided health insurance.

and non-displaced workers are quite different at ages 50 to 61 and after age 66, but are similar from age 62 to 65.

The next set of variables in Table 2 are months-not-working interacted with the prior-job-loss indicator. This captures the rate at which the displacement effect changes with time (since the job loss) and allows for a different profile of return rates over time for the displaced and non-displaced workers.[25] The size of this effect is quite small relative to the main displacement variable and so there remains a substantial difference between the rates at which the two groups of workers return to work over many months. The return rates do converge eventually, but not until more than five years after the start of the non-work spell.

These entry probabilities can also be used to calculate the fraction of older displaced workers who return to work over several years. Figure 2b shows the cumulative probabilities that displaced and non-displaced men return to work over time. The graph is based on calculation of monthly entry rates for a "typical" worker (defined as for Figure 2a) who begins a non-work spell at age 55, 60 or 62. The cumulative rates assume that the return to work is permanent (this strong assumption is relaxed below). For a worker who loses his job at age 55, the probability of returning to work within a year is 59 percent, and within two years it is 74 percent. For a worker who leaves work at age 55 for reasons other than a job loss, the comparable figures are 40 and 51 percent after one and two years. The pattern of cumulative entry probabilities for displaced and other non-working individuals is similar at age 60, but reverses starting at age 62. For those out of work at age 62, the job losers actually return at slightly lower rates than do other non-

workers. These differences are small and statistically insignificant but there is clearly no longer a positive effect of job loss relative to other reasons for being out of work on re-entry probabilities.

These return probabilities confirm the substantial flows across employment states by older men, noted previously by Blau (1994) and by Ruhm (1990). Ruhm, for example, notes that one-quarter of household heads return to the labor force after a self-reported retirement. Our rates, shown in Figure 2b, are even higher, because we include transitions from non-employment (including unemployment) back to employment. Additionally, our monthly transition rates will pick up more short-term fluctuations in employment status than the 2-year transition rates calculated by Ruhm. Generally, however, these high return probabilities are consistent with previous research on "reverse-retirement" and suggest that an important part of this phenomenon may be related to those who have involuntarily "retired."

We next turn to men who are employed, including displaced workers who have found new jobs. Table 3 shows results from estimation of the hazard for leaving employment. As in Table 2, the controls for age and demographic characteristics have the expected effects. The hazard has pronounced spikes at ages 62, 63 and 65. Table 4 shows that the baseline exit probability at ages 56 through 50 is just 0.66 percent per month. At ages 62, 63 and 65, however, this exit probability increases to more than 1.5 percent each month.

Our main coefficient of interest here is for the dummy for having a prior job loss and this shows that workers who have returned to work following a job loss have

[25] We have also allowed a higher order polynomial for these displacement*months-not-working variables

significantly higher exit probabilities during the next several years than comparable workers who have not lost jobs. The magnitude of this effect, however, varies substantially with both age and time elapsed since re-employment. As shown in the second column of Table 4, among men younger than 62, the main displacement effect of 0.25 suggests exit probabilities for displaced workers that are more than double those for non-displaced men of the same age. From age 62 to 65, the exit rates of displaced and non-displaced workers are closer together. In Table 4, results for the interaction effects between prior-job-loss and age reflect the difference in exit rates between a non-displaced worker of the specified age and a displaced worker of that age. At ages 62 and 65 displaced workers have exit rates that are not significantly different from workers who have not been displaced. For those experiencing a previous displacement, exits from employment are spread more evenly across the age profile, rather than having the sharp spikes at ages 62 and 65.

The effects of displacement on subsequent exit rates also vary with time elapsed since the return to work. The main effect of a prior job loss described by the coefficient of 0.25 is for the omitted category of being back at work for less than one year. This translates into an increase in the exit probability of more than one percent per month. In years two and three back at work, previously displaced workers have similarly elevated probabilities of exiting employment.[26] The overall effect of job loss (the main effect plus the time-back-at-work interaction) for workers in their fifties is positive and statistically

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and obtained nearly identical results.

[26] A chi-squared test for joint significance shows that the main effect plus the year two effect, and the main effect plus the year three effect are both statistically different from zero.

different from zero in years one through three, but is statistically insignificant after four or more years.

The combination of the main displacement effects and the interaction terms for age and for time-back-at-work suggests that the long-term effects of a prior job loss are quite different for workers in their fifties than for those in their sixties. For workers aged 61 or above who have been back at work for four or five years following a job loss, there is no statistically significant effect of the job loss on exit probabilities; however, six or more years after job loss there is a negative and statistically significant effect. That is, the sum of prior-job-loss, prior-job-loss*age 62, and prior-job-loss*back-at-work-more-than-60-months, is negative and statistically different from zero. One interpretation of this finding is that the long-run effect of displacement-induced earnings reductions and other changes is to delay retirement, or remain employed longer than similarly aged workers who have not lost a job in the recent past. Some caution is necessary in interpreting this result. While we observe workers for up to 14 years after a reported job loss, estimates of the job loss effect more than six years after the job loss are based entirely on men who report losing jobs prior to the wave 1 survey. This means that no pre-displacement control variables are available for these individuals and many of the controls for observable worker heterogeneity that we use below are weak or non-existent for this group. It is difficult, therefore, to examine the robustness of this specific result. Despite these caveats, however, it is possible that the long-term effect of job loss is to encourage workers to delay retirement, perhaps because of the shock to their earnings and wealth induced by the job loss. As mentioned in the introduction, if displacement results in a substantial loss of

earnings and wealth, theoretical models of retirement behavior suggest that retirement may be delayed.

To illustrate the effects of job loss for workers of different ages, Figure 3a shows typical monthly exit rates by age and displacement status, for the same reference group as the entry rates in Figure 2a. At age 55 the monthly exit rate from work for non-displaced workers is 0.5 percent, but jumps to 1.8 and 1.9 percent at ages 62 and 65. For displaced workers in their second year of post-displacement employment these exit rates are 1.3 percent at age 55 and more than 2 percent at ages 62 and 65. Previously displaced workers in their fifties leave employment at approximately twice the monthly rate of non-displaced workers of the same age and characteristics.

Cumulative exit probabilities by previous displacement status are shown in Figure 3b. These exit rates for displaced and non-displaced workers diverge over the first several years, reflecting the large positive effect of previous displacements on exit rates. For a worker starting post-displacement employment at age 55, there is a 42 percent chance of having left employment three years on, compared to just 21 percent for the non-displaced group. The comparison between displaced and non-displaced workers starting at age 60 is similar. At age 62, the effect of a prior displacement on exit probabilities becomes negative, and so the cumulative exit rates are lower for the displaced group than for those not losing jobs. These results emphasize the substantial effects of job loss on employment probabilities that occur after the initial period of search and re-employment.

These increased exit rates for re-employed displaced workers could come about either because these workers have subsequent job losses, or because they are voluntarily leaving the workforce. The two alternative causes may have different implications for

how we interpret the long-term effects of job loss on older workers. To see which of these effects is driving the estimated prior-job-loss coefficient, we have also estimated models for the voluntary exits only, where workers who face a subsequent displacement are treated as censored observations in the month of that job loss. This data restriction slightly reduces the positive effect of an earlier job loss on the exit rate. The main displacement effect on voluntary exits in the initial year of re-employment is no longer statistically different from zero, although there is a positive and significant effect in years two and three after returning to work. This change also implies stronger evidence of a negative job loss effect for older workers and for those re-employed for several years. When we look only at voluntary exit behavior, re-employed displaced workers in their 60s and those back at work for more than six years, are significantly less likely to exit employment than comparable non-displaced workers. This suggests that much of the positive effect of job loss on exit rates is the result of additional job losses, while the voluntary response on the part of displaced workers may take the form of a tendency to delay retirement.

B. Implied employment probabilities

While the entry and exit rates are themselves informative about the experiences of older workers after job loss, taken separately they do not provide a complete picture of the employment status of these workers over time. We next use the estimated hazard coefficients to calculate the monthly employment status of workers, letting age and time since the job loss increment over time. We generate a random draw from a normal

distribution for cohorts of 10,000 workers, each starting the period at age 55, 60 or 62.[27] In each month, the estimated coefficients and the random term determine whether a transition occurs from the work or non-work state. We perform this exercise four times for each age range, to characterize employment patterns for four different groups, defined by their work status in the initial month: working, not working (but not displaced), displaced, and re-employed following displacement. From the resulting employment paths we calculate the fraction of each group employed in each month over the next ten years.[28]

In addition to providing a means for summarizing the effects of both the entry and exit hazards, these implied employment patterns provide a useful basis for comparison between displaced and non-displaced workers. While we can estimate the fraction of displaced workers who are re-employed at various ages it is difficult to know what the relevant counterfactual comparison would be for their subsequent employment rates.[29] Since we want to know what the workers' employment rates would have been had the job loss not occurred, one possibility is to compare the fraction of displaced workers with an overall age-specific employment rate. If only 75 percent of the workers in a given age range are currently in the labor force, then perhaps we might expect only 75 percent of job losers to return to work. The problem with this comparison is that we would then be comparing workers who lost jobs, for example, at age 60, with a comparison group of workers, some of whom decided to retire at age 55. Workers who lost jobs at age 60 had

[27] As before, these "typical" workers are assumed to be married, not disabled, in excellent health, white, and high school graduates.

[28] These employment probabilities could also be calculated directly from the estimated coefficients alone, rather than using the simulation approach and random draws from the normal distribution. Because the employment probabilities in later months are functions of a large number of transition probabilities, our simulation method is used purely for its relative ease of calculation.

chosen to remain employed up to that point. Thus, a more appropriate comparison group would be other workers who were also employed at age 60. Of course, we still cannot correctly interpret the displaced and non-displaced patterns as effects of displacement if unobserved worker heterogeneity that is related to job loss probabilities is driving our estimated displacement coefficients. We investigate this issue below, but believe these results, which are summarized in Figure 4, provide a meaningful comparison of the expected employment rates of displaced and non-displaced workers.

Focusing first on the workers losing jobs at age 55: the fraction working in each month initially rises quickly but flattens out after approximately three years. One year after the job loss, 50 percent of displaced workers are working, compared with 95 percent of workers who have not lost jobs. After two years, these numbers are 61 and 91 percent respectively. It is interesting to compare this result with the simple cumulated entry probabilities shown in Figure 2: recall that 74 percent of displaced workers had returned to work for at least one month by two years after their displacement, yet only 61 percent are working in the 24th month after job loss. These results also highlight the long-term nature of the impact of displacement on employment rates. It takes at least seven years after a job loss for the employment rates of displaced and non-displaced workers to converge within ten percentage points of each other. Job loss among men in their fifties results in a lengthy period of substantially reduced employment probabilities.

Figure 4a also shows the simulated employment rates for workers who lose jobs, but are re-employed during the first month of the period simulated. This is done to isolate

[29] As noted above, this is a problem in interpreting some of the earlier literature on this topic. For example, Diamond and Hausman (1984) report the fraction of fired workers who are subsequently retired, but present no comparable results for similarly aged workers who have not been fired.

the secondary effect of displacement (on subsequent exit rates as well as re-entry rates) from the effects of displacement relating to searching for an initial post-displacement job. As suggested by the exit rates illustrated in Figure 3, the employment probabilities of re-employed displaced workers is initially below the non-displaced group, but eventually crosses over, reflecting the lower exit rates for displaced workers in their sixties who have been re-employed for several years. We interpret this as some evidence for a negative wealth or income effect that induces the worker to remain employed for longer than he would have in the absence of a job loss.

The monthly employment probabilities at age 60 (Figure 4b) have a similar pattern to the results at age 55. The main difference is that the fraction of those working at age 60 who are still working in each subsequent month declines more rapidly, as this cohort moves through ages of much higher retirement probabilities. The displaced workers, however, return to work more slowly and so there remains a significant gap in the employment rates of the two groups.

The final panel of Figure 4 conducts the same exercise for men starting the period at age 62. Here, the gap in employment rates between those who have lost jobs and those who have not, remains over the entire time period, reflecting the very low probabilities of returning to work after losing a job at age 62 or later. Among men who lose jobs at this age, two results stand out. First, there is a striking similarity between the re-entry and exit rates of these displaced workers and all other non-employed men of that age, leading to the similar profile of employment rates. Second, however, when we compare displaced workers to those who are working at age 62 and do not experience an involuntary separation, there are very large and persistent effects of job loss on employment patterns.

Given the sizable employment rate differentials between displaced and non-displaced older workers, it is natural to ask to what extent these workers view their non-employment as "retirement." Much previous research in this area has focused not on the employment/non-employment distinction, but rather on self-reported retirement status. Table 5 shows the fraction of workers reporting themselves to be "working", "retired", and "unemployed" at each survey date, by whether they had a displacement over the previous several years.[30] This table suggests that many displaced workers, including those who lost jobs several years earlier and have had extended periods of not working, do not view themselves as retired, but rather as unemployed. The fraction of men who are working is substantially reduced for those within two years of a job loss, although this fraction is similar for those with no job loss and those three to four years after a job loss. These simple tabulations are roughly consistent with the patterns shown in Figure 4 in which employment probabilities converge slowly over time depending upon the age of the workers at displacement. Note, however, that where there is a difference in employment probabilities between displaced and non-displaced workers, it does not appear to coincide with high "retirement" rates among the displaced. Instead, many displaced workers continue to report themselves as unemployed for several years after the job loss. The apparent divergence here between long-term non-employment and reported retirement status suggests that it may be important to consider alternative measures of employment status for older workers, rather than simply employed and retired.

[30] The responses to this question were not forced to be mutually exclusive, although the vast majority of individuals responded with only one of the options. Other possible responses include disabled or on temporary layoff or sick leave.

C. Controls for observable worker heterogeneity

Our results so far suggest that workers who have lost jobs in the later portion of their careers may have substantially different employment and retirement patterns throughout their fifties and sixties. One concern with such results, however, is whether they can be correctly interpreted as the result of displacement, or whether they instead reflect worker heterogeneity that is correlated with job loss probabilities. Previous research focusing on the wage and earnings effects of job loss has relied upon fixed-effects models to control for individual-specific worker differences in abilities or preferences that might bias estimated costs of job loss. In the current framework, such a straightforward method of controlling for heterogeneity is not available. As an alternative, and to check the robustness of the estimates presented above, we next control for a variety of observable worker characteristics, and examine whether these controls alter our estimated displacement effects.

First, concern about the job loss effects reflecting negative worker characteristics that make them targets for displacement and poor labor market attachment is most applicable to those losing jobs through layoffs, as opposed to plant closings. In the second columns of Tables 2 and 3 we present additional specifications of the entry and exit hazards that distinguish between workers displaced through layoffs and through plant closings. The interaction between the job loss variable and an indicator for whether the job lost was due to a plant closing is never close to statistical significance, and particularly in the exit hazard, produces a very small point estimate. We thus have similar estimated magnitudes for the effects of layoffs and plant closings. If the effects of plant closings are

less susceptible to bias from selection than are the effects of layoffs, this may suggest that the estimates above capture the intended effects well.

We have also included in the additional hazard specifications a variable capturing individuals' previous history of layoffs. It seems likely that individuals who have had frequent layoffs throughout their careers, or who work in industries in which layoffs are common might have systematically different employment and retirement behavior from workers with more stable job histories. At the first wave of the survey workers were asked to give the total number of times they had been laid off from jobs since they began working. This information is summarized in the variable labeled "number of other layoffs." As expected, workers with many previous layoffs are more likely to make transitions into and out of the work force, but including this variable does not change the estimated displacement effect. Based on this evidence it is unlikely that the tendency of displaced workers to remain out of the work force and perhaps retire early is actually capturing weak labor force attachment on the part of recently laid-off workers.

Another set of variables we have included in the hazards are summaries of workers' wealth and pension holdings. This could provide a potentially important control for heterogeneity in resource levels across displaced and non-displaced workers, particularly given the evidence from Table 1 that displaced workers tend to have significantly less wealth than the average worker, and are slightly less likely to have private pension coverage. To control for these wealth differences we include variables in the hazards for non-housing assets[31] and a dummy variable for whether the worker has private pension coverage from any source, including the spouse's employer and previous

[31] The inclusion of housing assets gives similar results.

employers. All of these variables have statistically significant effects on the exit and entry hazards, as shown in columns 2 of Tables 2 and 3. As expected, having more assets or private pension eligibility makes workers both less likely to return to work quickly and more likely to exit work. A worker with non-housing asset holdings one standard deviation above the mean is approximately 20 percent less likely to return to work in a given month than a comparable worker with the mean level of assets. The asset coefficients in the exit hazard suggest a slightly smaller impact on exit rates. The effect of assets on exits is positive (with more assets leading to faster exits) only through asset levels slightly higher than the mean. As assets increase above the mean level, the monthly exit rate gradually falls.

Inclusion of the pension and asset variables in these specifications might go beyond controlling for heterogeneity and actually pickup some of the effect of the job loss itself. If job loss is associated with reduced pension or other wealth, some of the displacement effect will be obscured by controlling for these variables in the hazard models.[32] The displacement effects, however, are unchanged when we include these controls, suggesting again, that at least *observable* worker heterogeneity is not influencing our estimates of the effects of a job loss on employment and retirement.

We have also experimented with including measures of workers' earnings histories in the exit and entry hazard. The wage measure used is taken from a worker's longest job prior to wave 1, in order to avoid using wages that might be affected by the job losses we

[32] We are able to investigate more directly whether displacement seems to be affecting pensions and asset holdings. We find little evidence that workers lose pension eligibility upon job loss as most workers report that they have maintained their eligibility for pensions after the job loss. It is not clear, however, whether the size of the pension payout is affected. For assets, in contrast, we find evidence that displacement produces substantial reductions in asset holdings.

are interested in. These prior wages are then adjusted for the worker's age and calendar year in which they were earned. Like many of the heterogeneity controls we try, however, including wages in the specifications does not alter the estimated effects of displacement. Our wage measures are also never close to statistical significance themselves.[33]

The final columns of Tables 2 and 3 include interactions of the pension and asset variables with the prior-job-loss variable. Given the importance of pension eligibility and asset holdings to the entry and exit hazards suggested by the estimates in column two of the tables, we were interested in whether such wealth measures are particularly important for displaced workers. These interaction terms are never statistically different from zero. In the exit hazard, the pension and prior-job-loss interaction is negative but statistically insignificant, and there is an increase in the displacement effect, perhaps suggestive of a selection effect. The vast majority of these pension-eligible displaced workers have pension eligibility that has carried over from a pre-displacement job or jobs. Those who return to the workforce (and so are in the exit hazard) despite the availability of private pension coverage are likely to have particularly strong labor force attachment.

Retirement expectations are another piece of information that can be used to control for worker heterogeneity or preferences over work and retirement. At the wave 1 survey workers were asked to give their expected time of retirement. For those men who lost jobs sometime after the first survey, this information provides a pre-displacement measure of their planned retirement behavior. We use a subsample consisting of workers not losing jobs and workers losing jobs some time after the initial survey, to re-estimate the entry and exit hazards with and without a variable indicating the worker's planned date

[33] A more complete wage history is available through HRS restricted files, based on social security

of retirement. The displacement effects for this smaller sample are somewhat larger than in the full sample, however, the inclusion of the retirement expectations variable does not substantially change these estimated displacement effects. As expected, having plans to retire earlier makes re-entry significantly less likely and exit significantly more likely, but does not affect our estimates of the impact of job loss on later employment patterns. If worker expectations concerning retirement reflect heterogeneity in labor force attachment, this exercise provides additional evidence that observed job losses among workers in this age range are uncorrelated with such heterogeneity.

One additional concern is whether there are omitted observable or unobservable factors that are correlated across non-work and work spells. The length of unemployment following a job loss could have an effect on subsequent exit rates perhaps through wages (a longer job search may be indicative of a better job match, or higher wages) or wealth (a lengthy job search may deplete assets to such an extent that workers end up working far longer), or there may be an individual-specific effect that induces correlation across spells. To investigate these possible linkages, we have added to the exit hazard, variables that capture the length of the previous unemployment spell. These variables had very small and insignificant effects, and did not change the significance and magnitude of our displacement results. We have also tried including a measure of wages in the post-displacement job relative to pre-displacement wages, in the exit hazard.[34] Again, the resulting coefficients were small and statistically insignificant. In this respect, our assumption of independence of transition rates across spells of work and non-work is not

earnings records. We do not currently have access to this restricted release data.

[34] Wages are not yet available for most of the jobs in the early release of the wave 3 data, and we had to restrict the sample for this estimation.

affecting our results. In future research we plan to examine whether these results are robust to allowing for correlation in transition rates for a given individual across spells of employment and non-employment.

In short, none of the available controls for observable worker characteristics significantly affect our estimated displacement coefficients. While these controls for observable worker characteristics are not a substitute for controlling for unobserved worker heterogeneity, the stability of our main coefficients of interest, those on the displacement variables, suggests that the estimated effects of job loss are quite robust.

V. Conclusions

Our findings point to large and lasting effects of late career job loss on future employment probabilities. Workers displaced in their fifties return to work at rates between three and six percent per month, with approximately three-quarters having returned to work within two years of displacement. However, the fraction re-employed declines substantially for workers who lose jobs in their sixties. For 60 year-old workers who lose jobs, only two thirds will be back at work within the next two years, and among those who lose jobs at age 62, less than a third will be back. Once re-employed, these workers face higher than average risks of leaving the new job, both due to additional displacements and "voluntary" or non-displacement exits. The combination of these effects on entry and exit probabilities results in a substantial and long-term gap between the employment rates of men who have and have not lost jobs. Employment rates of displaced and non-displaced men remain a minimum of 10 percentage points apart for at least seven years after a job loss.

The displacement effects we estimate here are robust to a number of alternative specifications. Controlling for a variety of observable characteristics that might affect labor force attachment and retirement preferences, including the type of layoff, the number of earlier layoffs, wealth holdings and pension eligibility, results in virtually no change in our estimated effects of job loss.

This paper contributes to our understanding of the effects of job loss on a growing segment of the population. Viewed in light of the literature on the timing of retirement, the results are consistent with displacement causing significant re-evaluation of work-retirement trade-offs. While some of the observed employment-rate reductions among displaced workers must reflect standard job search difficulties, there continue to be differences in observed employment transitions over many years, and following displaced workers' initial re-employment. Understanding the mechanisms through which displacement produces these long-term changes in employment patterns will shed light on both the effects of job loss and on the determinants of retirement timing more generally. In future research we plan to more directly estimate the impact of displacement after age fifty on some of these mechanisms, including future earnings expectations and asset holdings.

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Table 1: Summary Statistics by Displacement Status
(during the final month of observation for each individual)*

	Whole Sample		Displaced		Non-displaced	
	Number	% working	Number	% working	Number	% working
Age: 50-54	282	81.2	61	65.6	221	85.5
55-59	1907	75.3	374	64.7	1533	77.9
60	356	67.1	57	59.6	299	68.6
61	392	63.8	72	52.8	320	66.3
62	340	57.6	60	55.0	280	58.2
63	323	52.9	58	46.6	265	54.3
64	321	47.4	60	41.7	261	48.7
65	261	41.0	48	37.5	213	41.8
66+	791	33.2	110	30.9	681	33.6
Whole Sample	4973	61.2	900	54.6	4073	62.7

	Displaced	Non-displaced
Mean tenure of employed	4.1 years	17.0 years
Mean tenure at first observed displacement	9.3 years	
married	81.4%	85.8%
reporting “disability that affects work”	23.3%	25.7%
self reported health (1=excellent, 5=poor)	2.76	2.70
white	82.1%	82.7%
less than high school	31.1%	28.1%
high school graduate	34.9%	36.2%
some college	19.3%	17.4%
college graduate	19.0%	22.7%
Median non-housing assets	$10,260	$23,100
Median total assets	$50,050	$80,000
pension eligibility	70.1%	73.0%
displaced due to business closing	37.2%	

*Data from the Health and Retirement Study: men aged 50 or over in 1992.
“Displaced” refers to men who have suffered at least one involuntary job separation since 1984.

Table 2: Entry to Work Hazards*

intercept	-1.5528	(0.1079)	-1.5208	(0.1120)	-1.5147	(0.1164)
age: 55	-0.0191	(0.0772)	-0.0036	(0.0781)	-0.0011	(0.0783)
56 to 60	-0.0595	(0.0477)	-0.0415	(0.0484)	-0.0390	(0.0485)
61	-0.2094	(0.0800)	-0.1936	(0.0806)	-0.1910	(0.0809)
62	-0.2619	(0.0862)	-0.2279	(0.0870)	-0.2302	(0.0874)
63	-0.2887	(0.0920)	-0.2533	(0.0926)	-0.2529	(0.0928)
64	-0.3048	(0.1109)	-0.2726	(0.1114)	-0.2742	(0.1117)
65	-0.1453	(0.1045)	-0.1104	(0.1054)	-0.1109	(0.1054)
66	-0.3000	(0.0758)	-0.2640	(0.0765)	-0.2725	(0.0767)
1993	-0.0362	(0.0739)	-0.0343	(0.0750)	-0.0346	(0.0750)
1994	0.1070	(0.0717)	0.1190	(0.0727)	0.1164	(0.0728)
1995	-0.3882	(0.0816)	-0.3894	(0.0830)	-0.3892	(0.0830)
1996	-0.3972	(0.0914)	-0.3997	(0.0926)	-0.3953	(0.0925)
married	0.0186	(0.0452)	0.0582	(0.0462)	0.0655	(0.0466)
disability	-0.1675	(0.0480)	-0.1871	(0.0489)	-0.1919	(0.0493)
physical health	-0.0886	(0.0175)	-0.1043	(0.0177)	-0.1036	(0.0177)
white	0.0005	(0.0442)	0.0487	(0.0457)	0.0451	(0.0460)
high school graduate	0.0348	(0.0455)	0.0808	(0.0466)	0.0735	(0.0469)
some college	0.1747	(0.0510)	0.2550	(0.0523)	0.2522	(0.0526)
college graduate	0.0466	(0.0517)	0.1637	(0.0550)	0.1632	(0.0554)
months not working	-0.0320	(0.0037)	-0.0305	(0.0038)	-0.0301	(0.0038)
(months not working)^2	0.0004	(0.0001)	0.0004	(0.0001)	0.0004	(0.0001)
(months not working)^3	-1.60E-06	(3.72E-07)	-1.54E-06	(3.75E-07)	-1.53E-06	(3.76E-07)
(months not working)^4	1.80E-09	(4.82E-10)	1.75E-09	(4.87E-10)	1.74E-09	(4.88E-10)
prior job loss	0.2400	(0.0678)	0.2440	(0.0723)	0.1984	(0.0954)
prior job loss*age 62	-0.5101	(0.2154)	-0.5231	(0.2203)	-0.5019	(0.2197)
*age 63	-0.1239	(0.1721)	-0.0900	(0.1715)	-0.0744	(0.1721)
*age 64	-0.1043	(0.1887)	-0.0863	(0.1889)	-0.0706	(0.1899)
*age 65	-0.4463	(0.2446)	-0.4853	(0.2476)	-0.4749	(0.2477)
*age 66 +	0.1372	(0.1212)	0.1369	(0.1222)	0.1589	(0.1237)
*months not working	0.0072	(0.0057)	0.0065	(0.0057)	0.0067	(0.0058)
*(months not working)^2	-0.0002	(0.0001)	-0.0001	(0.0001)	-0.0002	(0.0001)
lost job in business closing			-0.0797	(0.0585)	-0.0720	(0.0589)
number of other layoffs			0.0098	(0.0027)	0.0097	(0.0027)
assets < 0			0.0627	(0.0686)	0.0183	(0.0944)
assets			-0.0017	(0.0005)	-0.0007	(0.0008)
(assets)^2			3.28E-06	(1.40E-06)	-7.01E-07	(3.02E-06)
(assets)^3			-2.30E-09	(1.26E-09)	2.90E-09	(3.82E-09)
(assets)^4			5.28E-13	(3.31E-13)	-1.45E-12	(1.46E-12)
pension eligible			-0.0883	(0.0392)	-0.1405	(0.0498)
prior layoff *assets < 0					0.1320	(0.1397)
*assets					-0.0015	(0.0011)
*(assets)^2					5.54E-06	(3.91E-06)
*(assets)^3					-6.71E-09	(4.50E-09)
*(assets)^4					2.40E-12	(1.59E-12)
*pension eligible					0.1355	(0.0790)

*Coefficients from probit discrete hazard model, standard errors in parentheses.

Table 3: Exit from Work Hazards*

intercept	-2.5035	(0.0548)	-2.6101	(0.0548)	-2.6255	(0.0553)
age: 55	0.0695	(0.0411)	0.0573	(0.0421)	0.0588	(0.0420)
56-60	0.0462	(0.0264)	0.0426	(0.0261)	0.0407	(0.0261)
61	0.1416	(0.0432)	0.1198	(0.0435)	0.1191	(0.0435)
62	0.4602	(0.0409)	0.4361	(0.0412)	0.4333	(0.0412)
63	0.4169	(0.0475)	0.3823	(0.0480)	0.3793	(0.0481)
64	0.2345	(0.0628)	0.1826	(0.0636)	0.1765	(0.0637)
65	0.4689	(0.0599)	0.4113	(0.0607)	0.4043	(0.0609)
66+	0.2993	(0.0444)	0.2120	(0.0441)	0.2023	(0.0443)
1993	-0.0696	(0.0394)	-0.0707	(0.0401)	-0.0678	(0.0401)
1994	-0.0314	(0.0392)	-0.0146	(0.0399)	-0.0095	(0.0399)
1995	-0.2634	(0.0427)	-0.2400	(0.0435)	-0.2349	(0.0435)
1996	-0.1317	(0.0449)	-0.1077	(0.0459)	-0.1018	(0.0459)
married	-0.1234	(0.0249)	-0.1170	(0.0242)	-0.1186	(0.0242)
disability	0.1395	(0.0278)	0.0839	(0.0275)	0.0856	(0.0274)
physical health	0.0537	(0.0098)	0.0568	(0.0097)	0.0573	(0.0097)
white	-0.0053	(0.0253)	0.0039	(0.0246)	0.0028	(0.0246)
high school graduate	0.0302	(0.0246)	0.0007	(0.0240)	0.0006	(0.0241)
some college	0.0228	(0.0281)	-0.0016	(0.0275)	-0.0060	(0.0276)
college graduate	-0.0166	(0.0276)	-0.0216	(0.0276)	-0.0257	(0.0277)
prior job loss	0.2557	(0.0537)	0.2372	(0.0552)	0.3376	(0.0637)
prior job loss*age 62	-0.2235	(0.1006)	-0.2394	(0.1005)	-0.2251	(0.1006)
*age 63	-0.2920	(0.1330)	-0.2952	(0.1341)	-0.3086	(0.1352)
*age 64	-0.0338	(0.1574)	-0.0080	(0.1585)	-0.0171	(0.1594)
*age 65	-0.2431	(0.1836)	-0.2430	(0.1830)	-0.2065	(0.1828)
*age 66+	-0.1129	(0.1050)	-0.1133	(0.1028)	-0.0662	(0.1024)
*12-23 months working	0.1190	(0.0738)	0.1089	(0.0732)	0.0981	(0.0725)
*24-35 months working	0.0665	(0.0817)	0.0500	(0.0811)	0.0300	(0.0808)
*36-47 months working	-0.1491	(0.0973)	-0.2100	(0.0991)	-0.2176	(0.0985)
*48-59 months working	-0.1068	(0.0982)	-0.1374	(0.0991)	-0.1610	(0.0989)
*60+ months working	-0.3085	(0.0724)	-0.3099	(0.0720)	-0.3462	(0.0719)
lost job in business closing			-0.0145	(0.0428)	-0.0250	(0.0429)
number of other layoffs			0.0059	(0.0018)	0.0058	(0.0018)
assets < 0			0.0397	(0.0444)	0.0590	(0.0518)
assets			0.0005	(0.0003)	0.0006	(0.0003)
$(assets)^2$			-2.51E-06	(8.47E-07)	-3.42E-06	(1.07E-06)
$(assets)^3$			2.39E-09	(8.45E-10)	3.57E-09	(1.17E-09)
$(assets)^4$			-6.43E-13	(2.54E-13)	-1.08E-12	(3.86E-13)
pension eligible			0.3192	(0.0186)	0.3559	(0.0206)
prior layoff *assets < 0					-0.0543	(0.1016)
*assets					-0.0001	(0.0006)
$*(assets)^2$					1.35E-06	(2.10E-06)
$*(assets)^3$					-1.55E-09	(1.98E-09)
$*(assets)^4$					5.58E-13	(5.63E-13)
*pension eligible					-0.2060	(0.0475)

*Coefficients from probit discrete hazard model, standard errors in parentheses.

Table 4: Effects of Covariates on Monthly Transition Rates

(Changes from a benchmark case to having the listed characteristic.
Basic benchmark case is working or not working for 12 months, 56-60 years old,
1992, married, not disabled, in excellent health, white, high school graduate.)

	Entry	Exit
Benchmark case with no prior job loss	0.02387	0.0066
Effect of change from benchmark case with no prior job loss to:		
age 55	0.0024	0.0004
age 61	-0.0073	0.0019
age 62	-0.0093	0.0122
age 63	-0.0103	0.0104
age 64	-0.0108	0.0042
age 65	-0.0044	0.0126
age 66+	-0.0107	0.0061
1993	-0.0020	-0.0011
1994	0.0067	-0.0005
1995	-0.0149	-0.0033
1996	-0.0151	-0.0020
unmarried	-0.0010	0.0025
disabled	-0.0080	0.0029
very poor physical health	-0.0141	0.0049
non-white	0.0000	0.0001
no high school	-0.0019	-0.0005
some college	0.0090	-0.0001
college graduate	0.0007	-0.0008
24 months out of work	-0.0107	
prior job loss	0.0230	0.0105
prior job loss*age 62[1]	-0.0061	0.0080
*age 63[1]	0.0076	0.0037
*age 64[1]	0.0084	0.0139
*age 65[1]	-0.0058	0.0069
*age 66+[1]	0.0244	0.0112
Benchmark case with prior job loss	0.0469	0.0167
Effect of change from benchmark case with prior job loss to:		
24 months not working	-0.0150	
24-35 months working		-0.0021
36-47 months working		-0.0084
48-59 months working		-0.0074
60+ months working		-0.0114

[1]Change from specified age and not displaced to specified age and displaced.

Table 5: Percent Working, Retired and Unemployed
by Displacement Status

	No job loss	Job loss 1-2 years ago	Job loss 3-4 years ago
Wave 1			
% working	71	43	69
% retired	22	18	14
% unemployed	1	34	7
Wave 2			
% working	62	51	56
% retired	30	24	27
% unemployed	1	15	7
Wave 3			
% working	56	49	56
% retired	40	32	34
% unemployed	1	11	5

Figure 1a: Re-employment Following Displacement*

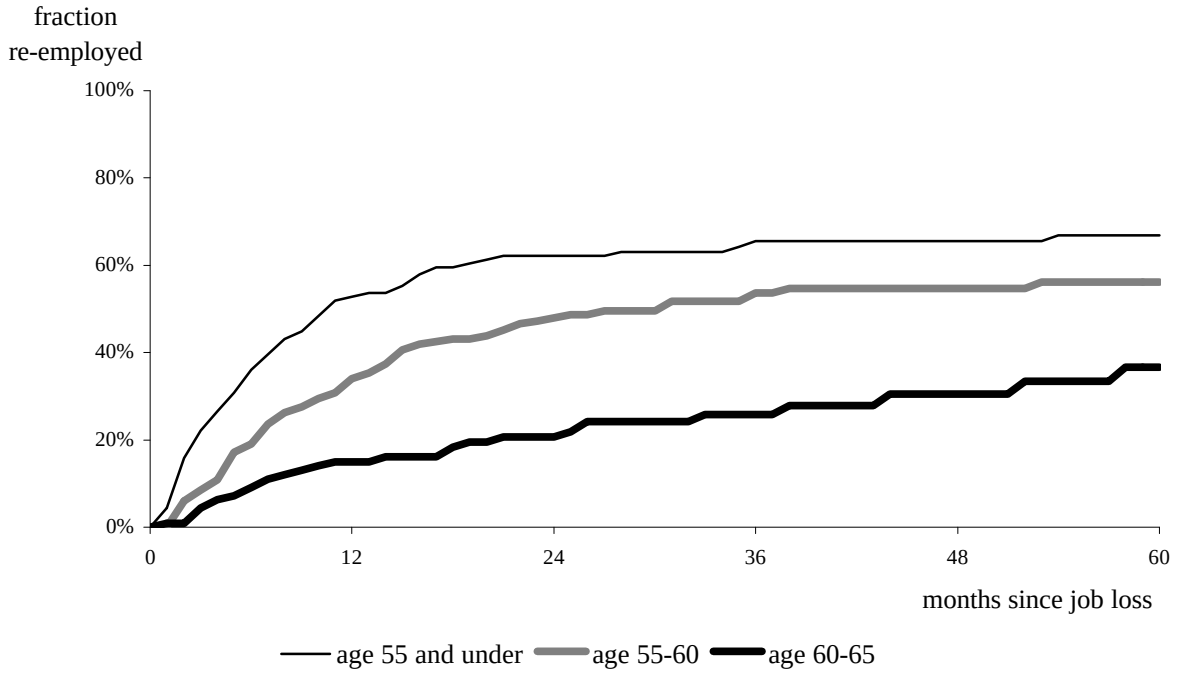
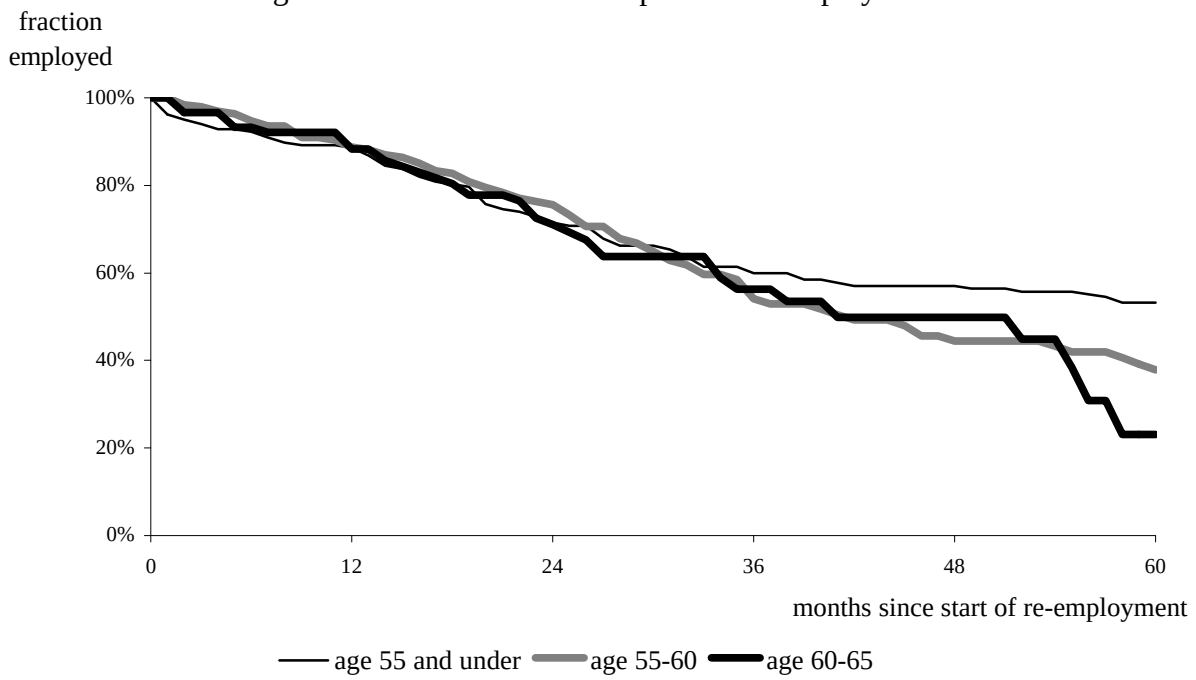


Figure 1b: Exit From Post-Displacement Employment*



*Based on data from the HRS. Age brackets refer to age at displacement

Figure 2a: Monthly Entry Probabilities by Displacement Status and Age*

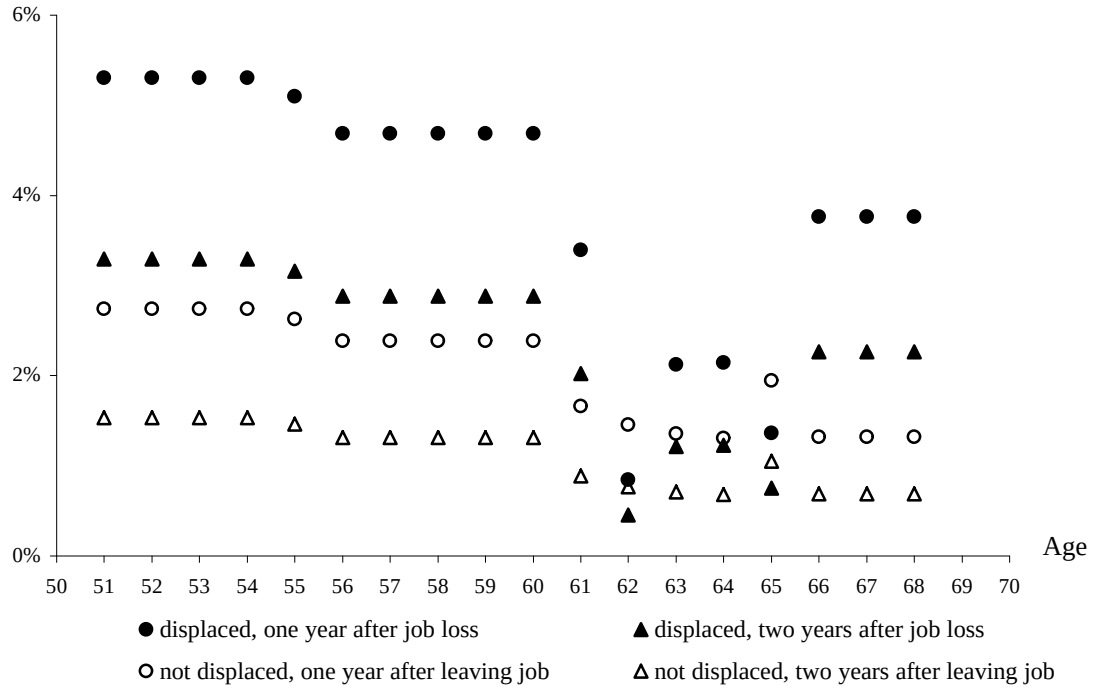
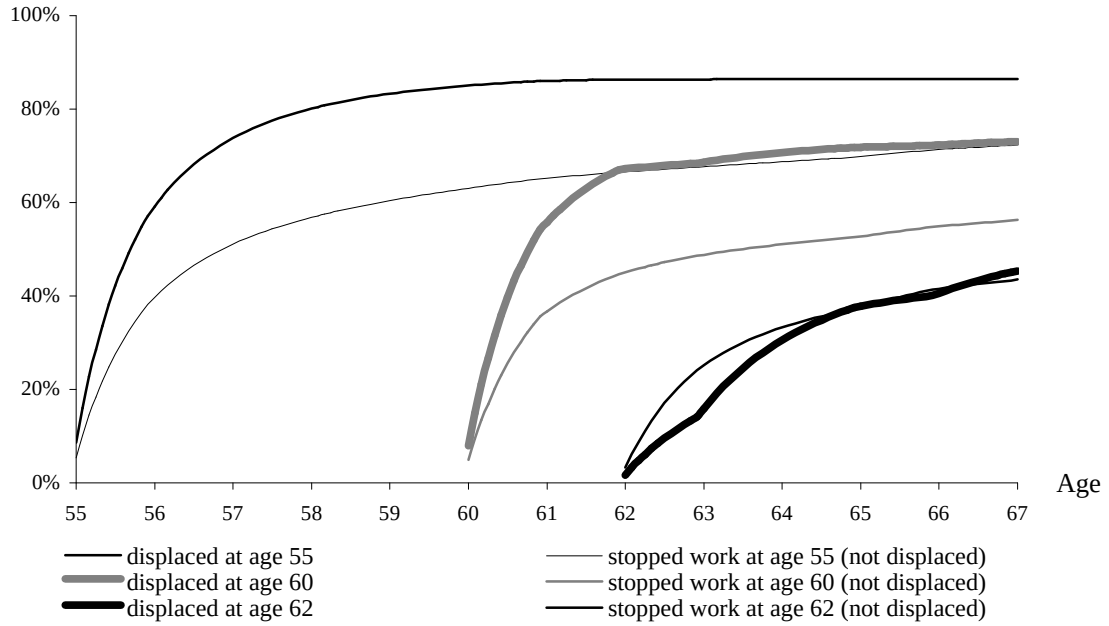


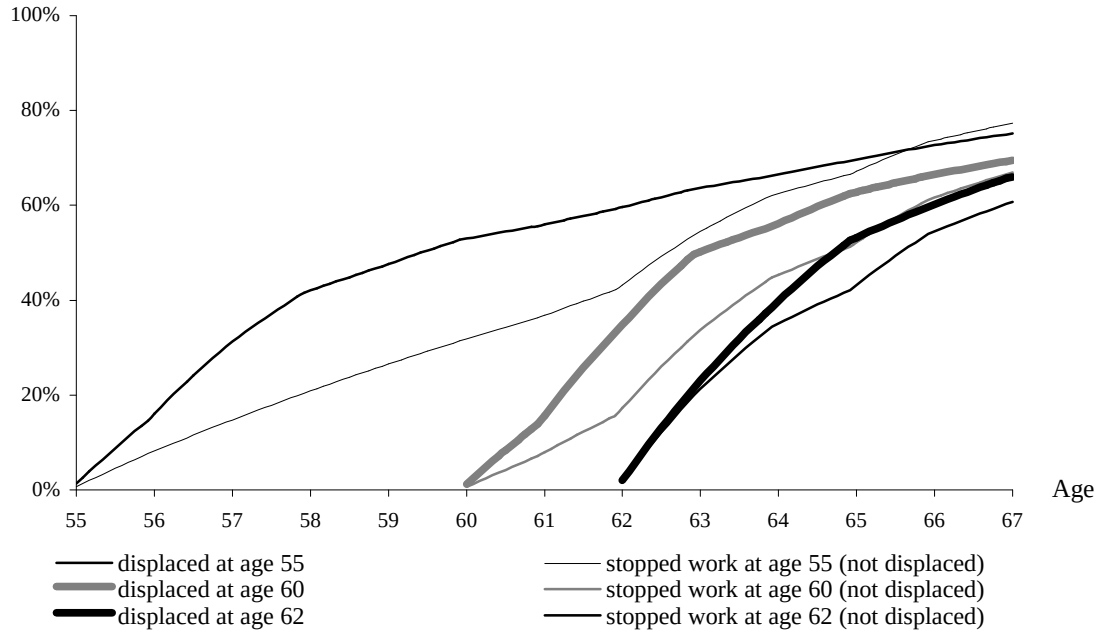
Figure 2b: Cumulative Entry Probabilities by Displacement Status at Ages 55, 60 and 62*



*Based on estimates from Table 2 column 1
for a married, not disabled, in excellent health, white, high school graduate.

Figure 3a: Monthly Exit Probabilities by Displacement Status and Age*

Figure 3b: Cumulative Exit Probabilities by Displacement Status at Ages 55, 60 and 62*



*Based on estimates from Table 3 column 1
for a married, not disabled, in excellent health, white, high school graduate.