# THE LONG-TERM COSTS OF JOB DISPLACEMENT FOR YOUNG ADULT WORKERS

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Using NLSY data, the authors estimate the long-term costs of job displacement for young adults. Earnings and wage losses were large for the first three years following displacement. Compared to earnings losses found by other studies for more mature workers, however, earnings losses for these young adults were short-lived, with differences between observed and expected earnings narrowing considerably five years after job loss. At that point, the shortfall in annual earnings (relative to what would have been expected absent job loss) was 9% for men and 12.5% for women, and the shortfall in hourly wages was 21.2% for men. Young workers also apparently differ from more established workers in the composition of total earnings losses: for older workers, total losses largely represent actual, immediate earnings losses, whereas for young workers the loss of opportunities for rapid earnings growth is more important.

The earnings costs of job displacement are sizable and persistent. Recent studies find that five or more years after displacement, earnings remain from 10% to 18% below expected levels.[1] The persistence of earnings losses after job loss has implications for the design of assistance policies, as it raises concerns about the long-term earnings prospects of displaced workers.

One limitation of the recent research on the long-term costs of job displacement is its focus on individuals with established work histories. We know very little about the long-term consequences of job loss among young adult workers. This omission in the job displacement literature may stem from the assumption that young workers have less to lose from job displacement given their relatively short job tenures and resulting lower investments in firm-specific human capital. Young workers may also be

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A data appendix with additional results, and copies of the computer programs used to generate the results presented in the paper, are available from the second author at University of California, Department of Economics, Social Sciences 1, Santa Cruz, CA 95064. E-mail: rfairlie@ucsc.edu.

[1]See Ruhm (1991), Jacobson, LaLonde, and Sullivan (1993), Schoeni and Dardia (1996), and Stevens (1997).

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less likely than older workers to experience losses of industry or union rents following job loss and have less to lose from job loss than their older, more-tenured counterparts at firms with promotion-from-within policies. More generally, the omission of young adult workers from studies of the consequences of permanent job loss may stem from the overall orientation of a research literature that views early careers, in which young workers gain generalized work experience, as inherently high-turnover and high-wage-growth.

Most analyses of job loss have employed human capital and firm-specific earnings explanations that focus on potential reductions in the actual earnings or wages of workers who experience a job displacement. In contrast, the focus of research on early career labor markets is the rapid growth of wages and earnings, due to continued human capital acquisition (both specific and general), learning about worker ability, and job matching.[2] Particularly in matching models, sampling and experiencing a variety of jobs is considered an investment, as workers learn about their abilities and how they fit with employers. This kind of job shopping may also enhance generalized human capital. Wage growth is seen as an outcome of these human capital investments.

Clearly, the costliness of job loss for young adult workers is an empirical question. From the early career perspective, substantial costs may be associated with job displacement in the form of missed or delayed opportunities to accumulate general human capital. Wage growth associated with learning about worker ability and job-match quality is also put at risk by job displacement. With less labor market experience than older and more established workers, young adults may face a signaling problem associated with job loss. For example, in the private learning model discussed by Farber and Gibbons (1996), observable characteristics convey only partial information about productive ability, and with accumulated experience, further information is revealed only to the worker and his or her current employer. Other employers draw inferences from observed actions of the worker and current employer, suggesting that an observed displacement may be particularly costly if it is used by prospective and future employers as a negative signal about worker performance.

These speculations suggest that the construction of the appropriate counterfactual will be especially important in determining the long-term costs of job displacement among young workers. A few recent studies have relied on the earnings profiles of non-displaced workers to provide an understanding of what earnings would have been in the absence of displacement (Jacobson, LaLonde, and Sullivan 1993; Schoeni and Dardia 1996; Stevens 1997). This approach frames the question properly, even though for established workers the control group technique may not have a large effect on the estimates of earnings losses, given the fairly slow earnings growth among non-displaced workers in their samples of all age groups.[3] In contrast, the use of a comparison group of non-displaced workers is likely to have a substantial effect on estimates of the long-term costs of job displacement among young adult workers, due to rapid early career wage and earnings growth.

Using data from the National Longitudinal Survey of Youth, we examine the long-term costs of job displacement for young workers. Similar to the studies cited above, we use a group of non-displaced workers to identify common age and experience effects and regressions that include individual-level fixed-effects to estimate post-displacement earnings losses for a group of displaced workers. These results provide additional estimates of the long-term costs of job displacement at the national level and provide the first estimates of these costs for young adult workers.

[2]See Murphy and Welch (1990), Topel and Ward (1992), Klerman and Karoly (1995), and Farber and Gibbons (1996).

[3]For example, see Figure 3.1, p. 45 in Jacobson, LaLonde, and Sullivan (1993) and Figure 3 in Schoeni and Dardia (1996).

## Data

The National Longitudinal Survey of Youth (NLSY) is a nationally representative sample of 12,686 men and women who were between the ages of 14 to 22 when they were first interviewed in 1979.[4] Survey members have been interviewed annually since 1979. We exclude the subsample of 1,280 youths designed to represent the population who were enlisted in the four branches of the military as of September 30, 1978. By virtue of sampling weights provided by the NLSY, our sample is representative of the civilian noninstitutionalized population in this age cohort.

The NLSY is relatively unexploited as a data source for studies of job displacement. It has several distinct advantages over the widely used Displaced Worker Surveys (DWSs). Because of its annual interviews, the NLSY has a short recall period for reporting job losses, in contrast to the three- to five-year retrospective period in the DWSs. Furthermore, the longitudinal nature of the NLSY provides detailed information on the characteristics of individuals and jobs both before and after the potential job loss, thus allowing examination of both the short-term and long-term consequences of job displacement. Most important, the detailed work histories in the NLSY allow calculation of actual labor market experience. Finally, we can readily create a sample of comparison workers who do not suffer a job displacement to use in calculating displacement rates and relative earnings losses.

The NLSY also has some advantages over the Panel Study of Income Dynamics (PSID) for our analysis. First, information in the PSID does not allow a distinction to be made between layoffs and discharges for cause (firings).[5] Second, because the PSID is based primarily on household heads, it contains only limited information on women. Finally, sample sizes for young workers are much smaller in the PSID than in the NLSY.

Our procedure for determining whether an individual experienced a job displacement in a given year is as follows.[6] First, we exclude individuals who are enrolled in school during the year, in order to have a group of workers committed to the labor market. Second, we use detailed employment information on up to five jobs held during the interview period (approximately one year) to determine whether the individual was at risk of a job displacement. The individual must have held a job for which he or she worked an average of 25 or more hours per week during the weeks worked on this job. This criterion helps ensure that we are drawing a sample of workers with some attachment to the job. Individuals meeting this requirement are considered at risk of displacement. If an individual was no longer working at a reported job and the reason for the job ending was "layoff" or "plant closing," then we provisionally regard the job loss as a displacement.[7] Following this determination, information from the following year on employer matches was used to ascertain whether the respondent reported being (re)employed with that employer. If there was an employer match, the "layoff" was considered temporary and not counted as a displacement.

## The Incidence of Job Displacement

Before estimating the long-term costs of job displacement, we examine the extent to which young workers experience job loss. Clearly, job-displacement-related earnings losses for this group of workers may be of special concern if their likelihood of job

[4]See Center for Human Resource Research (1993) for additional details on the NLSY sample.

[5]This is also a shortcoming of the administrative data sets for Pennsylvania and California used in Jacobson, LaLonde, and Sullivan (1993) and Schoeni and Dardia (1996), respectively.

[6]See Kletzer and Fairlie (1996) for further details.

[7]The questionnaire did not distinguish between plant closings and layoffs until the 1984 interview.

displacement is high. In the first row of Table 1, we report average annual displacement rates for our sample of young male and female workers during the entire sample period (1984–93).[8] We define the displacement rate as the number of workers reporting a displacement divided by the number of workers "at risk" of displacement (that is, working or displaced). The estimates clearly indicate that young adult workers are at a high risk of experiencing job displacement. An average of 6.7% of working men and 3.9% of working women lost their jobs in each year during our sample period. Previous studies using data for workers of all ages have shown that younger workers have higher probabilities of job loss than older workers (see Farber 1997).

An examination of male and female displacement rates over the sample period reveals that displacement rates declined from the early 1980s to the early 1990s (see Figure 1). This reduction in the observed rate of job displacement contains within it two important changes that affected our sample of young adult workers over the period 1984–93: the aging of all sample members, and changes in the educational composition of the sample as its youngest members finished school and entered the work force.[9] Returning to Table 1, in which we report displacement rates by age and education, it is evident that there is a negative relationship between each of the measures and the probability of displacement. These patterns suggest that compositional changes may have contributed substantially to the downward trend in observed displacement from 1984 to 1993 for this group.

*Table 1.* Displacement Rates for Young Adults.

| | *Men* | | *Women* | |
|---|---|---|---|---|
| | *Displacement Rate* | *N* | *Displacement Rate* | *N* |
| Total | 6.7% | 28,301 | 3.9% | 24,846 |
| *Age* | | | | |
| < 25 | 10.3% | 6,012 | 5.0% | 5,403 |
| 25–30 | 6.2% | 16,953 | 3.9% | 14,775 |
| > 30 | 5.2% | 5,336 | 2.8% | 4,668 |
| *Education* | | | | |
| Less Than 12 Years | 11.7% | 5,420 | 7.0% | 2,500 |
| 12 Years | 7.2% | 13,699 | 4.8% | 11,976 |
| 13–15 Years | 6.6% | 4,632 | 2.8% | 5,714 |
| 16+ Years | 2.3% | 4,470 | 1.8% | 4,544 |

*Notes:* Samples include individuals who worked in non-agricultural industries and were not self-employed.
Each observation represents a person-year.
All calculations use NLSY sampling weights.

We calculate adjusted displacement rates that remove the effects of these compositional changes. To calculate these adjusted displacement rates, we estimate a logit regression for the probability of job displacement that includes age, education, and year fixed effects. The regression estimates are reported in Kletzer and Fairlie (1996). We define the adjusted or predicted displacement rate for year $t$ as

$$\hat{D}_t = \Lambda(\tilde{X}\hat{\beta} + \hat{\delta}_t), \tag{3.1}$$

where $\Lambda$ represents the logistic distribution, $\tilde{X}$ represents specific values for the age and education variables, $\hat{\beta}$ are the coefficient estimates on these variables, and $\hat{\delta}_t$ represents the coefficient estimates on fixed effect for year $t$. Before plotting the series of fixed effects, however, we need to choose a base year. We choose 1993 as the base year, and calculate $Z = \tilde{X}\hat{\beta}$ to solve the equation

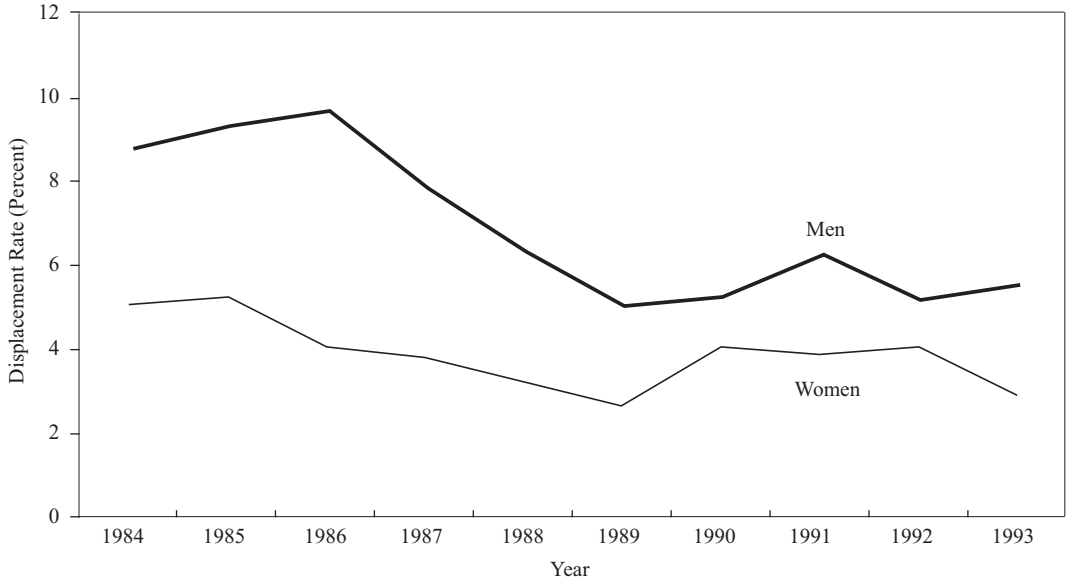
$$D_{93} = \Lambda(Z + \hat{\delta}_{93}), \tag{3.2}$$

where $D_{93}$ is the displacement rate in 1993.

[8]We do not include observations from 1979 to 1983 because of changes to the possible responses to the "reason left job" question. Prior to 1984, temporary and permanent layoffs were grouped together.

[9]In 1984, sample members were ages 19–27, and by 1993, they were ages 28–36. In addition, 11.0% of our sample had graduated from college in 1984, whereas 23.1% had graduated from college in 1990. These changes resulted in an increase in our sample size from 4,094 in 1984 to 6,021 in 1990.

*Figure 1.* Displacement Rates for Young Adults.




Therefore, our choice of $Z$ equates the ends of the unadjusted and adjusted time series in displacement rates. By choosing to calibrate the displacement rates series to the 1993 level, we are effectively using sample characteristics that reflect widespread school completion and adulthood.

Adjusted displacement rates using equation (3.2) are displayed in Figure 2. As expected for both men and women, adjusted displacement rates are lower than unadjusted rates during our sample period. The adjusted rates indicate that young adult workers were not at a lower risk of displacement in the early 1990s than in the early 1980s. This finding is consistent with more general trends in displacement reported in Farber (1997).

To conclude, our estimates indicate that young workers were at a high risk of experiencing a job displacement during the sample period and that this risk did not decline during the 1980s and early 1990s. We now examine whether the job displacements experienced by this group of workers resulted in large earnings and wage losses.

## Long-Term Earnings Losses Following Job Displacement

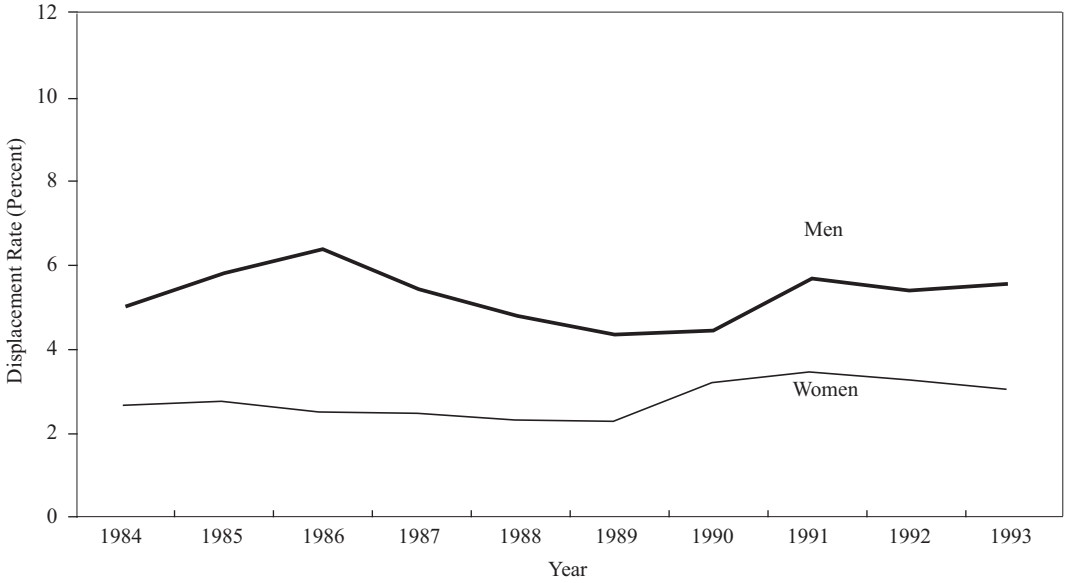
### Annual Earnings, Hourly Wage, and Annual Hours Patterns for Our Sample of Young Workers

Before discussing the regression results, it is useful to examine age-earnings profiles for our sample of displaced workers. Figure 3 presents average annual earnings for men and women, with average wages presented in Figure 4 (see also Tables 2 and 3). The sample for these figures and tables includes workers who potentially have observations in all eight years (that is, workers displaced by 1988, so that they have five post-displacement years up to 1993).[10]

The most striking observation from Figures 3 and 4 is that earnings do not decline for displaced young adult workers either before or after job loss, in contrast to the

[10]This selection ensures that the displaced and non-displaced groups have similar ages. In 1988, workers in our sample were between 23 and 30 years old.

*Figure 2.* Adjusted Displacement Rates for Young Adults.



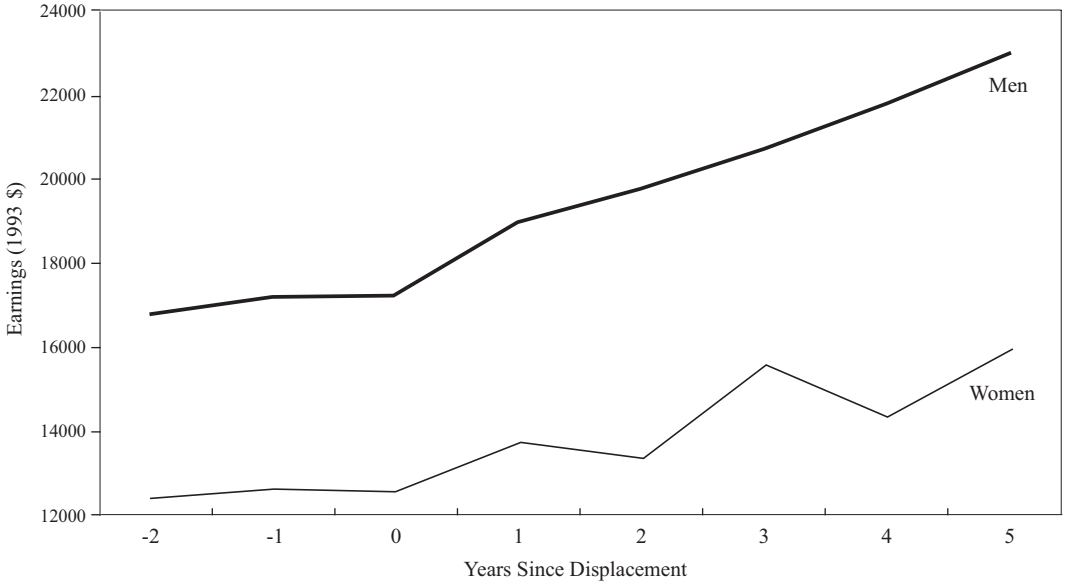

marked declines for both periods reported in Jacobson, LaLonde, and Sullivan (1993) in their Figure 3.1. Perhaps this is not surprising given the well-known steep age-earnings profiles of young workers. However, as we discuss in more detail below, displaced worker earnings growth must be considered in comparison to that of their non-displaced counterparts. Earnings for the displaced group are essentially flat from two years before job loss through the year of job loss, and then rise steadily. Averaged over all (eight) sample years, displaced men earned 24.8% ($6,402) less than non-displaced men.

Mean earnings for displaced young women exhibit more annual variation than is seen in the pattern for displaced young men, but the trend is upward. Displaced women experience flat earnings growth before job loss, but then recover some earnings growth in the years after. Averaged over all years, displaced women earned 20.3% ($3,481) less than non-displaced women.

One possible explanation for the earnings growth for displaced workers exhibited in Figure 3 is that work hours compensate for wage losses. An examination of wage patterns for displaced workers, however, reveals that this is not the case (reported in Figure 4). In the years after displacement, wages do vary for displaced workers, but there is wage growth following job loss. Wage growth is somewhat erratic in the first two years after job loss, and steadier over the next three years. In the fifth year after job loss, wages for displaced men are 33.3% higher than in the year of displacement. Pre-displacement wage growth, when combined with fewer work hours, helps explain the lack of earnings growth pre-displacement seen in Figure 3.

Differences in hours worked are apparent (see Tables 2 and 3). Averaged over all years, displaced men work 8.8% (193) fewer annual hours than non-displaced men. The average annual work hours of displaced men decline, or are flat, from two years before job loss through the first year after. Differences in work hours between displaced and non-displaced women are roughly similar to those for men, as is the pattern of declining work hours for displaced women from two years before job loss through the first year after.

*Figure 3.* Mean Earnings for Displaced Workers by Years Since Displacement.




Figures 3 and 4 reveal a clear contrast between the experiences of our younger workers and samples of older displaced workers. Jacobson, LaLonde, and Sullivan (1993) reported that older, more established workers experience large earnings reductions following displacement. For example, in their sample of high-tenure manufacturing workers in Pennsylvania, average quarterly earnings for separators fell 21.6% over a period from two years prior to separation to four years after separation.[11] Estimates in Table 3 of Stevens (1997) show large reductions in earnings among displaced workers from 2–3 years prior to displacement to several years after displacement. Her estimates suggest that even nine years after displacement the earnings of displaced workers are below their levels three years prior to displacement. These findings suggest that, unlike the patterns for young workers, the costs of displacement for older workers are due in large part to the substantial earnings reductions experienced by displaced workers in the years following displacement.

[11]See their Figure 1. Similar patterns are shown in Figure 3, p. 33 of Schoeni and Dardia (1996) for a sample of durable goods manufacturing workers (primarily in aerospace sectors) in California.

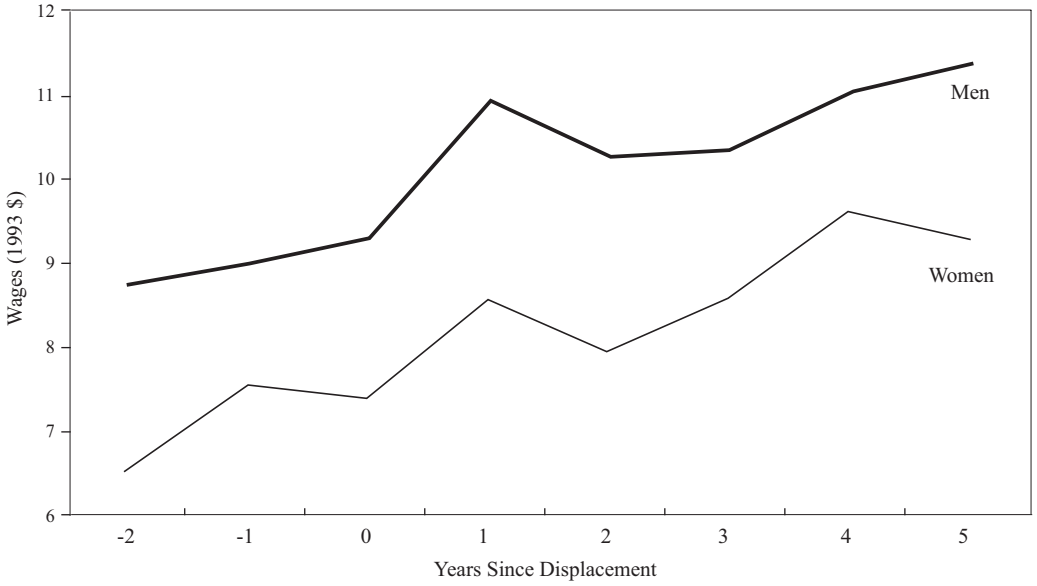
**Econometric and Measurement Issues**

Although Figures 3 and 4 are informative, we are interested in obtaining estimates of the long-term earnings losses due to job displacement among young adult workers. We use the same regression specification as that used in Jacobson, LaLonde, and Sullivan (1993), Schoeni and Dardia (1996), and Stevens (1997). In particular, we estimate

$$(4.1) \qquad \ln Y_{it} = \alpha_i + \gamma_t + X_{it}'\beta + D_{it}'\delta + \varepsilon_{it},$$

where $Y_{it}$ is individual $i$'s annual earnings in year $t$, $\alpha_i$ is an individual-level fixed effect, $\gamma_t$ is a vector of time effects, $X_{it}$ includes time-varying individual characteristics, and $D_{it}$ is a vector of dummy variables indicating each year before, after, and during the individual's job displacement. This regression model allows individuals to differ in both measurable characteristics that change over time and unmeasurable characteris-

*Figure 4.* Mean Wages for Displaced Workers by Years Since Displacement.




tics that are time-invariant. For example, the model accounts for the possibility that displaced workers have lower earnings levels throughout their careers than non-displaced workers. The vector of time effects is included to account for important economy-wide effects on earnings during the sample period.

The inclusion of years-since-displacement dummy variables and the use of both displaced and non-displaced workers to estimate (4.1) allows non-displaced workers to contribute to estimating the rate of earnings growth during the sample period. Estimates of the costs of job displacement can be obtained directly from the time-since-displacement dummy variables.

Before discussing the findings for our estimates of (4.1), it is useful to briefly describe the sample criteria used to create our displaced and non-displaced groups. We include only those individuals who suffer a job displacement that immediately follows three years of work experience free of other job displacements (that is, a displacement in year $t$ must be preceded by working and no displacements in years $t$–1, $t$–2, and $t$–3). This restriction guarantees that our displaced worker group does not consist of recent school attendees or workers suffering a recent job displacement. The three years of work experience restriction assures us of a sample of young adult workers with some attachment to the labor force. This growing attachment provides some reason to think that these workers have "something" to lose with job loss. We include only the first observed job displacement for each individual (if one exists) during the survey period, and we include it only if it meets the work experience restriction. We do not separately include additional displacements for these individuals, because we view future displacements as a potential cost of the initial displacement.[12] For our sample of displaced workers, we include measures of their earnings and independent variables in the two years prior to the displacement, the year of the displacement, and the five years following the displacement.[13]

[12]See Stevens (1997) for an analysis of the importance of multiple job losses in determining earnings losses among displaced workers.

[13]We do not include earnings from the first year of work experience (or three years prior to the displace-

*Table 2.* Annual Earnings, Hourly Wages, Work Hours, Accumulated Labor Market Experience, and Age of Displaced and Non-Displaced Workers: **Men.**

| *Years before/ after Displacement* | *Annual Earnings* | *Hourly Wages* | *Hours* | *Experience (Weeks)* | *Age (Years)* | *N* |
|---|---|---|---|---|---|---|
| **Displaced** | | | | | | |
| 2 before | $16,887 | $8.76 | 1,947 | 204 | 22.6 | 283 |
| 1 before | $17,171 | $8.99 | 1,905 | 250 | 23.6 | 271 |
| Year of Displacement | $17,264 | $9.28 | 1,917 | 289 | 24.5 | 282 |
| 1 after | $19,025 | $10.92 | 1,894 | 332 | 25.5 | 251 |
| 2 after | $19,802 | $10.24 | 2,061 | 377 | 26.5 | 254 |
| 3 after | $20,772 | $10.28 | 2,098 | 424 | 27.6 | 255 |
| 4 after | $21,864 | $10.96 | 2,097 | 473 | 28.6 | 252 |
| 5 after | $23,021 | $11.26 | 2,122 | 521 | 29.5 | 243 |
| Mean for All Years | $19,372 | $10.03 | 2,001 | 331 | 25.9 | 2,091 |
| **Non-Displaced** | | | | | | |
| Mean for All Years | $25,774 | $11.95 | 2,194 | 325 | 25.8 | 9,021 |

*Notes:* Includes only individuals who potentially contribute to full 8-year block. See text for more details. Annual earnings and hourly wages are measured in 1993 dollars.

Our sample of non-displaced workers includes all workers who do not suffer a job displacement during the survey period. These individuals do not have a year of displacement reference, and thus we include the first observed eight-year period from the survey that meets the following restriction: the individual must have four years of work experience followed by five years of not experiencing a job displacement and not having a missing value for these measures. For both the displaced and non-displaced samples we follow the approach taken in previous studies of excluding from our earnings calculations annual observations for which the individual was enrolled in school or had no reported earnings.[14] The resulting sample contains 23,941 person-year observations representing 2,648 non-displaced workers and 812 displaced workers.

We consider two basic specifications for $X_{it}$. The first specification includes age and age squared in the vector $X_{it}$ to estimate the costs of displacement, where costs include lost work experience. The second specification includes age and its square and accumulated labor market experience and its square. With the inclusion of the experience terms, we remove the effects of differences in labor market experience resulting from job displacement on our estimates of earnings and wage losses.

We create the experience variable as follows. We sum the number of weeks worked (if any) for 1975, 1976, and 1977 to get a starting point. We then add the number of weeks worked since the last interview to create a cumulative experience variable, adjusting when needed for unaccounted weeks since the last interview. The result is an adjusted experience variable that provides information on the total number of weeks worked as of the current survey date. We note that our earnings measure is for the previous calendar year. To avoid any contemporaneous elements in the determination of earnings, hours, and experience, we then adjust our cumulative labor

ment) because for many individuals these earnings are low due to working only part of the year. Also, the length of our survey does not allow us to reliably estimate earnings losses for more than five years after displacement.

[14]Only 3.3% of all post-displacement observations for displaced workers were removed because of school enrollment.

*Table 3.* Annual Earnings, Hourly Wages, Work Hours, Accumulated Labor Market Experience, and Age of Displaced and Non-Displaced Workers: **Women.**

| *Years before/ after Displacement* | *Annual Earnings* | *Hourly Wages* | *Hours* | *Experience (Weeks)* | *Age (Years)* | *N* |
|---|---|---|---|---|---|---|
| **Displaced** | | | | | | |
| 2 before | $12,340 | $6.50 | 1,829 | 195 | 22.8 | 163 |
| 1 before | $12,608 | $7.55 | 1,776 | 239 | 23.8 | 160 |
| Year of Displacement | $12,558 | $7.25 | 1,726 | 283 | 24.8 | 161 |
| 1 after | $13,776 | $8.55 | 1,538 | 331 | 25.9 | 137 |
| 2 after | $13,351 | $7.93 | 1,684 | 367 | 27.0 | 124 |
| 3 after | $15,604 | $8.37 | 1,802 | 409 | 28.0 | 130 |
| 4 after | $14,384 | $9.56 | 1,803 | 448 | 29.0 | 121 |
| 5 after | $16,037 | $9.27 | 1,822 | 493 | 30.0 | 116 |
| Mean for All Years | $13,689 | $8.00 | 1,748 | 310 | 26.1 | 1,112 |
| **Non-Displaced** | | | | | | |
| Mean for All Years | $17,170 | $9.20 | 1,884 | 301 | 25.8 | 11,059 |

*Notes:* See notes to Table 2.

market experience to make it correspond to the beginning of the previous calendar year.[15]

For our dependent variable, we use annual earnings and, separately, its components, hourly wages and annual hours. Total annual labor market earnings are the sum of wage and salary earnings, farm and business income, and military income (measured in 1993 dollars).[16] A real hourly wage is calculated by dividing total annual earnings by total annual hours of work. Our wage measure should be informative about the human capital effects of displacement, and the annual hours measure allows us to examine directly the question of hours reductions resulting from reemployment after job loss, as well as the use of additional hours to compensate for wage losses. Time unemployed following job displacement will also result in fewer hours worked in a year.

### Estimates of Earnings and Wage Losses and Changes in Hours

Starting first with age and age squared as time-varying control variables, we report estimates from (4.1) in Table 4 for both men and women.[17] For the dependent variable, specifications (1) and (4) use the natural log of annual earnings, specifications (2) and (5) use the natural log of hourly wages, and specifications (3) and (6) use the natural log of annual hours. We consider these estimates to be total losses (or changes) in earnings, wages, and hours, the measures of most interest to policymakers and the general public.

For displaced men, earnings losses are relatively small and statistically insignificant in the year prior to displacement. In the year of displacement and the first four

[15]To perform this last step, we use the previous survey year's cumulative labor market experience and subtract an estimate of the number of weeks worked by the individual from January to the previous survey date (usually in the spring).

[16]We use the CPI-U to convert labor market earnings to 1993 constant dollars.

[17]The coefficients on the age and age squared variables in some specifications are sensitive to the inclusion of the year fixed effects. Because the data follow a cohort over time, these coefficients may not capture the full effect of aging.

*Table 4.* Log Earnings, Wages, and Hours Regressions with Individual Fixed Effects.

| | *Specification* | | | | | |
|---|---|---|---|---|---|---|
| *Variable* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* |
| Dependent Variable | Ln(Earnings) | Ln(Wage) | Ln(Hours) | Ln(Earnings) | Ln(Wage) | Ln(Hours) |
| Sample | Men | Men | Men | Women | Women | Women |
| Age | 0.1827 | 0.1371 | 0.0067 | 0.2577 | 0.1864 | 0.0522 |
| | (0.0356) | (0.0263) | (0.0399) | (0.0425) | (0.0237) | (0.0399) |
| Age Squared | –0.0042 | –0.0023 | –0.0008 | –0.0047 | –0.0026 | –0.0014 |
| | (0.0005) | (0.0004) | (0.0005) | (0.0006) | (0.0003) | (0.0006) |
| 1 Year before Displacement | –0.0292 | –0.0342 | –0.0747 | 0.0279 | 0.0276 | 0.0448 |
| | (0.0318) | (0.0238) | (0.0355) | (0.0497) | (0.0278) | (0.0466) |
| Year of Displacement | –0.0931 | –0.0784 | –0.0314 | –0.0402 | 0.0018 | 0.0365 |
| | (0.0319) | (0.0239) | (0.0357) | (0.0503) | (0.0283) | (0.0473) |
| 1 Year after Displacement | –0.1680 | –0.0984 | –0.1247 | –0.3303 | 0.0027 | –0.2746 |
| | (0.0341) | (0.0253) | (0.0381) | (0.0542) | (0.0306) | (0.0510) |
| 2 Years after Displacement | –0.0788 | –0.1050 | –0.0301 | –0.2479 | –0.0692 | –0.1758 |
| | (0.0357) | (0.0266) | (0.0400) | (0.0580) | (0.0324) | (0.0545) |
| 3 Years after Displacement | –0.1173 | –0.1261 | –0.0571 | –0.1154 | –0.0734 | –0.1545 |
| | (0.0379) | (0.0281) | (0.0424) | (0.0607) | (0.0340) | (0.0571) |
| 4 Years after Displacement | –0.0950 | –0.1491 | –0.0298 | –0.1907 | –0.0760 | –0.0628 |
| | (0.0405) | (0.0301) | (0.0454) | (0.0669) | (0.0376) | (0.0627) |
| 5 Years after Displacement | –0.0870 | –0.1923 | 0.0055 | –0.1180 | –0.0500 | –0.0015 |
| | (0.0441) | (0.0327) | (0.0495) | (0.0767) | (0.0427) | (0.0723) |
| Sample Size | 11,392 | 11,010 | 11,276 | 12,342 | 11,760 | 12,216 |

*Notes:* Earnings and wages are measured in 1993 dollars.
All equations include individual fixed effects and year dummies as additional independent variables.
Standard errors are in parentheses below the coefficient estimates.

years afterward, however, earnings losses are large. For each of these years the estimates are highly statistically significant. In the year of displacement, while actual earnings for displaced young men do not decline (Figure 3 and Table 2 show them to be essentially flat), relative to expected levels, earnings fall by 9.8%.[18] Earnings losses are even larger in the year following displacement, at 18.3%.[19] At five years after displacement, the earnings of displaced young adult men are about 9% below expected levels.

A natural next question is whether the deviation of earnings from expected levels for displaced men is due to differences in hourly wages, differences in hours worked, or both. Specification (2) uses ln(hourly wage) as the dependent variable, and specification (3) uses ln(annual hours).

Again, in the year before displacement, wages are not statistically different from their expected levels for the displaced group. Hours of work fall, however, with displaced men losing work hours from two years before displacement to the year before (see averages in Table 2), and in the year before the job loss displaced men work 7.8% fewer hours than would be expected.[20]

[18]The percentage effect on earnings (or wages) is calculated from estimates of the log of the relevant pay measure as $e^{\delta}-1$.

[19]A displacement can occur anytime during the year of displacement. If the job loss is near the end of the calendar year, earnings losses may not be realized until the following year.

[20]Hours reductions before job loss are consistent with the patterns found in Jacobson, LaLonde, and Sullivan (1993).

In the year of displacement, wages of displaced men fall 8.2% relative to expected levels. In percentage terms, earnings losses are larger (9.8%), reflecting a combination of the relative reduction in hourly pay and a reduction in hours worked (of 3.2%). In the year following displacement, relative wages fall to 10.3% below expected levels, and earnings, again, even further, to 18.3% below expected levels. The loss of hours for displaced men is both relative and absolute. Displaced men work 13.3% fewer hours than expected in the year following job loss, and mean hours for displaced men fall by 1.2% from the year of displacement to the year following.[21]

Wage losses are large through the period one year after displacement to five years after displacement, ranging from 11.2% to 19.9%. From two years following displacement, point estimates of relative wage losses are larger than estimates of relative earnings losses. At two years after job loss, mean hours worked for displaced men begin to rise. For some displaced men, the additional hours may help compensate for their large hourly wage losses. The point estimates in specification (3) show displaced men working fewer hours than expected from two years following displacement to four years following displacement, but the differences are not statistically significant. By the fifth post-displacement year, wage losses are 21.2% and earnings losses are estimated at 9.1%. There is no statistically significant difference in hours worked at the fifth post-displacement year.

Figures 3 and 4 show that both earnings and wages are more variable for women than for men. With controls for age, a clearer pattern emerges for women in Table 4 (specifications 4–6). Relative to expected levels, there is no statistically significant difference in earnings, wages, or hours in the year before displacement. The lack of a statistically significant difference continues in the year of displacement. In the year following, however, displaced women lose 39.1% in earnings relative to expected levels. These losses come from a 31.6% relative reduction in hours, and there is no relative wage loss. In the second year, earnings of displaced women are 28.1% below expected levels, wages 7.2% below, and relative hours 19.2% below. Wage and earnings losses are statistically significant through the fourth post-displacement year. Hours losses are statistically significant through the third post-displacement year.

A number of factors help explain these earnings and wage losses. With our experience measure, we can examine the role of lost labor market experience and general human capital. The trends in mean accumulated labor market experience reported in Tables 2 and 3 show a reduction in the rate of accumulation of general human capital for displaced young adult workers. For displaced young men, there are two key years, from the year before displacement to the year following displacement, during which their rate of accumulation of experience slows. This reduction in the accumulation of experience seems likely to put displaced workers at some disadvantage, relative to the non-displaced. The rate of accumulation of experience recovers from the second year after job loss for the displaced group. On average over the years, displaced men have slightly more experience than non-displaced men (a difference of six weeks out of an average of 6.4 years of experience), although their average ages are nearly identical. The pattern of mean experience for women across time is virtually the same, although averaged over the years, the accumulated experience of displaced women exceeds that of non-displaced women (a difference of 2.9%, or nine weeks out of 5.9 years).

Regressions with age and experience (and their squares) in the vector of explanatory variables are reported in Table 5. With the inclusion of age and experience, the losses captured by the estimated coefficients on the time-since-displacement

[21]The samples used in Tables 2 and 4 are slightly different, suggesting the need for some caution in drawing inferences. Table 4 uses the full sample of displaced and non-displaced, and Table 2 uses a more restrictive sample of individuals who potentially contribute a full 8-year block of annual observations.

*Table 5.* Log Earnings, Wages, and Hours Regressions with Individual Fixed Effects and Controls for Experience.

| | *Specification* | | | | | |
|---|---|---|---|---|---|---|
| *Variable* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* |
| Dependent Variable | Ln(Earnings) | Ln(Wage) | Ln(Hours) | Ln(Earnings) | Ln(Wage) | Ln(Hours) |
| Sample | Men | Men | Men | Women | Women | Women |
| Age | 0.1250 | –0.0300 | –0.0635 | 0.0840 | 0.0772 | –0.0908 |
| | (0.0436) | (0.0326) | (0.0488) | (0.0512) | (0.0289) | (0.0481) |
| Age Squared | –0.0020 | –0.0010 | –0.0002 | –0.0030 | –0.0020 | –0.0003 |
| | (0.0006) | (0.0004) | (0.0007) | (0.0007) | (0.0004) | (0.0007) |
| Experience (weeks) | –0.0290 | 0.2772 | 0.1097 | 0.2694 | 0.1958 | 0.2413 |
| | (0.0388) | (0.0304) | (0.0436) | (0.0422) | (0.0246) | (0.0397) |
| Experience Squared | –0.0134 | –0.0124 | –0.0061 | –0.0164 | –0.0064 | –0.0111 |
| (000 weeks) | (0.0027) | (0.0020) | (0.0031) | (0.0035) | (0.0020) | (0.0033) |
| 1 Year before Displacement | –0.0362 | –0.0319 | –0.0740 | 0.0267 | 0.0282 | 0.0450 |
| | (0.0318) | (0.0237) | (0.0355) | (0.0496) | (0.0277) | (0.0465) |
| Year of Displacement | –0.1061 | –0.0724 | –0.0295 | –0.0426 | 0.0040 | 0.0372 |
| | (0.0319) | (0.0238) | (0.0358) | (0.0502) | (0.0282) | (0.0473) |
| 1 Year after Displacement | –0.1902 | –0.0800 | –0.1185 | –0.3264 | 0.0129 | –0.2666 |
| | (0.0343) | (0.0254) | (0.0384) | (0.0542) | (0.0305) | (0.0510) |
| 2 Years after Displacement | –0.1097 | –0.0734 | –0.0194 | –0.2323 | –0.0479 | –0.1552 |
| | (0.0361) | (0.0269) | (0.0405) | (0.0581) | (0.0324) | (0.0546) |
| 3 Years after Displacement | –0.1525 | –0.0853 | –0.0429 | –0.0864 | –0.0417 | –0.1212 |
| | (0.0385) | (0.0286) | (0.0432) | (0.0609) | (0.0341) | (0.0573) |
| 4 Years after Displacement | –0.1332 | –0.0955 | –0.0107 | –0.1497 | –0.0361 | –0.0185 |
| | (0.0414) | (0.0308) | (0.0465) | (0.0673) | (0.0378) | (0.0631) |
| 5 Years after Displacement | –0.1229 | –0.1270 | 0.0299 | –0.0677 | –0.0019 | 0.0515 |
| | (0.0452) | (0.0336) | (0.0508) | (0.0771) | (0.0429) | (0.0727) |
| Sample Size | 11,392 | 11,010 | 11,276 | 12,342 | 11,760 | 12,216 |

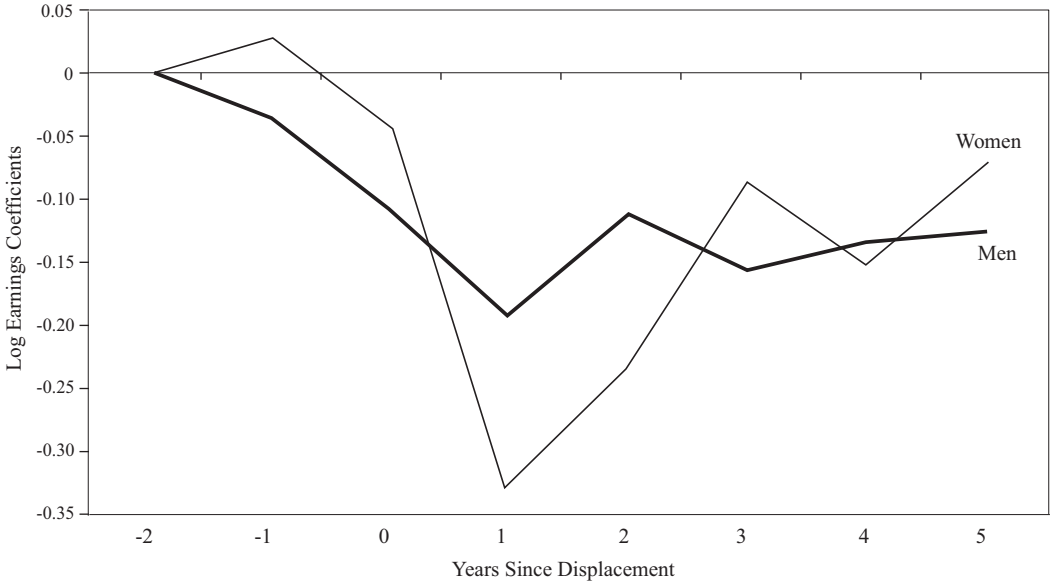
*Notes:* See notes to Table 4.

dummy variables may understate the cost of displacement, because displaced workers may have less experience after displacement as a result of being displaced. We note again that the measure of accumulated experience used in these regressions is lagged, so that experience, hours, and earnings are not contemporaneously determined. We include both age and experience because for this group of young adult workers, age, through maturation and the gaining of interpersonal work-related skills, is likely to have an effect beyond that accounted for by experience.[22] As expected, the estimates generally show experience to be positively related to earnings, wages, and hours. These estimates, however, may not capture the full effect of experience because of their correlation with age and the year fixed effects.

With the additional control of (lagged) experience, Figures 5 and 6 graphically depict wage and earnings losses relative to expected levels. The figures are drawn from the estimated coefficients on the time since displacement dummy variables, reported in Table 5. Figure 5 shows initially large earnings losses in the year following job loss, particularly for women, with smaller losses in the years following displacement. For wages, the story is somewhat different, with persistently large wage losses for men,

[22]We note also, from Farber and Gibbons (1996), that in the NLSY, age and experience do not increase one-for-one.

*Figure 5.* Earnings Losses Relative to Expected Levels for Displaced Workers.




through the fifth year following displacement, and large but diminishing wage losses for women.[23]

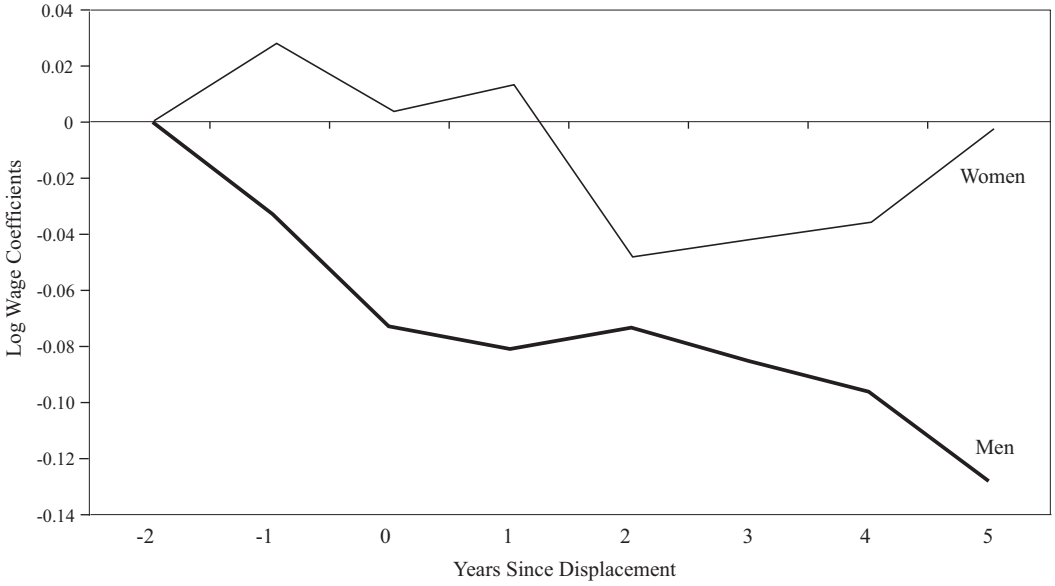
A comparison of the results in Tables 4 and 5 shows that wage losses are smaller, particularly in years far forward from the year of displacement, when we account for lost opportunities to accumulate general skills. Turning first to men, earnings and wage losses are small and statistically insignificant in the year prior to displacement. In the year of displacement and the first few years following, however, earnings and wage losses remain large, although wage losses are somewhat smaller in Table 5 than the total estimates in Table 4. In the year following displacement, while actual earnings for displaced young men do not decline, they are 20.9% below expected levels, and wages are 8.3% below expected levels. Accounting for lost labor market experience does not reduce the relative wage losses by much (Table 4 reports 10.3% for the year following). At three years after displacement, the hourly wages of displaced young men are about 9% lower than expected. Without controlling for experience, the relative loss is 13.4%. Five years after job loss, controlling for age and experience, the earnings of displaced men are 13.1% below expected levels.

Accounting for experience appears to be particularly important in the regressions for women, as the estimates reported in Tables 4 and 5 differ more for women than for men. There remains no difference in earnings or wages in the year before displacement, nor is there a statistically significant difference in the year of displacement. In the year following displacement, however, the earnings of displaced women are 38.6% below expected levels. These losses come from a reduction in hours, because there is virtually no wage loss. In the second year after job loss, earnings of displaced women are 26.1% below expected levels. Earnings losses are notably smaller in the third through fifth years.

Over time, fewer hours worked result in less work experience. From this association, we expect the relative hours losses of

[23]The positive coefficients for women in Table 5 and Figure 5 are not statistically significant.

*Figure 6.* Wage Losses Relative to Expected Levels for Displaced Workers.




displaced workers to be smaller with controls for work experience, and this is what we see in Table 5. As time since displacement grows, the relative hours loss due to displacement per se diminishes as the difference in hours worked is accounted for by lost accumulated experience.

Overall, the estimated post-displacement earnings losses reported in Table 5 are a bit smaller in magnitude than those reported in Jacobson, LaLonde, and Sullivan (1993) and Schoeni and Dardia (1996), and basically similar to results in Stevens (1997). Stevens (1997) offered the best comparison, in that she used nationally representative data, drawn from the Panel Study of Income Dynamics (PSID) with a control for experience. We compare our results for men in column (1) of Table 5 to her results for household heads (specification 1 of Table 4, p. 175).[24] Stevens's results for the first to fourth years following displacement differ somewhat from ours, but in a predictable way. She found earnings losses ranging from 11.3% to 15.1% for these years. Our loss estimates range from 11.6% to 20.9%. Her estimate of earnings losses in the fifth year (2.7%) is smaller than ours (13.1%), but this may simply reflect sampling variability, as her estimates of earnings losses in the sixth and seventh years following displacement are 7.3% and 12.4%, respectively. In addition, our lagged experience measure does not allow weeks worked in the current year to compensate for wage losses. Our estimates differ from those of Stevens in that we find smaller losses in the year preceding displacement and in the year of displacement. To conclude, our finding is that young adult displaced workers experience earnings losses that are sizable but somewhat smaller than the losses of older and more established displaced workers.[25]

[24]Her sample of household heads from the PSID is 84% male.

[25]From their sample, Jacobson, LaLonde, and Sullivan (1993) reported that older workers experienced "somewhat larger losses," with little evidence that earnings would return to expected levels (p. 100). In contrast, for younger workers (born in the 1950s) they found evidence that earnings would recover to expected levels within nine years. Our finding of smaller earnings losses for younger workers than older workers is also consistent with results reported in Farber (2001).

We also checked the robustness of these results using a sample that includes only individuals who potentially have observations for all years. This is the sample used to generate Figures 3 and 4. With this restricted sample, the estimates of relative earnings and wage losses are generally a bit smaller for men, but larger for women.[26]

## Conclusions

The widespread permanent job loss of the 1980s and 1990s that is central to the current public perception of economic insecurity did not spare the baby boomers of the NLSY. The rate of job displacement among this cohort was high during the 1980s and early 1990s. In addition, the earnings and wage costs of job loss for young workers are large, although somewhat smaller and less persistent than the losses found by others for older and more established workers. In total earnings losses, not accounting for lost labor market experience, in the third year following job loss, displaced men and women lose about 12% in annual earnings, relative to expected levels. In wages, the third-year-out losses are even larger for men, at 13.4%, and somewhat smaller for women, at 7.5%.

There is a clear contrast, however, between young and older workers in the causes of these losses. We find that young displaced workers do not experience a large decline in earnings following displacement. Unlike the situation for older workers, for young workers earnings reductions caused by a loss of firm-specific capital are entirely offset by the growth in earnings due to continued labor market experience. At the same time, this growth in earnings is below expected levels, based on displaced workers' pre-displacement earnings and the expected growth in earnings due to age and experience. Their non-displaced counterparts continue to experience rapid earnings growth.

These two factors produce large relative wage losses among displaced young adult workers. Lost and delayed opportunities to accumulate generalized skills account for a small part of relative wage losses (small for men, somewhat larger for women). After the analysis accounts for lost experience, the wage losses that remain are due to lost firm-specific components of earnings growth, such as learning about worker capabilities and qualities of job matches, and perhaps some adverse signaling. Displaced young adult workers, particularly men, lose work hours prior to job loss, and continue to experience hours reductions up through one year after job loss. These hours reductions are likely due to unemployment following job loss along with reduced hours upon re-employment. Lost hours accumulate over time, producing some part of the lost experience that reduces relative wages.

Job mobility is often cited as an important part of early career labor market activity. It has been suggested that the "try and try again" principle is important to workers' advancement to better positions as they learn about jobs and their own capabilities. Our findings suggest that not all job changes in the process of job shopping produce improved outcomes. For this cohort, involuntary job change appears to impose a critical barrier in the progression toward the earnings stability of mature careers.

[26]In an earlier version of this paper, we checked for the effect of excluding zero earnings observations by using a sample that added back all zero earnings observations. Zero earnings observations might result from periods of joblessness following displacement, and excluding these observations might result in an understatement of earnings losses. As expected, we found slightly larger earnings losses for men. Results were less clear for women, as losses were higher in some years and lower in others. We also checked for the effect of very low earnings, by excluding all earnings observations less than $500. The results were very similar, suggesting that our estimates of substantial earnings losses among young workers are not being driven by a few displaced workers with very low earnings following displacement.

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