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What do we know about Job Loss in the United States?  
Evidence from the Displaced Workers Survey, 1984-2004<sup>1</sup>

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**Abstract**

The ability of employers to shed workers in response to cyclical or secular changes in demand is an important part of an efficient market economy. However, workers who lose jobs bear substantial uncompensated costs. I examine the experience of jobs losers between 1981 and 2003 using data from the Displaced Workers Surveys (DWS) from 1984-2004. In the most recent period 1) about 35 percent of job losers are not employed at the subsequent survey date, 2) about 13 percent re-employed full-time job losers are holding part-time jobs, 3) full-time job losers who find new full-time jobs earn about 13 percent less on average on their new jobs than on the lost job, and 4) counting foregone earnings increases enjoyed by non-losers, full-time job losers who find new full-time jobs earn to 17 percent less on average on their new jobs than they would have had they not been displaced. This makes job loss an expensive and damaging event on average, and programs to help displaced workers with the transition need to be implemented and expanded.

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# 1 Introduction

A defining characteristic of the U.S. labor market is its fluid nature. Half of all new jobs (worker/employer matches) end in the first year and, at any point in time, about 20 percent of workers have been with their current employer for less than one year (Farber, 1999a).<sup>1</sup> This fluidity allows rapid reallocation of workers across sectors in response to demand shifts, and the relatively small direct costs to employers of laying off workers encourages hiring in the face of uncertain future demand. Rates of employment growth in the U.S. have dwarfed that in Western Europe in no small measure because of the small costs to firms of shedding workers in the U.S. as compared to in the European Community. However, this flexibility can impose substantial costs on the workers who lose jobs.

My goal here is to characterize the level of job loss and the costs to job losers over the 1981-2003 period and to look for changes over time, both cyclical and secular, in the types of workers who lose jobs and the costs borne by various types of job losers.

Perhaps the most comprehensive source of information on the incidence and costs of job loss in the United States is the Displaced Workers Survey (DWS), administered every two years since 1984 as a supplement to the Current Population Survey (CPS). In this paper I incorporate the data from the latest (January 2004) DWS, covering the period through 2003.<sup>2</sup> The tight labor market of the 1990s saw a dramatic reduction in the civilian unemployment rate from the average of 7.3 percent in the 1980s to a low of 4.0 percent in 2000. The annual average unemployment rate rose steadily through the 2001 recession and beyond, reaching 6.0 percent in 2003. Job loss and worker displacement are of particular concern in this period given the perceived continuing general weakness in the labor market, fears of worker displacement due to import competition and out-sourcing of jobs, and the substantial costs borne by job losers.

There are three important issues of measurement and interpretation that arise when comparing job loss rates calculated using the DWS over time.

1. First, the DWS asks only about a single involuntary job loss. The survey does not capture multiple job losses by the same worker. Neither does it capture worker termi-

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<sup>1</sup> Tabulation of the Mobility Supplement to the January 2004 Current Population Survey yields the result that 19.5 percent of workers have been with their employer for less than one year and 22.9 percent of workers have been with their employer for one year or less.

<sup>2</sup> Examples of earlier work using the DWS includes Farber (1993, 1997, 1998, 1999b, 2004), Podgursky and Swaim (1987), Kletzer (1989), Topel (1990), Gardner (1995), Neal (1995), Esposito and Fisher (1997), and Hipple (1999). I present a brief review of this literature in Farber (2004).

nations “for cause.” The survey is meant to capture worker terminations as the result of business decisions of the employer unrelated to the performance of the particular employee (e.g., a plant closing, a layoff, the abolition of a job). Thus, the measure of the job loss rate that I calculate is the fraction of workers who lost at least one job not “for cause” in the relevant period rather than the rate of destruction of worker-employer matches.

2. The DWS from 1984-1992 asked about job separations in the previous five years while the later DWS asked about job separation in the previous three years. The measure of job loss that I use is adjusted to account for this change in the recall period so that all rates are reported on a three-year basis. This adjustment is detailed in Farber (1997).
3. The basic wording of key questions changed since the inception of the DWS in 1984. This may have affected whether survey respondents would report a job separation in a particular circumstance as an involuntary separation in one survey but would not report a separation in the same circumstance as involuntary in another year. In Farber (1998) and Farber (2004), I use additional data from debriefing questions asked of a fraction of DWS respondents in 1996, 1998, and 2000 to investigate how changes in the wording of the key question may have affected the likelihood that a worker reported a particular separation as an involuntary job change. I use the results of that analysis to calculate re-weighted job loss rates that I present in this study.

Based on the three-year rates of job loss computed adjusting for the change in the recall period and for changes in the wording of the key job loss question, I find that the rate of job loss has followed a roughly cyclical pattern between 1981 and 2004. However, the overall rate of job loss increased through the 1993-95 period despite the sustained economic expansion and the rate of job loss increased during the 2001-2004 period despite the onset of the expansion in late 2001.

I investigate the consequences of job loss in several dimensions. These include post-displacement probability of employment, the probability of part-time employment, and the magnitude of the earnings loss suffered by job losers. I break the earnings loss into two components: 1) the difference between the earnings received by job losers workers on their post-displacement job and the earnings they received prior to displacement and 2) foregone earnings growth measured by the earnings growth received by a group of non-displaced workers. I find that more educated job losers have higher post-displacement employment rates and are more likely to be employed full-time. Those re-employed, even full-time and

regardless of education level, suffer significant earnings declines relative to what they earned before they were displaced. In addition to the decline in earnings, foregone earnings growth is an important additional part of the cost of job loss. One striking finding is that, for re-employed job losers with education beyond high school, the earnings loss is dramatically larger in the 2001-2003 period than in any earlier period for which there are data.

## 2 The Rate of Job Loss

I analyze data on 839,434 individuals between the ages of twenty and sixty-four from the DWSs conducted as part of the January CPSs in 1984, 1986, 1988, 1990, 1992, 2002, and 2004 and the February CPSs in 1994, 1996, 1998, and 2000. In these surveys, I count as job losers workers who reported a job loss in the three calendar years prior to the survey. Based on these data, I calculate the rate of job loss as the ratio of the number of reported job losers divided by the number of workers who were either employed at the survey date or reported a job loss but were not employed at the survey date. I then adjust these job loss rates as described in Farber (2004) to account for the change in the recall period from five years to three years in 1994 and changes in the wording of the key job loss question.<sup>3</sup>

Information on rates of job loss is presented most accessibly in graphical form, and the discussion here is organized around a series of figures.<sup>4</sup>

Figure 1 contains plots of adjusted three-year job loss rates computed from each of the ten DWSs from 1984-2004 along with the average civilian unemployment rate for each three-year period. The cyclical behavior of job loss is apparent, with job-loss rates clearly positively correlated with the unemployment rate ( $\rho = 0.39$ ). Both unemployment and job-loss rates were high in the 1981-83 period, and they both fell sharply during the expansion of the mid-1980's. However, the job-loss rate rose much more sharply from the 1987-89 to the 1989-91 period than did the unemployment rate. The job-loss rate rose by fully 3.1 percentage points (from 7.1 percent to 10.2 percent) while the average unemployment rate rose by only 0.2 percent (from 5.7 percent to 5.9 percent) over this period. Between 1993 and 1999, both the job-loss and unemployment rates fell sharply, but the gap between them remained larger than in the strong labor market of the late 1980s.

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<sup>3</sup> Job losers are asked to report the reason for their job loss. One allowable response is "other." The adjustment for changes in the wording of the key job loss question discounts job loss rates for "other" reasons by 37.4% for the 1984-1992 DWS and by 74.8% for the 1994 and later DWSs. See Farber (1998) for details.

<sup>4</sup> The numerical values underlying all figures in this study are contained in the appendix. All counts are weighted using the CPS sampling weights.

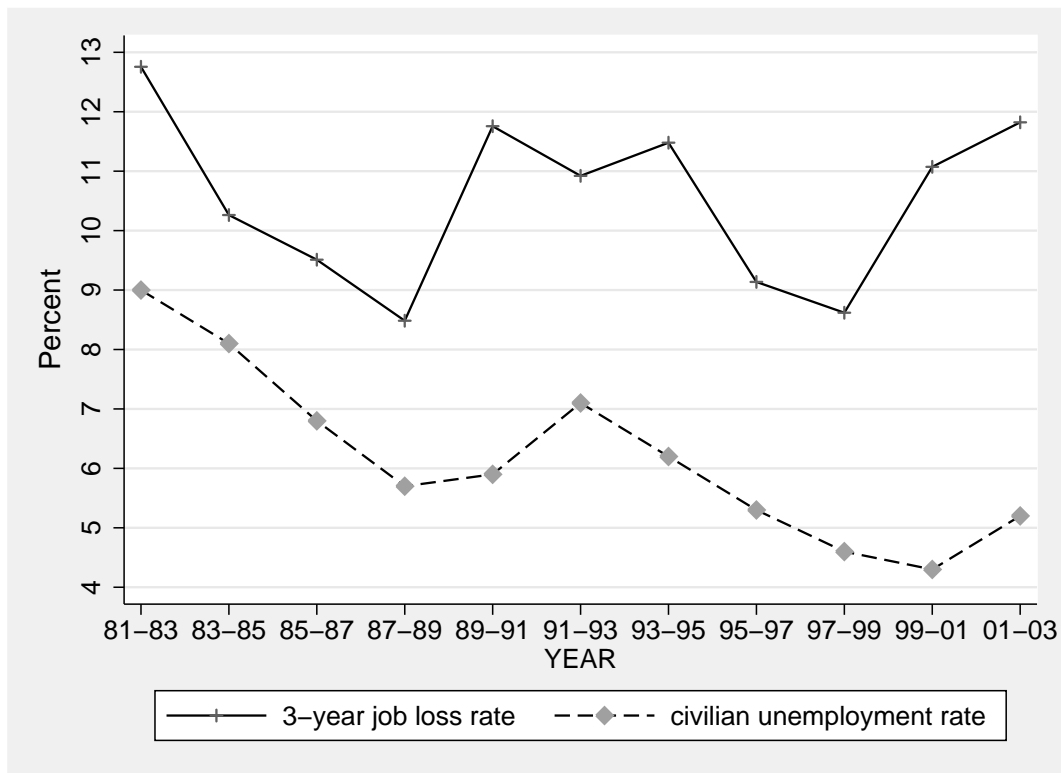


Figure 1: Unemployment and Job Loss Rates, by Year

The unemployment rate continued to fall in the 1999-2001 period before rising somewhat in the 2001-03 period. The job loss rate rose sharply after the 1997-99 trough through the 2001-03 period.<sup>5</sup> The gap between the job loss rate and the unemployment rate is the largest it has been over the history of the DWS.

Figure 2 contains three-year rates of job loss by year for each of four education categories. Not surprisingly, job loss rates are dramatically higher for less educated workers than for more educated workers. There is a strong cyclical pattern in job loss rates for less educated workers, but the cyclical pattern is weaker for more educated workers. For example, the job loss rate for workers with twelve years of education was 8.9 percent in 1997-99 (the lowest in the sample period) compared with 14.3 percent in 1981-83. In contrast, the job loss rate for

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<sup>5</sup> The use of three-year averages here hides the facts that the job loss rate was steady in 1999 and 2000 before increasing sharply in 2001 while the unemployment rate declined slightly in 1999 and 2000 before increasing slightly in 2001. The comparison of job loss rates for specific years of job loss compares the job loss rates across surveys computed using only job losers who reported losing jobs the same number of years prior to the survey date. For example, the 2001 job loss rate is computed from the 2002 DWS and compared with the 1999 job loss rate computed from the 2000 DWS. Similarly, the 2000 job loss rate is computed from the 2002 DWS and compared with the 1998 job loss rate computed from the 2000 DWS.

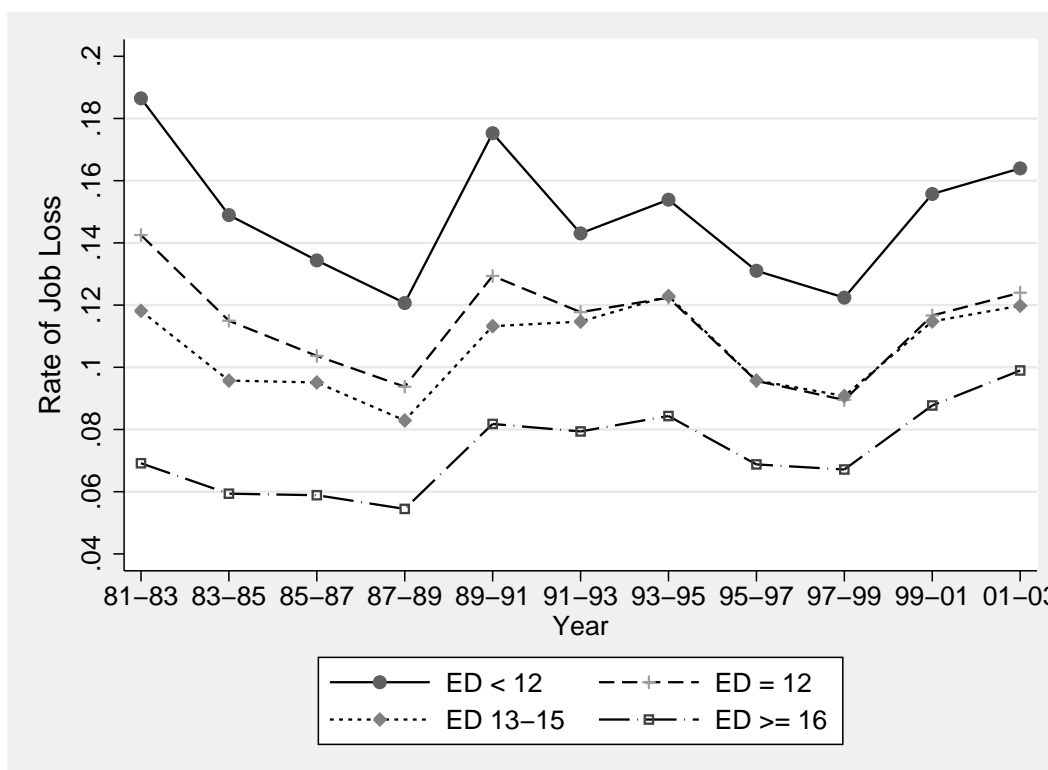


Figure 2: Three-Year Job Loss Rate by Education, 1981-2003.

workers with at least sixteen years of education was 6.7 percent in 1997-99 compared with 6.9 percent in 1981-83 and 5.4 percent in 1987-89. It does appear that there has been an upsurge in job loss rates for more educated workers in the early and mid-1990s and again early in the new century. The job loss rate for workers with at least 16 years of education attained its highest level in the 2001-2003 period, reaching 9.9 percent. Job loss rates for the other educational groups show a cyclical pattern but no upward trend.

Figure 3 contains three-year job loss rates by year for four age groups covering the range from 20-64. Job loss rates are highest for the youngest workers (20-29) and generally show the standard cyclical pattern. The job loss rates of the oldest two groups, ages 40-49 and 50-64, are very similar. There is little evidence here of a secular increase in job loss rates among older workers.

## 2.1 Has there been a Secular Increase in the Rate of Job Loss?

It is clear that job loss was slow to decline in the early stages of the economic expansion of the 1990s relative to the decline in the economic expansion of the 1980s. Overall job-loss

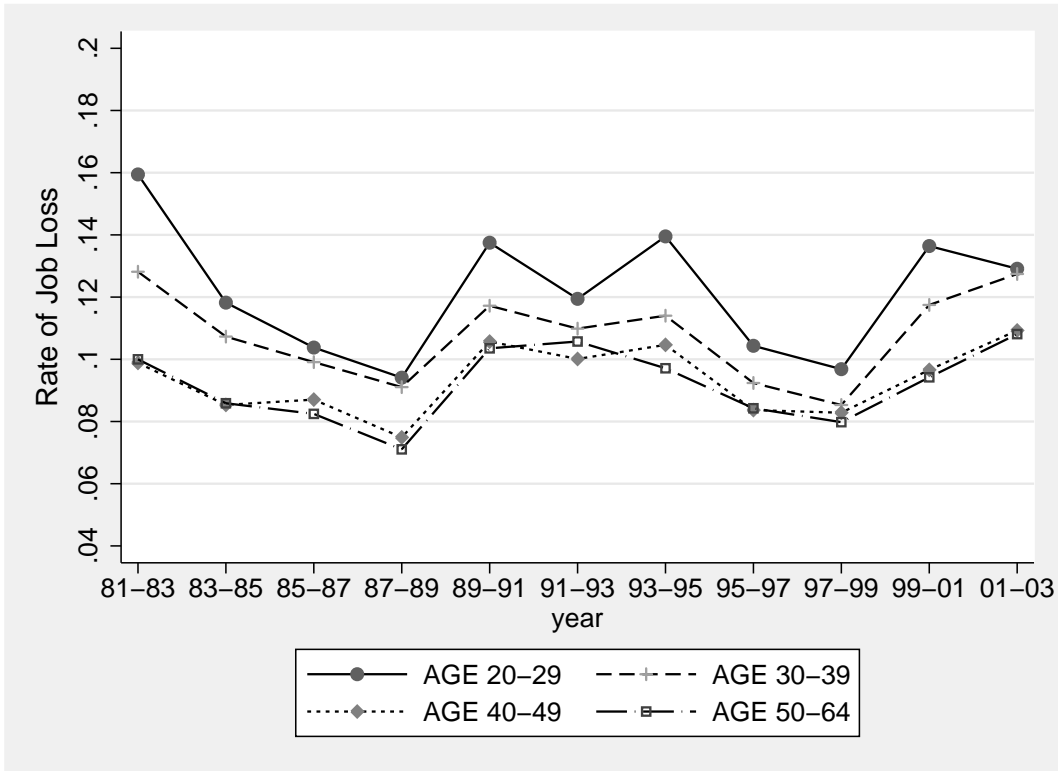


Figure 3: Three-Year Job Loss Rate by Age, 1981-2003.

rates did decline substantially beginning in the 1995-97 period, and, by 1997-1999, job-loss rates were approximately as low as they had been in the late 1980s. There was some variation by education and age. Job-loss rates among older and more educated workers did decline after 1995, but they remained higher than they were at the peak of the 1980s expansion. This may reflect the kinds of restructuring that has been the subject of much attention since the early 1990s. Job loss rates have increased substantially since the 1999-2001 period and have not yet declined. This is despite the fact that the recession, as timed by the National Bureau of Economic Research, ended in late 2001, and it is likely due to the lack of robust employment growth in the recovery to date.

### 3 The Consequences of Job Loss

Due to the unusual character of the recession of 2001 and the subsequent recovery beginning in November 2001, it is of interest to investigate how workers who lost jobs since 1991 have fared. The recession of 2001 followed a sustained expansion that lasted for almost ten years

and was of quite short duration itself, lasting only eight months or so.<sup>6</sup> The expansion in 2002 and 2003 featured rapid GDP and productivity growth but relatively little employment growth and only a small decline in the unemployment rate. Additionally, as I documented above, job-loss rates remained high.

I examine two sets of outcomes for displaced workers. The first set concerns post job-loss employment experience, and I examine survey date labor force status. These include rates of employment (both full- and part-time), unemployment and nonparticipation. The second set of outcomes concerns earnings among reemployed job losers. Here, I examine the change in weekly earnings for displaced workers between the pre-displacement job and the job held at the DWS survey date. Because earnings of displaced workers would likely have changed had the workers not been displaced, I also use a control group of workers from the outgoing rotation groups of the CPS to compute the change in earnings over the same period covered by each DWS for workers who were not displaced. I then use these changes to compute difference-in-difference (DID) estimates of the effect of displacement on earnings of re-employed workers.

The design changes in the DWS since 1994 complicate the analysis of the consequences of job loss. Most importantly, the follow-up questions designed to gather information on the characteristics of the lost job and experience since job loss were asked only of job losers whose reported reason for the job loss was one of three reasons: slack work, plant closing, or position/shift abolished. I term these the “big three” reasons. Workers who lost jobs due to the ending of a temporary job, the ending of a self-employment situation, or “other” reasons were not asked the follow-up questions. In order to maintain comparability across years my analysis, regardless of year, uses only workers who lost jobs for the “big three” reasons. Additionally, in order to have a consistent sample over time, I do not use information on job losers in the 1984-1992 DWSs whose reported job loss was more than three years prior to the interview date.

### 3.1 Post-Displacement Labor Force Status

In this section, I examine how distribution of survey-date labor force status of workers has varied over time and with other factors including sex, education, and age. Figure 4 contains plots of the fraction employed, unemployed and not in the labor force at the DWS survey

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<sup>6</sup> The Business Cycle Dating Committee of the National Bureau of Economic Research dated the recession as starting March 2001 and ending in November 2001. Source: <http://www.nber.org/cycles/july2003.html>.



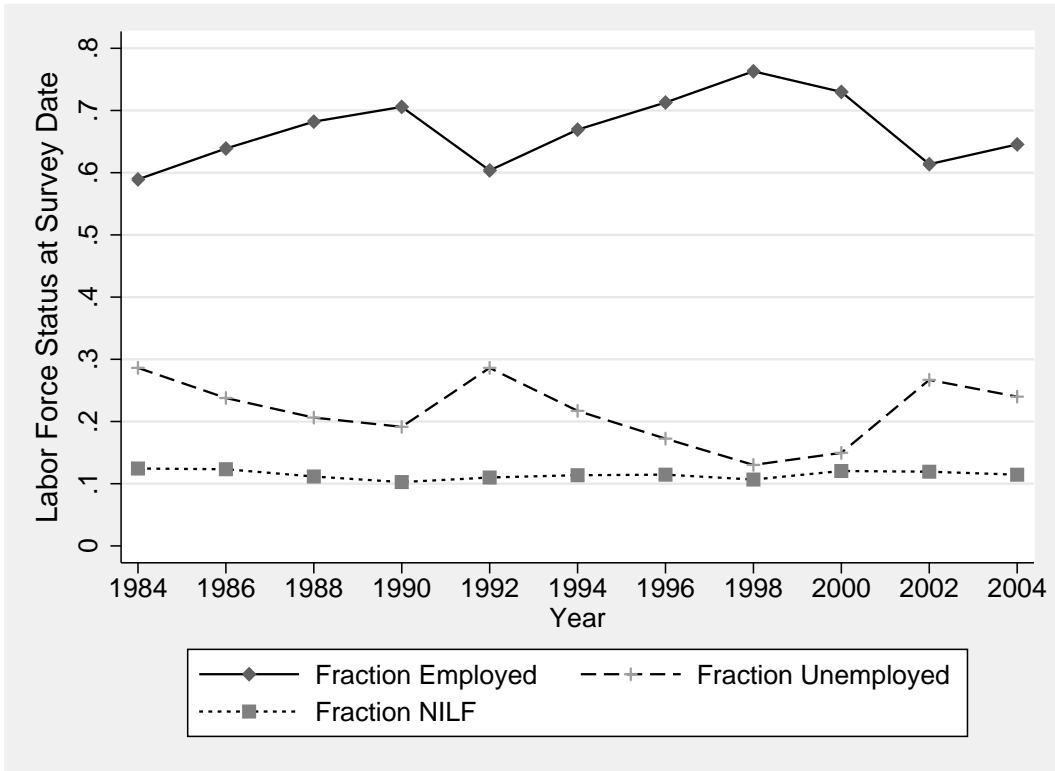


Figure 4: Survey Date Labor Force Status of Job Losers

dates for job losers in each of the DWSs. It is clear from this figure that the post-displacement employment rate is pro-cyclical, with relatively low rates in the slack labor market periods of 1981-83 and 1989-91. The figure also shows that the post-displacement employment rate has been increasing since 1989-91, reaching its highest levels in 1995-97 before declining slightly in 1997-99 and then more sharply in 1999-2001. The fraction employed increased slightly in the most recent (2001-2003) period.

Not surprisingly, the survey-date unemployment rate among job losers moves counter-cyclically, with peak unemployment rates at the 1984, 1992, and 2002 survey dates. This mirrors the movements noted in the employment fraction. The survey-date fraction of job losers not in the labor force is remarkably constant across all years, at about 10 percent. There is no evidence that job losers are disproportionately discouraged in recessions, leading to withdrawal from the labor force.

The use of aggregate fractions in figure 4 masks some important differences in labor force status across workers by sex, education, and age. Figure 5 contains plots of the distribution of survey-date labor force status by sex, and, while the male and female plots show the same cyclical patterns, it is clear that female job losers have weaker attachment to the

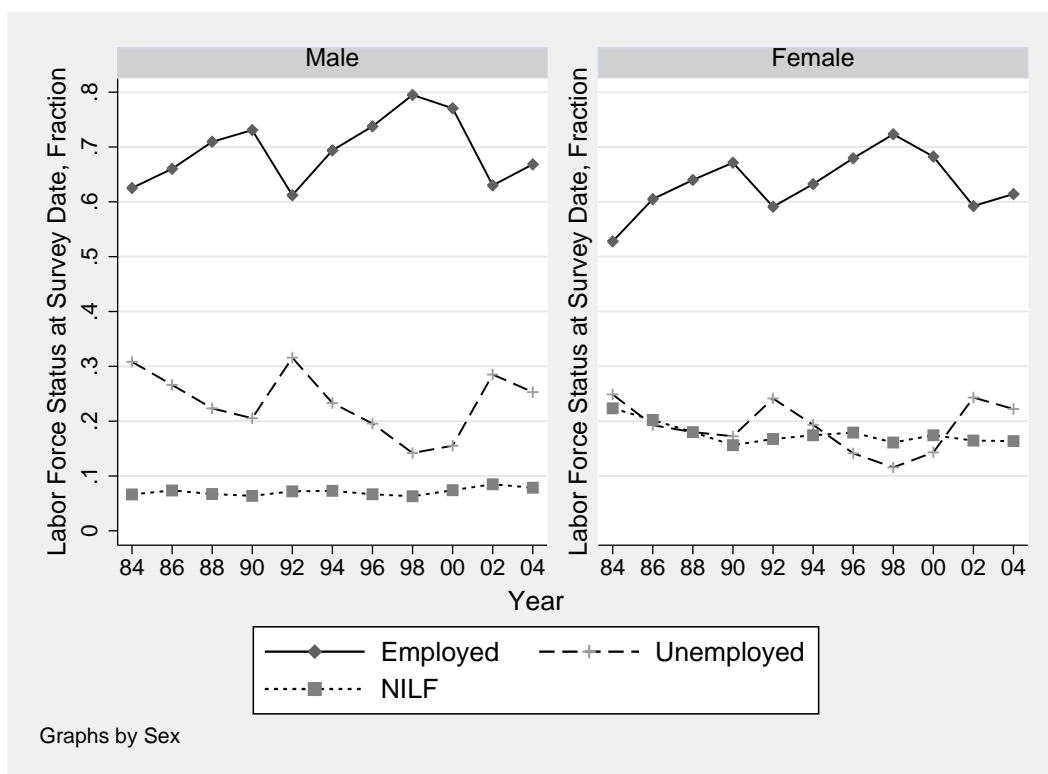


Figure 5: Survey Date Labor Force Status of Job Losers, by Sex

labor force. Women have lower post-displacement employment and unemployment rates and substantially higher fractions not in the labor force. It is worth noting that these differences by sex are among both men and women who were working and lost a job so that this does not simply reflect the fact that some women are consistently out of the labor force. It may reflect the fact that some women have a richer set of alternative activities on which to spend time, such as child bearing. It may be that the timing of job loss among females, with its exogenous loss of specific capital, affects the timing of fertility decisions.

Another important dimension along which there are differences is education. Figure 6 contains plots of survey-date employment probabilities for displaced workers by year broken down by education. Not surprisingly, the likelihood of post-displacement employment rises with education while there is a negative relationship between post-displacement unemployment and education.

The usual cyclical pattern of both the employment and unemployment fractions exists at all education levels. However, until recently, there was substantially more cyclical variation among the less educated. In the recent of the early 1990s, the fraction employed among college graduate job losers fell from a peak of about 82 percent in 1990 to a trough of

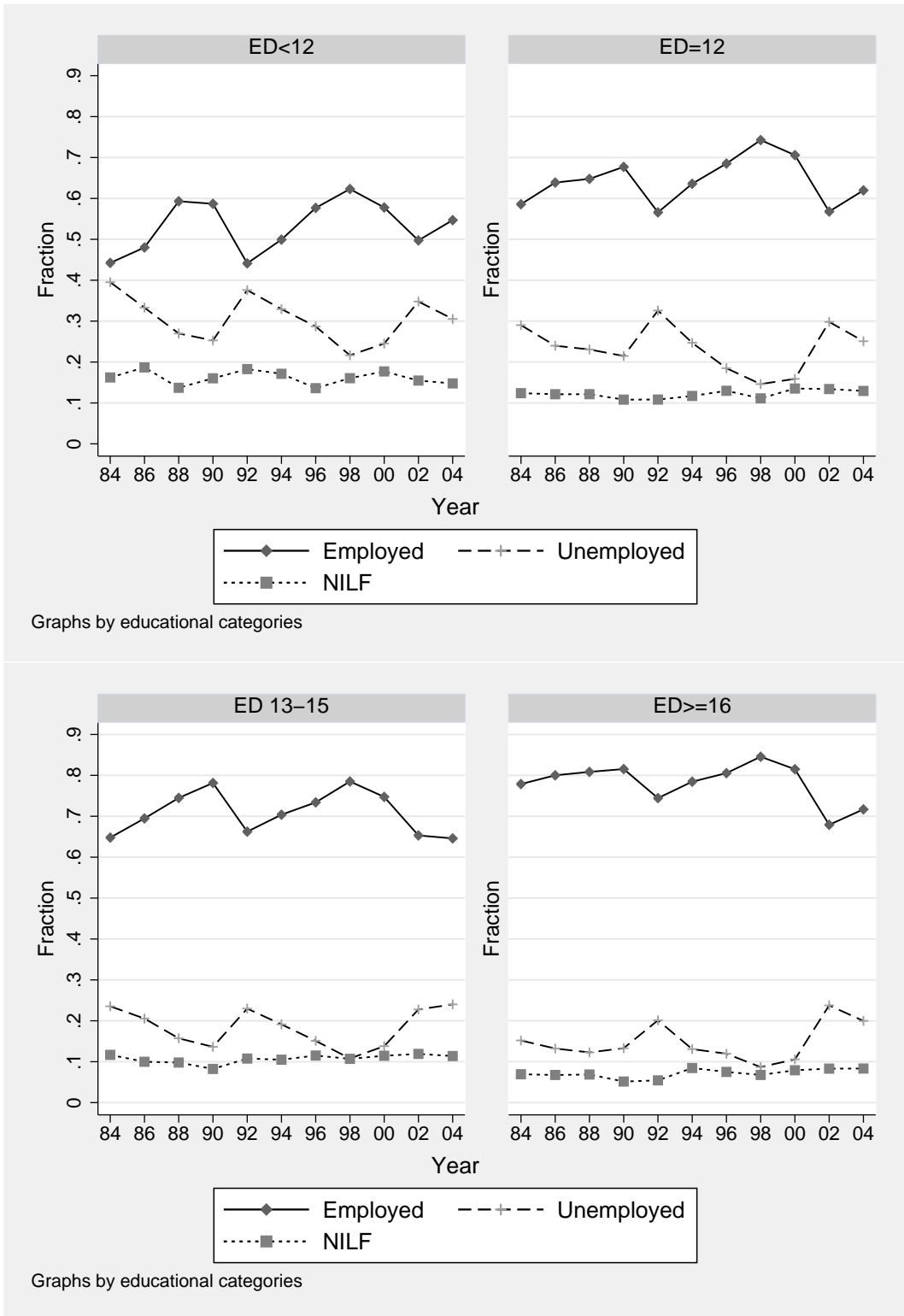


Figure 6: Survey Date Labor Force Status of Job Losers, by Education

74 percent in 1992, a decline of 8 percentage points. Over the same period, the fraction employed among high school graduate job losers fell from 68 percent to 57 percent, a decline of 11 percentage points. In the most recent recession, the fraction employed among college graduate job losers fell from a peak of about 85 percent in 1998 to a trough of 68 percent in 2002, a decline of 17 percentage points. Over the same period, the fraction employed among high school graduate job losers fell from 74 percent to 57 percent, also a decline of 17 percentage points. Fractions unemployed follow a similar pattern.

The likelihood of being out of the labor force post-displacement falls with education, although the gap by education level has narrowed slightly over time.

There are also strong differences in post-displacement labor force status by age. Figure 7 contains plots of survey-date employment probabilities for displaced workers by year broken down by age. As with sex and education, the usual cyclical pattern of both the employment and unemployment fractions exists at all age levels. Not surprisingly, prime-age job losers (25-54 years of age) have the strongest attachment to the labor force. They have the highest fraction employed and the lowest fraction out of the labor force. Interestingly, older job losers (55-64 years of age) are substantially more likely than younger job losers to be out of the labor force.

Since older job losers have, on average, more seniority on the lost job, it is likely that they lose more specific capital on average as a result of job loss than do younger workers. The result is that the gap between earnings on the lost job and likely reemployment earnings of older displaced workers will be relatively large. In this situation it would not be surprising that a substantial fraction of older displaced workers would decide to retire and report that they are not in the labor force subsequent to job loss.

### **3.2 Post-Displacement Full-Time / Part-Time Status**

Many re-employed job losers are employed part-time subsequent to job loss. Some of these workers lost part-time jobs but many had lost full-time jobs. In addition to having lower weekly earnings, it is well known that part-time workers have substantially lower hourly wage rates than do full-time workers. The DWSs collect information on part-time status (less than 35 hours per week) on the lost job, and it is straightforward to compute part-time status on post-displacement jobs from the standard CPS hours information. The analysis in this section focuses only on individuals employed at the survey date, and all part-time rates are computed based on this group of workers.

Figure 8 contains a plot of the fraction employed of employed job losers who are em-

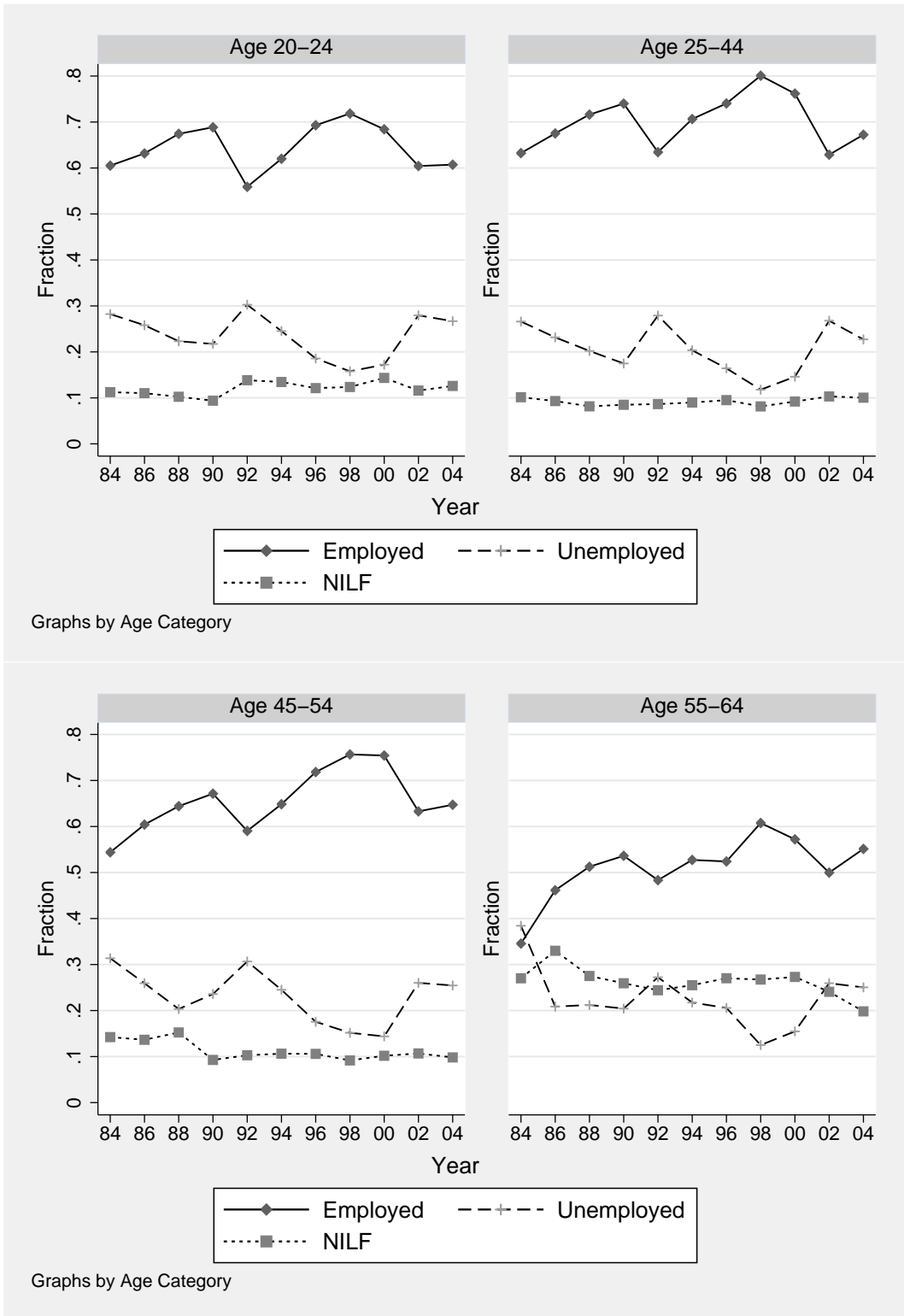


Figure 7: Survey Date Labor Force Status of Job Losers, by Age

employed part-time at each survey date conditional on part-time status on the lost job.<sup>7</sup> Not surprisingly, workers who lose part-time jobs are substantially more likely to be working on part-time jobs at the survey date. Many of these workers are part-time due to labor supply choices, and it is reasonable to expect that these workers would continue to choose to work part time. It is noteworthy, then, that on the order of 50 percent of part-time job losers are working full-time at the survey date.

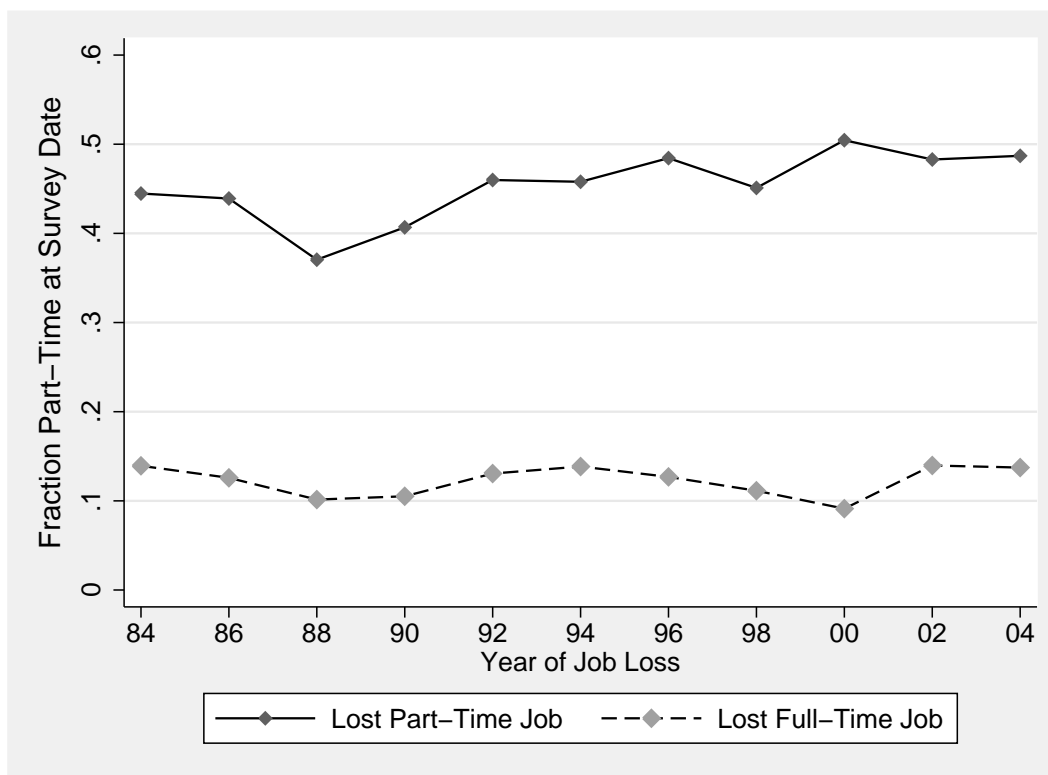


Figure 8: Fraction Part-Time at Survey Date, by Part-time Status on Lost Job

In terms of the cost of job loss, a more interesting group to study consists of those workers who lost full-time jobs. About ten percent of these workers are working part-time at the survey date. It appears that there is a cyclical component to the ability of full-time job losers to find full-time employment. The post-displacement part-time rate among full-time job losers is higher in the slack labor markets of the early 1980s and the early 1990s. This

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<sup>7</sup> Note that there is a problem of temporal comparability of the data on part-time employment at the survey date. The new survey instrument, first used in the 1994 CPS, asks a different battery of questions about hours of work on the current job, and this may have the effect of raising the fraction of workers reporting they are currently working part time (Polivka and Miller, 1998). The survey question regarding whether the lost job was part-time is unchanged in the 1994 and later DWSs.

part-time rate reached its lowest level in the late 1990s before increasing in 2002 and 2004.

There are important differences by sex in the post-displacement part-time employment rate. In order to illustrate these differences, figure 9 contains separate plots for males and females of the fraction employed of job losers employed part-time at each survey date conditional on part-time status on the lost job. The post-displacement part-time rate is substantially higher (about 10 percentage points) among females, even controlling for part-time status on the lost job. This is consistent with the earlier finding that, relative to male job losers, female job losers are less likely to be employed and more likely to be out of the labor force. Once again, this may be a labor supply response, reflecting the fact that some women have a richer set of alternative activities on which to spend time.

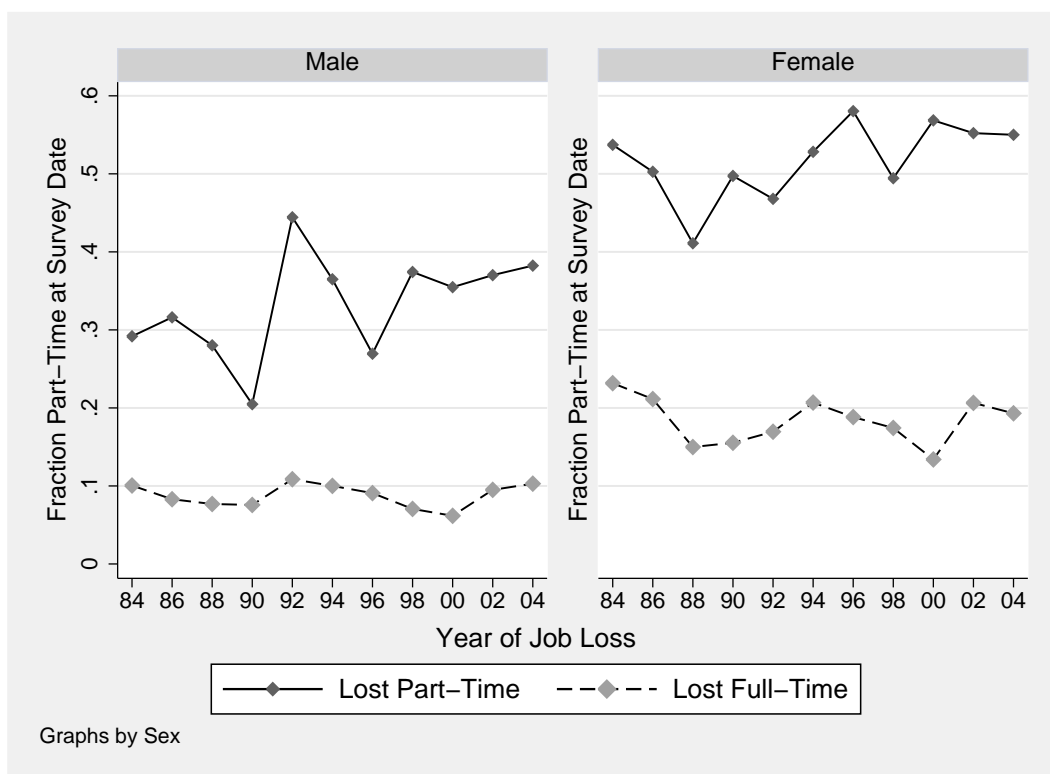


Figure 9: Fraction Part-Time at Survey Date, by Sex and Part-time Status on Lost Job

### 3.3 The Loss in Earnings Due to Displacement

The analysis of the loss in earnings of re-employed displaced workers proceeds in two stages. First, I investigate the change in earnings between the lost job and the job held at the DWS survey date. However, had the displaced worker not lost his or her job, earnings likely

would have grown over the interval between the date of job loss and the DWS survey date. Thus, second, I investigate the earnings loss suffered by displaced workers including both the decline in earnings of the displaced workers and the increase in earnings enjoyed by non-displaced workers that is foregone by displaced workers. In order to measure this earnings loss, a control group of non-displaced workers is required, and later in this section, I provide such a control group using data from the CPS outgoing rotation groups.

### 3.3.1 Difference Estimates of The Change in Earnings as a Result of Job Loss

I begin the analysis of earnings changes by examining the difference in real weekly earnings between the post-displacement job and the job from which the worker was displaced.<sup>8</sup> I restrict my analysis of weekly earnings changes to workers who make full-time to full-time employment transitions (i.e., lost a full-time job and are re-employed on a full-time job).<sup>9</sup>

Figure 10 contains the average decline in log real weekly earnings between the lost job and the survey-date job for workers who were not self-employed on either the lost job or the new job and who made full-time to full-time transitions broken down by survey year. It is clear that there is a strong cyclical component to the earnings change. The average earnings decline was quite large in 1981-83 (10.8 percent) and eventually fell to 5.6 percent in 1987-89 before rising to 11.3 percent in 1989-91. During the 1990s the decline in average real earnings decreased, falling to a statistically insignificant 0.2 percent in the 1997-99 period. The magnitude of the decline increased subsequently, rising to its highest level (13.6 percent) in the most recent period.

Figure 11 contains the average decline in log real weekly earnings between the lost job and the survey-date job for workers who make full-time to full-time transitions broken down by education. During the first part of the sample period (1981-1991), there were statistically significant differences in earnings changes across educational categories, with workers with more education suffering smaller earnings declines, on average, than workers with less education. However, since 1991 the differences in earnings changes across educational groups have not been statistically significant. There was a general decline in the earnings loss across

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<sup>8</sup> Earnings are deflated by the 1982-84=100 consumer price index (CPI). The CPI in the reported year of displacement is used to deflate earnings on the old job. The CPI for the DWS survey month is used to deflate current earnings.

<sup>9</sup> The change in real weekly earnings for workers who make a full-time to full-time transition is a straightforward measure, but it only gets at part of the effect of displacement on earnings. It does not account for the effect of job loss on unemployment spells, employment probabilities, or probabilities of part-time work. Nor does it account for earnings growth that may have occurred absent the job loss.



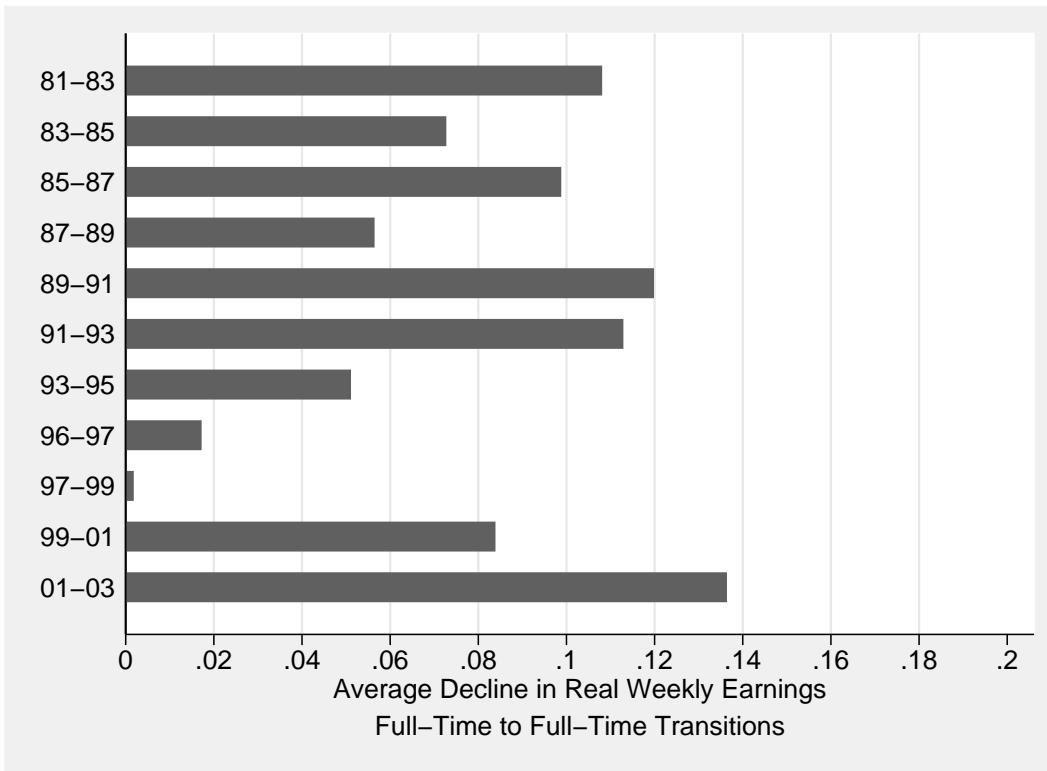


Figure 10: Average Decline in Log Weekly Earnings, by Year.

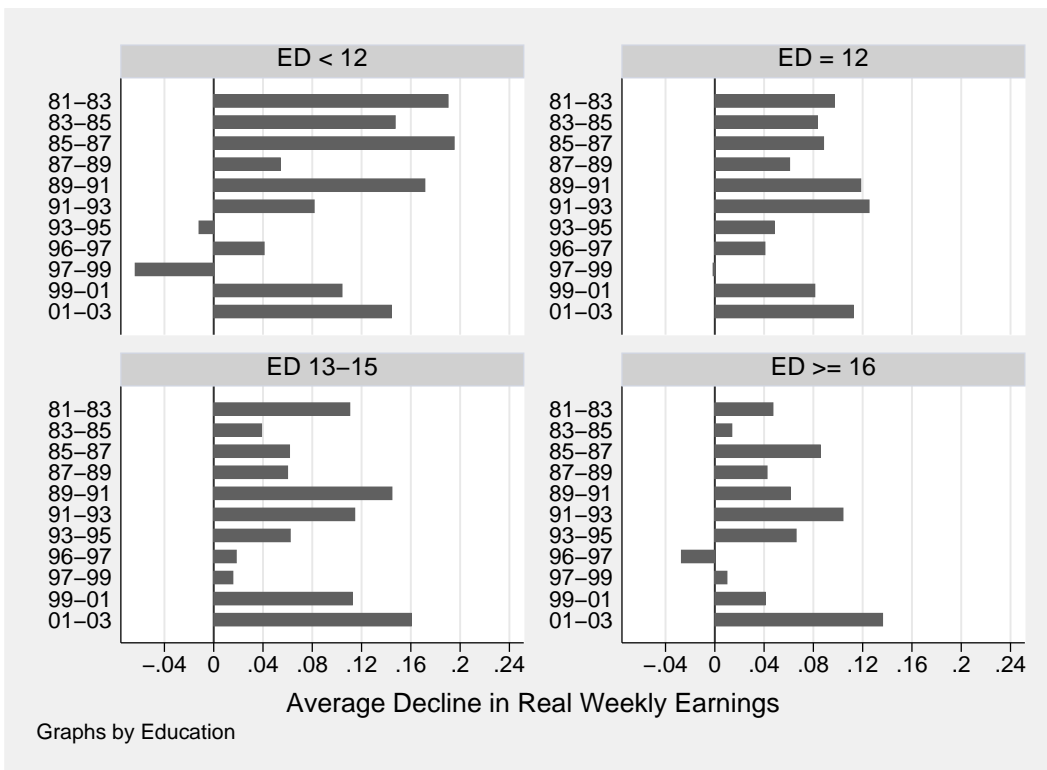


Figure 11: Average Decline in Log Weekly Earnings, by Year and Education

educational categories during the 1990s that has reversed since the 1999-01 period. One striking finding is that the average earnings decline of job losers who have attended college is now larger than the average earnings decline of workers with less education.

While not presented here, multivariate regression analysis of the earnings change of displaced workers shows no significant relationship with race or sex.<sup>10</sup> However, there is a very strong relationship between the change in earnings and tenure on the lost job. The average earnings loss is dramatically larger when the worker had accumulated substantial tenure on the lost job. This is consistent with the destruction of job specific human capital when a long-term job ends.<sup>11</sup>

### 3.3.2 Difference-in-Difference Estimates of the Effect of Job Loss on Earnings

In order to account for the extent to which earnings might have grown had the workers not been displaced, I generate a comparison group of workers using a random sample from the merged outgoing rotation group (MOGRG) files of the CPS for the three calendar years prior to each DWS (period 0) together with all workers from the outgoing rotation groups of the CPSs containing the DWSs (period  $t$ ). The data from MOGRG files of the CPS provides the period 0 earnings, and the data from the outgoing rotation rotation groups in the CPSs containing the DWSs provide the period  $t$  earnings. These data can then be used to compute difference-in-difference estimates of the effect of job loss on earnings as follows.

Define the change in log real earnings for displaced workers as

$$\Delta_d = (\ln W_{dt} - \ln W_{d0}), \quad (1)$$

and define the difference in log real earnings for workers in the comparison group as

$$\Delta_c = (\ln W_{ct} - \ln W_{c0}), \quad (2)$$

where  $d$  refers to displaced workers (the “treatment” group),  $c$  refers to non-displaced workers (the “control” group),  $t$  refers to “current” (post-displacement) period, and 0 refers to the “initial” (pre-displacement) period. The difference-in-difference estimate of the loss in real weekly earnings due to job loss in is computed as

$$\Delta\Delta = \Delta_d - \Delta_c. \quad (3)$$

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<sup>10</sup> See Farber (2004) for presentation of regression results on the earnings change through the 2002 DWS.

<sup>11</sup> Kletzer (1989), Neal (1995), and Parent (1995) address the issue of job loss and specific capital, both at the firm and industry level.

Assuming average earnings would have grown rather than declined in the absence of displacement,  $\Delta_c$  will be positive so that the difference-in-difference estimate of the average earnings decline ( $\Delta\Delta$ ) will be larger in absolute value than the simple difference estimate ( $\Delta_d$ ).

Ideally, the comparison group would contain only workers who had not lost a job during the relevant period. While I can identify the displaced workers in period  $t$  (since the data come from the CPSs with DWSs), I cannot identify the workers who will be displaced in the MOGRG samples. To the extent that earnings growth for displaced workers is different from that for the non-displaced workers, earnings growth computed from the control group as defined here would lead to biased estimates of earnings growth for a group of non-displaced workers. However, the estimates based on the outgoing rotation groups can be adjusted to provide unbiased estimates of the earnings change for a control group of non-displaced workers. the effect of job loss on earnings.

The observed wage change of workers in the outgoing rotation groups (which include both displaced and non-displaced workers) is a probability-of-job-loss weighted average of the change in earnings for displaced and non-displaced workers. Define the change in earnings for the outgoing rotation groups as

$$\Delta_g = (1 - \theta)\Delta_c + \theta\Delta_d, \quad (4)$$

where  $\Delta_g$  is the earnings change in the outgoing rotation group sample ( $\ln W_{gt} - \ln W_{g0}$ ) and  $\theta$  is the fraction of workers in the outgoing rotation group sample who lost a job (the displacement rate).

The observable quantities are  $\Delta_g$  and  $\Delta_d$ , but calculation of the difference-in-difference estimate of the earnings change due to job loss requires both  $\Delta_d$  and  $\Delta_c$  (equations 1 and 2).<sup>12</sup> I can compute  $\Delta_c$  with the available data on  $\Delta_g$ ,  $\Delta_d$ , and  $\theta$ . Using equation 4, the change in earnings for the comparison group is

$$\Delta_c = \frac{\Delta_g - \theta\Delta_d}{(1 - \theta)}, \quad (5)$$

and the difference-in-difference estimate of the effect of job loss on earnings is

$$\Delta\Delta = \frac{\Delta_d - \Delta_g}{(1 - \theta)}. \quad (6)$$

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<sup>12</sup> Note that I do not use the information on who is displaced that is available in the DWS outgoing rotation groups. My estimate of  $\Delta_g$  includes both displaced and non-displaced workers at both time 0 and time  $t$ .

Intuitively, the samples from the outgoing rotation groups are “contaminated” with displaced workers so that the difference-in-difference estimate computed using this contaminated control group need to be scaled up by the factor  $\frac{1}{(1-\theta)}$  to compensate.

In order to get initial earnings for the “contaminated” comparison group ( $lnW_{g0}$ ), I take a random sample from the merged outgoing rotation group CPS file (MOGRG) each year from 1981-2003.<sup>13</sup> The resulting comparison sample of initial earnings for full-time workers contains 121,550 observations.

The CPSs containing the DWSs have two outgoing rotation groups (OGRGs) with earnings data for all workers. These provide the observations on current earnings for the “contaminated” comparison group of non-displaced workers ( $lnW_{gt}$ ). This sample contains observations on full-time earnings for 119,269 workers at the DWS survey date.

The source of data for the treatment group earnings is clear. These data come from the DWSs, where  $lnW_{dt}$  is survey-date earnings for displaced workers and  $lnW_{d0}$  is earnings on the lost job. The predisplacement sample consists of all displaced workers who were not self-employed but were employed full-time on the lost job and who were employed with earnings available at the survey date (n=21,264). The postdisplacement sample consists of all displaced workers who were not self-employed but were employed full-time at the survey date and who had earnings data available on the lost job (n=19,460).

The difference-in-difference estimates are derived from separate ordinary least squares (OLS) regressions for each DWS survey year of log real earnings (deflated by the CPI) on a set of worker characteristics and an indicator for time period (before or after displacement), an indicator for whether the observation is part of the “contaminated” control sample or part of the displacement sample, and the interaction of the time period and sample indicators.<sup>14</sup>

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<sup>13</sup> The size of the random sample was set so that 1) the size of the sample with initial earnings on the control group was expected to be the same size as that with current earnings on the control group (two rotation groups) and 2) the distribution of years since the associated DWS survey date roughly mimicked the distribution of years since displacement in the sample of displaced workers. In other words, a separate control sample was drawn for each DWS from the three MOGRGs for the years immediately prior to the DWS that reflected the distribution of time since job loss. Each MOGRG file has 24 rotation groups (2 per month for 12 months). Denote the share of reported job loss one, two, and three years prior to the survey date  $t$  as  $p_{1t}$ ,  $p_{2t}$ , and  $p_{3t}$  respectively. In order to get the appropriate sample size in survey year  $t$ , I took a random sample with probability  $(p_{1t})(2)/24$ . Similarly, for the second and third years prior to to the DWS I took random samples with probability  $(p_{2t})(2)/24$  and  $(p_{3t})(2)/24$ , respectively.

<sup>14</sup> Note that I do not calculate first-differenced estimates for the displaced workers, as I did in section 3.3.1, despite the fact that the observations are paired. This is because observations for the control group are from a set of cross-sections and are not paired. I do not account for the correlation over time in the two observations for each displaced worker.

This regression is

$$\ln W_{is} = X_{is}\beta + \gamma_1 T_s + \gamma_2 D_i + \gamma_3 T_s D_i + \epsilon_{is}, \quad (7)$$

where  $\ln W_{is}$  measures log real full-time earnings for individual  $i$  in period  $s$  (either 0 or  $t$ ),  $X$  is a vector of individual characteristics,  $\beta$  is a vector of coefficients,  $T_s$  is a dummy variable indicating the post-displacement period,  $D_i$  is a dummy variable indicating the displacement sample, and  $\epsilon$  is an error term.<sup>15</sup> The parameters  $\gamma_j$  are used along with information from the DWS on job loss rates ( $\theta$ ) to compute estimates of the earnings effects as follows:

$$\Delta_d = \gamma_1 + \gamma_3, \quad (8)$$

$$\Delta_c = \gamma_1 - \frac{\theta\gamma_3}{(1-\theta)}, \quad \text{and} \quad (9)$$

$$\Delta\Delta = \frac{\gamma_3}{(1-\theta)}. \quad (10)$$

Figure 12 contains the overall regression-adjusted difference-in-difference estimates of the earnings loss from job loss for full-time workers for each year.<sup>16</sup> In order for the figure to be clearly readable, the earnings loss for displaced workers is presented as a positive number (the negative of the earnings change for displaced workers:  $-\Delta_d$ ). The foregone earnings increase is  $\Delta_c$ , and the Diff-in-Diff earnings effect is  $\Delta\Delta$ . Note that these estimates incorporate the effect of normal growth along the age-earnings profile. This is because the age variables in the regression are measured at the DWS survey date (period  $t$ ) for both the period 0 and period  $t$  observations.<sup>17</sup> The results show that in the 1980s displaced workers earned about 9 percent less on average after displacement than before while earnings for the control group rose by about 4.5 percent over the same period. The difference-in-difference estimate of the earnings loss is the difference between these numbers, which is a loss of about 13 percent during the 1980s.<sup>18</sup> The 1990s show a more striking pattern. The earnings decline of displaced workers in the 1990s dropped sharply during the decade, from 11.3 percent in

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<sup>15</sup> The  $X$  vector includes a constant, dummy variables for sex, race, nine age categories, and four educational categories.

<sup>16</sup> These differences in log earnings are approximations to the appropriate proportional differences in earnings levels that are reasonably accurate for values of  $|\Delta| < 0.2$ . Since some estimated values are outside this range, I convert each of the estimates to the appropriate proportional difference as  $\exp(\Delta) - 1$  and proceed using these transformed measures.

<sup>17</sup> This is one reason why it was important that the sample fractions in the initial-earnings control group mimic the fractions in the treatment group with respect to the time until the DWS survey date.

<sup>18</sup> Since in the figure I present the earnings loss rather than the earnings change for displaced workers, the difference-in-difference estimate is the negative of the sum of the earnings decline for displaced workers and the foregone earnings increase.

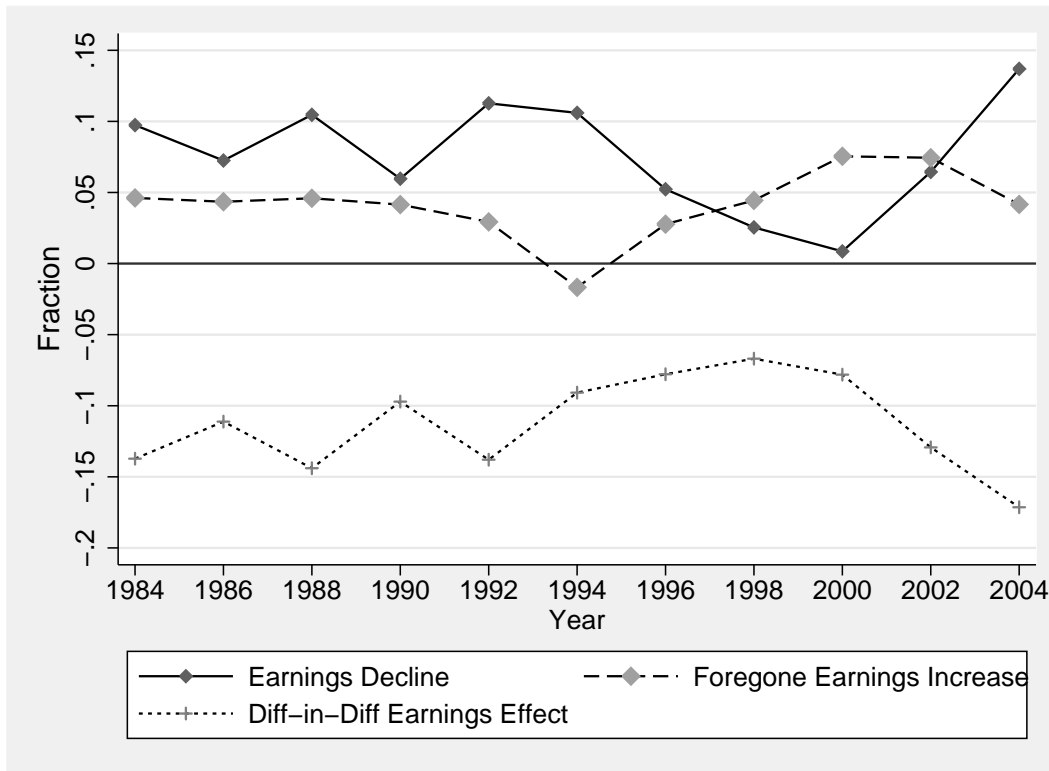


Figure 12: Difference-in-Difference Analysis of Proportional Earnings Loss.

the 1989-91 period to a statistically insignificant 0.9 percent in 1997-99. During the same period, the earnings growth of the control group increased from 2.9 percent in 1989-91 to 7.5 percent in 1997-99, reflecting the general increase in real wages in the late 1990s. The difference-in-difference estimate of the earnings loss associated with job loss decreased during the 1990s (from a high of 13.8 percent in 1989-91 to a low of 6.7 percent in 1995-97), reflecting the fact that the earnings decline suffered by displaced workers fell by more than earnings grew among the comparison group.

The picture changes dramatically beginning with the most recent recession. While the foregone earnings increase fell somewhat from 7.5 percent in 1997-1999 to 4.2 percent in 2001-03, the earnings decline suffered by displaced workers increased substantially from virtually zero in the 1997-99 period to 13.7 percent in 2001-03. The result is that the difference-in-difference estimate of the earnings loss from displacement increased from 7.8 percent in 1997-99 to 17.1 percent in 2001-03.

Figure 13 contains difference-in-difference estimates of the earnings loss by education

category.<sup>19</sup> Examining the year-by-year estimates by education level, there are some interesting changes over time. Not surprisingly given the work on increased inequality and the decline in earnings among the less-skilled, job losers with less than a high-school education suffered dramatic earnings losses in the 1980s. This improved in the early 1990s, but the difference-in-difference estimate of the earnings loss for these workers has been increasing since the mid-1990s. The estimated earnings losses are relatively stable (in the 10 to 15 percent range) over time for high-school graduates although the composition has shifted from predominantly an earnings decline to more weight on foregone earnings growth.

The situation among job losers with more than a high-school education is particularly striking since the late 1990s. The difference-in-difference estimate of the earnings loss associated with job loss for workers with 13-15 years of education workers increased dramatically to about 20 percent in the 2001-2003 period, more than tripling from about 6 percent in 1997-99. For these workers, the cause is a sharp increase in the earnings decline associated with job loss from zero in 1997-99 to 16.5 percent in 2001-2003. The pattern is even starker for workers with at least 16 years of education. The difference-in-difference estimate of the earnings loss for these workers increased to 21 percent in the 2001-2003 period, more than quadrupling from about 4.5 percent in 1995-97. For these workers, the cause is also a sharp increase in the earnings decline associated with job loss from less than zero (-2.5 percent) in 1995-97 to 16.1 percent in 2001-2003. It is worth noting that, unlike in earlier periods, the earning decline suffered by workers with more than a high-school education dwarfs that suffered by workers with a high-school education or less.

It is also worth noting that foregone earnings growth (the earnings change of the control group) has become a more important component of the overall earnings effect of job loss since the 1990s. This was particularly true for workers with at least sixteen years of education since 1995, but it is a factor in all education groups in the 1995-99 period. Job losers with at least sixteen years of education in the 1997-1999 period suffered a dramatic real earnings decline on average while the earnings of the college-educated control group saw a sharp rise in real earnings. This pattern reversed somewhat in the 2001-03 period, with foregone earnings growth becoming less important relative to the earnings decline among those displaced.

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<sup>19</sup> These estimates are based on separate regressions by educational category for each year.

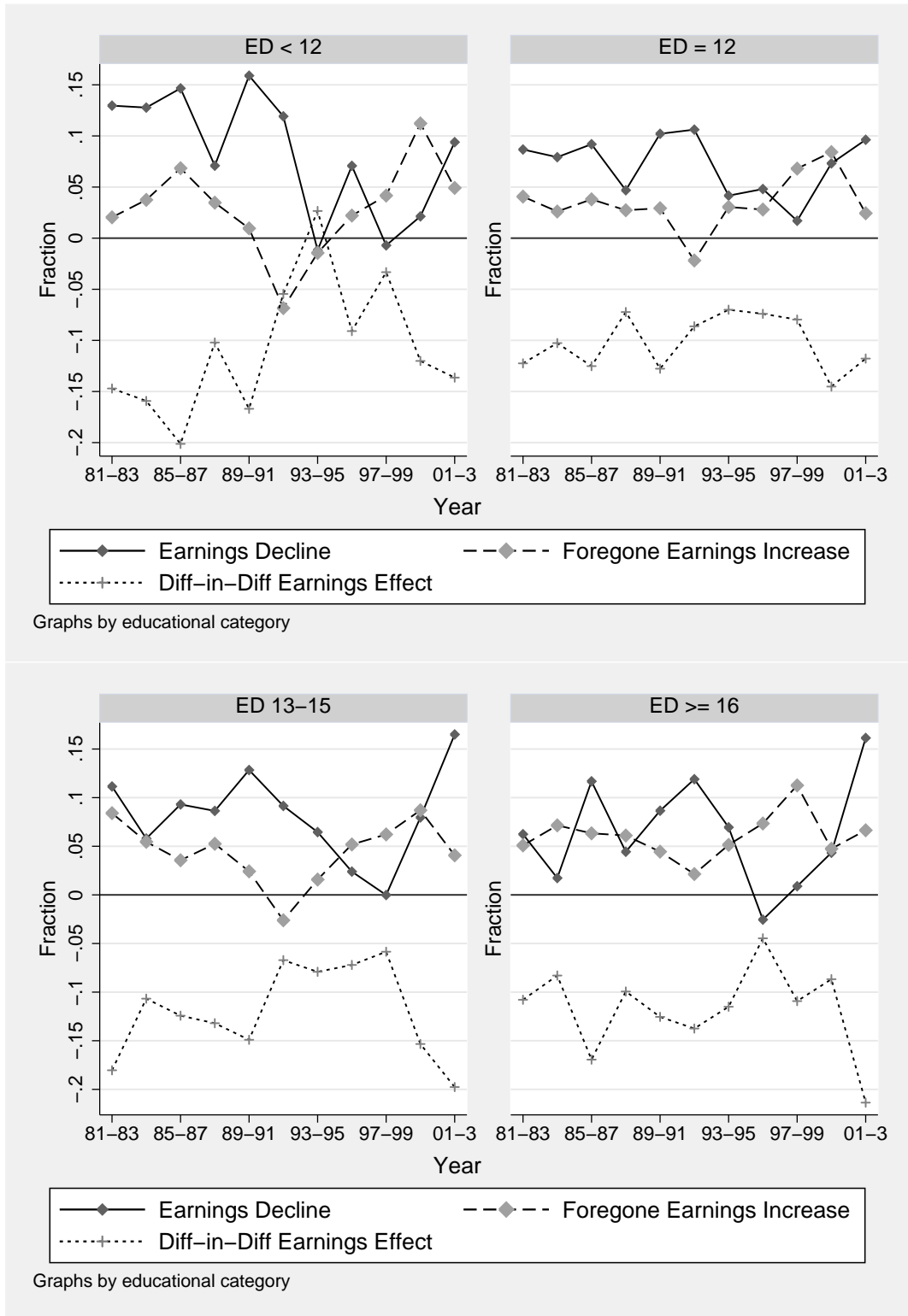


Figure 13: Difference-in-Difference Analysis of Proportional Earnings Loss, by Education.



## 4 Concluding Remarks

Job loss and worker dislocation are facts of life in the U.S. economy. They are part of an efficient labor allocation process. The problem is in the costs that are borne by job losers. While these costs are cyclical, they are substantial even in good times. In the most recent period (2001-2003),

- about 35 percent of job losers are not employed at the subsequent survey date,
- about 13 percent re-employed full-time job losers are holding part-time jobs,
- full-time job losers who find new full-time jobs earn about 13 percent less on average on their new jobs than on the lost job, and
- counting foregone earnings increases enjoyed by non-losers, full-time job losers who find new full-time jobs earn to 17 percent less on average on their new jobs than they would have had they not been displaced.

These measures likely substantially understate the true economic cost of job loss. First, time spent unemployed by those workers who are re-employed is not considered. Second, more hinges on employment, particularly full-time employment, in the U.S. than in other developed countries. Health insurance and pensions are closely linked to employment, and many workers do not have alternative access to these important benefits. This makes job loss an expensive and damaging event on average.

There is an underlying tension here between equity and efficiency. Most economists argue that low costs of shedding workers is efficiency enhancing, resulting in higher total output. However, the costs of this reallocation are shared inequitably. Workers generally bear too large a share of the burden, particularly when measured relative to their resources. These costs, to the extent they reflect non-employment or under-employment, also represent inefficiency. An economy with too many unemployed workers is operating inside its production possibilities frontier, and resources are being wasted.

One appropriate policy response is to speed the reallocation of workers to appropriate alternative employment. Perhaps modern information technology, including internet job listings, job search, and so on, would be useful. A second appropriate policy response is helping workers acquire new skills suitable to a changing economy. Another, more controversial, policy response would be relocation aid to encourage displaced workers to relocate geographically to alleviate any geographic mismatch of workers and jobs. While this may

make sense in purely economic terms, such mobility away from hard-hit areas imposes serious social costs. However, living in chronically depressed communities also imposes such costs. A program of universal health care that is not linked to employment would also mitigate some of the costs of job loss.

To conclude, job loss is a fact of life in the U.S. This is both a strength and a weakness of our economy. The core problem is how to manage job loss to minimize the costs borne by displaced workers and the communities they live in. Programs to aid matching of firms and workers, education and retraining of job losers, relocation aid, and alternative sources of health care and other job-related benefits can all play a role.

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## APPENDIX

Appendix Table 1:  
Three-Year Rate of Job Loss and Unemployment Rate, 1981-2003  
(Numbers for Figure 1)

All Individuals		
Year	Job-Loss Rate	Unemployment Rate
1981-83	12.8	9.0
1983-85	10.3	8.1
1985-87	9.5	6.8
1987-89	8.5	5.7
1989-91	11.8	5.9
1991-93	10.9	7.1
1993-95	11.5	6.2
1995-97	9.1	5.3
1997-99	8.6	4.6
1999-01	11.1	4.3
2001-03	11.8	5.2

Appendix Table 2:  
Three-Year Rate of Job Loss by Education, 1981-2003  
(Numbers for Figure 2)

Year	ED < 12	ED = 12	ED 13-15	ED ≥ 16
1981-83	0.186	0.143	0.118	0.069
1983-85	0.149	0.115	0.096	0.059
1985-87	0.134	0.104	0.095	0.059
1987-89	0.121	0.094	0.083	0.054
1989-91	0.175	0.129	0.113	0.082
1991-93	0.143	0.118	0.115	0.079
1993-95	0.154	0.122	0.123	0.084
1996-97	0.131	0.096	0.096	0.069
1997-99	0.122	0.090	0.091	0.067
1999-01	0.156	0.117	0.115	0.088
2001-03	0.164	0.124	0.120	0.099

Appendix Table 3:  
Three-Year Rate of Job Loss by Age, 1981-2003  
(Numbers for Figure 3)

Year	Age 20-24	Age 25-44	Age 45-54	Age 55-64
1981-83	0.159	0.128	0.099	0.100
1983-85	0.118	0.107	0.085	0.086
1985-87	0.104	0.099	0.087	0.082
1987-89	0.094	0.091	0.075	0.071
1989-91	0.137	0.117	0.106	0.104
1991-93	0.119	0.110	0.100	0.106
1993-95	0.140	0.114	0.105	0.097
1996-97	0.104	0.092	0.084	0.084
1997-99	0.097	0.085	0.083	0.080
1999-01	0.136	0.117	0.097	0.094
2001-03	0.129	0.127	0.109	0.108

Appendix Table 4:  
 Post-Displacement Labor Force Status, 1984-2004  
 (Numbers for Figure 4)

Year	Employed	Unemployed	NILF
1981-83	0.589	0.286	0.124
1983-85	0.639	0.238	0.123
1985-87	0.682	0.206	0.112
1987-89	0.706	0.191	0.103
1989-91	0.604	0.286	0.110
1991-93	0.669	0.217	0.114
1993-95	0.713	0.172	0.115
1996-97	0.763	0.130	0.107
1997-99	0.730	0.150	0.120
1999-01	0.614	0.267	0.119
2001-03	0.646	0.240	0.115

Appendix Table 5:  
 Post-Displacement Labor Force Status, 1984-2004, by Sex  
 (Numbers for Figure 5)

Year	Male			Female		
	Employed	Unemployed	NILF	Employed	Unemployed	NILF
1981-83	0.625	0.308	0.066	0.528	0.249	0.223
1983-85	0.660	0.266	0.074	0.605	0.193	0.202
1985-87	0.710	0.223	0.067	0.640	0.180	0.180
1987-89	0.731	0.205	0.064	0.671	0.172	0.156
1989-91	0.612	0.316	0.072	0.591	0.241	0.168
1991-93	0.694	0.233	0.073	0.632	0.193	0.174
1993-95	0.738	0.196	0.067	0.679	0.141	0.179
1996-97	0.795	0.142	0.063	0.723	0.116	0.161
1997-99	0.771	0.155	0.074	0.683	0.143	0.174
1999-01	0.630	0.285	0.085	0.592	0.243	0.165
2001-03	0.668	0.253	0.079	0.614	0.222	0.164

Appendix Table 6:  
 Post-Displacement Labor Force Status, 1984-2004, by Education  
 (Numbers for Figure 6)

Year	ED < 12			ED = 12		
	Employed	Unemployed	NILF	Employed	Unemployed	NILF
1981-83	0.442	0.395	0.162	0.586	0.290	0.124
1983-85	0.480	0.333	0.187	0.639	0.240	0.121
1985-87	0.593	0.270	0.137	0.648	0.231	0.121
1987-89	0.587	0.253	0.160	0.677	0.215	0.108
1989-91	0.441	0.376	0.183	0.566	0.326	0.108
1991-93	0.499	0.329	0.171	0.636	0.247	0.117
1993-95	0.577	0.287	0.136	0.685	0.185	0.130
1996-97	0.623	0.217	0.160	0.743	0.146	0.111
1997-99	0.578	0.245	0.177	0.706	0.159	0.135
1999-01	0.497	0.348	0.155	0.568	0.298	0.134
2001-03	0.547	0.305	0.148	0.620	0.251	0.129

Year	ED 13-15			ED ≥ 16		
	Employed	Unemployed	NILF	Employed	Unemployed	NILF
1981-83	0.648	0.235	0.117	0.779	0.152	0.069
1983-85	0.695	0.205	0.100	0.800	0.132	0.068
1985-87	0.745	0.157	0.098	0.808	0.123	0.069
1987-89	0.781	0.136	0.082	0.815	0.133	0.052
1989-91	0.662	0.230	0.108	0.744	0.201	0.054
1991-93	0.704	0.191	0.105	0.785	0.131	0.085
1993-95	0.734	0.151	0.115	0.805	0.119	0.075
1996-97	0.785	0.108	0.107	0.846	0.087	0.068
1997-99	0.747	0.138	0.115	0.815	0.106	0.079
1999-01	0.653	0.228	0.119	0.679	0.238	0.083
2001-03	0.646	0.240	0.114	0.717	0.200	0.083

Appendix Table 7:  
 Post-Displacement Labor Force Status, 1984-2004, by Age  
 (Numbers for Figure 7)

Year	Age 20-24			Age 25-44		
	Employed	Unemployed	NILF	Employed	Unemployed	NILF
1981-83	0.605	0.282	0.112	0.632	0.266	0.101
1983-85	0.632	0.258	0.110	0.675	0.232	0.093
1985-87	0.674	0.223	0.102	0.716	0.202	0.082
1987-89	0.689	0.217	0.094	0.740	0.175	0.085
1989-91	0.559	0.303	0.138	0.634	0.279	0.087
1991-93	0.620	0.245	0.135	0.706	0.204	0.090
1993-95	0.693	0.186	0.121	0.740	0.164	0.095
1996-97	0.718	0.158	0.124	0.801	0.118	0.081
1997-99	0.684	0.172	0.143	0.762	0.146	0.092
1999-01	0.604	0.280	0.116	0.629	0.268	0.103
2001-03	0.607	0.267	0.126	0.672	0.227	0.100

Year	Age 45-54			Age 55-64		
	Employed	Unemployed	NILF	Employed	Unemployed	NILF
1981-83	0.544	0.314	0.142	0.346	0.384	0.270
1983-85	0.604	0.259	0.137	0.461	0.209	0.330
1985-87	0.644	0.203	0.152	0.513	0.212	0.275
1987-89	0.671	0.236	0.093	0.536	0.204	0.259
1989-91	0.590	0.307	0.103	0.483	0.272	0.244
1991-93	0.648	0.245	0.106	0.527	0.218	0.255
1993-95	0.718	0.176	0.106	0.524	0.206	0.270
1996-97	0.757	0.152	0.092	0.608	0.125	0.267
1997-99	0.754	0.144	0.102	0.572	0.155	0.273
1999-01	0.633	0.260	0.107	0.500	0.259	0.241
2001-03	0.647	0.255	0.098	0.551	0.250	0.198

Appendix Table 8:  
 Fraction Part-Time at Survey Date, by Part-time Status on Lost Job and Year  
 (Numbers for Figure 8)

Year	Old PT	Old FT
1981-83	0.445	0.139
1983-85	0.439	0.126
1985-87	0.370	0.101
1987-89	0.407	0.105
1989-91	0.460	0.131
1991-93	0.458	0.138
1993-95	0.484	0.127
1996-97	0.451	0.111
1997-99	0.505	0.091
1999-01	0.483	0.140
2001-03	0.487	0.137



Appendix Table 9:  
 Fraction Part-Time at Survey Date, by Sex and Part-time Status on Lost Job and Year  
 (Numbers for Figure 9)

Year	Male		Female	
	Old PT	Old FT	Old PT	Old FT
1981-83	0.292	0.101	0.537	0.232
1983-85	0.316	0.083	0.503	0.211
1985-87	0.280	0.077	0.411	0.150
1987-89	0.205	0.076	0.497	0.155
1989-91	0.444	0.109	0.468	0.169
1991-93	0.365	0.100	0.528	0.207
1993-95	0.270	0.091	0.580	0.188
1996-97	0.374	0.071	0.494	0.174
1997-99	0.355	0.062	0.569	0.134
1999-01	0.370	0.095	0.552	0.206
2001-03	0.382	0.103	0.550	0.193

Appendix Table 10-11:  
 Decline in Log Real Weekly Earnings, by year and Education  
 Full-Time to Full-Time Transitions  
 (Numbers for Figures 10 and 11)

Year	All	ED<12	ED=12	ED 13-15	ED $\geq$ 16
1981-83	0.108	0.190	0.097	0.110	0.047
1983-85	0.073	0.147	0.083	0.039	0.014
1985-87	0.099	0.195	0.088	0.062	0.086
1987-89	0.056	0.054	0.061	0.060	0.042
1989-91	0.120	0.171	0.118	0.145	0.061
1991-93	0.113	0.082	0.125	0.114	0.104
1993-95	0.051	-0.012	0.048	0.062	0.066
1996-97	0.017	0.041	0.041	0.018	-0.027
1997-99	0.002	-0.064	-0.001	0.016	0.010
1999-01	0.084	0.104	0.081	0.113	0.041
2001-03	0.136	0.144	0.112	0.160	0.136

Appendix Table 12:  
 Loss in Log Real Weekly Earnings, by year  
 Regression Adjusted Difference-in-Difference Estimates  
 Full-Time to Full-Time Transitions  
 (Numbers for Figure 12)

Year	$-\Delta W_d$	$\Delta W_c$	$\Delta\Delta W$
1981-83	0.097	0.046	-0.137
1983-85	0.072	0.043	-0.111
1985-87	0.105	0.046	-0.144
1987-89	0.060	0.041	-0.097
1989-91	0.113	0.029	-0.138
1991-93	0.106	-0.017	-0.091
1993-95	0.052	0.028	-0.078
1996-97	0.025	0.044	-0.067
1997-99	0.009	0.075	-0.078
1999-01	0.064	0.074	-0.129
2001-03	0.137	0.042	-0.171

Appendix Table 13:  
 Loss in Log Real Weekly Earnings, by year and education  
 Regression Adjusted Difference-in-Difference Estimates  
 Full-Time to Full-Time Transitions  
 (Numbers for Figure 13)

Year	ED < 12			ED = 12		
	$-\Delta W_d$	$\Delta W_c$	$\Delta\Delta W$	$-\Delta W_d$	$\Delta W_c$	$\Delta\Delta W$
1981-83	0.130	0.020	-0.147	0.087	0.041	-0.122
1983-85	0.128	0.037	-0.159	0.079	0.026	-0.103
1985-87	0.147	0.068	-0.201	0.092	0.038	-0.125
1987-89	0.071	0.035	-0.102	0.047	0.027	-0.072
1989-91	0.159	0.010	-0.167	0.102	0.029	-0.128
1991-93	0.119	-0.068	-0.055	0.106	-0.022	-0.086
1993-95	-0.012	-0.014	0.027	0.042	0.031	-0.070
1996-97	0.071	0.022	-0.091	0.048	0.028	-0.074
1997-99	-0.007	0.042	-0.033	0.017	0.068	-0.080
1999-01	0.021	0.112	-0.120	0.073	0.084	-0.145
2001-03	0.094	0.049	-0.136	0.096	0.024	-0.118

Year	ED 13-15			ED $\geq$ 16		
	$-\Delta W_d$	$\Delta W_c$	$\Delta\Delta W$	$-\Delta W_d$	$\Delta W_c$	$\Delta\Delta W$
1981-83	0.111	0.084	-0.180	0.062	0.051	-0.108
1983-85	0.058	0.055	-0.107	0.017	0.072	-0.083
1985-87	0.093	0.036	-0.124	0.117	0.063	-0.169
1987-89	0.086	0.053	-0.132	0.044	0.061	-0.099
1989-91	0.128	0.024	-0.149	0.087	0.044	-0.125
1991-93	0.091	-0.026	-0.067	0.119	0.021	-0.137
1993-95	0.065	0.016	-0.079	0.070	0.051	-0.115
1996-97	0.024	0.052	-0.072	-0.025	0.073	-0.045
1997-99	-0.000	0.062	-0.058	0.009	0.113	-0.109
1999-01	0.080	0.087	-0.153	0.043	0.047	-0.087
2001-03	0.165	0.041	-0.198	0.161	0.066	-0.214