

# What do we know about job loss in the United States? Evidence from the Displaced Workers Survey, 1984–2004

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## 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 those in Western Europe in no small measure because of the relatively small costs to firms of shedding workers in the U.S. compared with their counterparts in the European Union. 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 article, 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 an 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 outsourcing of jobs, and the substantial costs borne by job losers.

There are three important issues of measurement and interpretation that arise when one compares job loss rates calculated using the DWS over time. 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 terminations “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 (for example, 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.

From 1984 to 1992, the DWS 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).

The basic wording of key questions has 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

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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 that I 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 through the 2001–04 period, despite the onset of the expansion in late 2001.

I investigate the consequences of job loss along 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 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 who are reemployed, 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 reemployed 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.

### The rate of job loss

I analyze data on 839,434 individuals between the ages of 20 and 64 from the DWS conducted as part of the January CPS in 1984, 1986, 1988, 1990, 1992, 2002, and 2004 and the February CPS 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

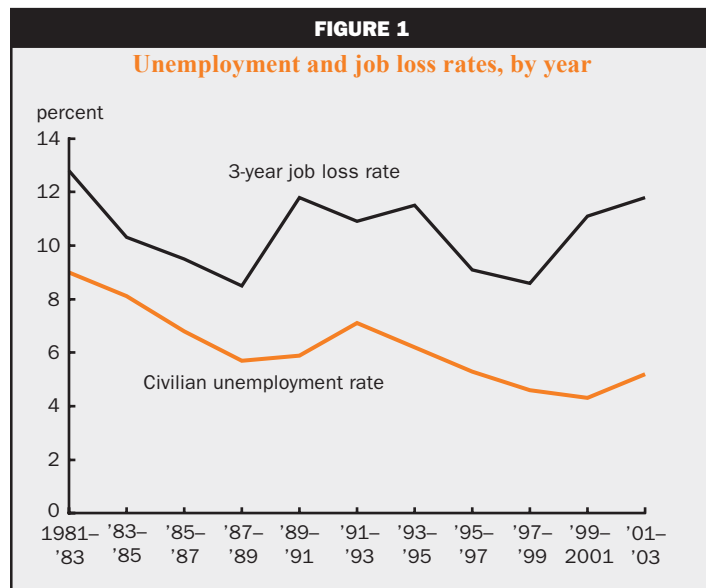
these job loss rates as described in Farber (2004) to account for the change in the recall period from five years to three years in 1994 and changes in the wording of the key job loss question.<sup>3</sup>

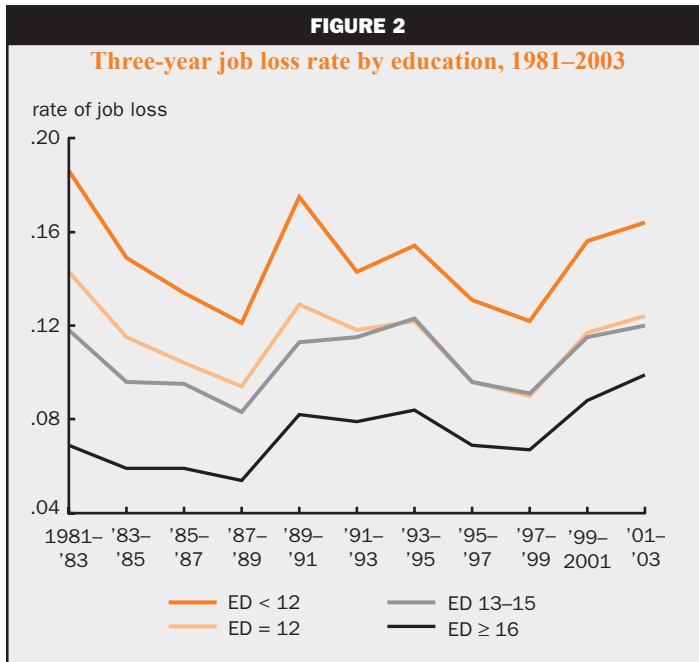
In my view, information on rates of job loss is presented most accessibly in graphical form, and I organize the discussion here around a series of figures.<sup>4</sup>

Figure 1 contains plots of adjusted three-year job loss rates computed from each DWS from 1984 to 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-1980s. 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.

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 12 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 workers with at least 16 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 appears that there were upsurges 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 2001–03 period, 9.9 percent. Job loss rates for the other educational groups show a cyclical pattern but no upward trend.

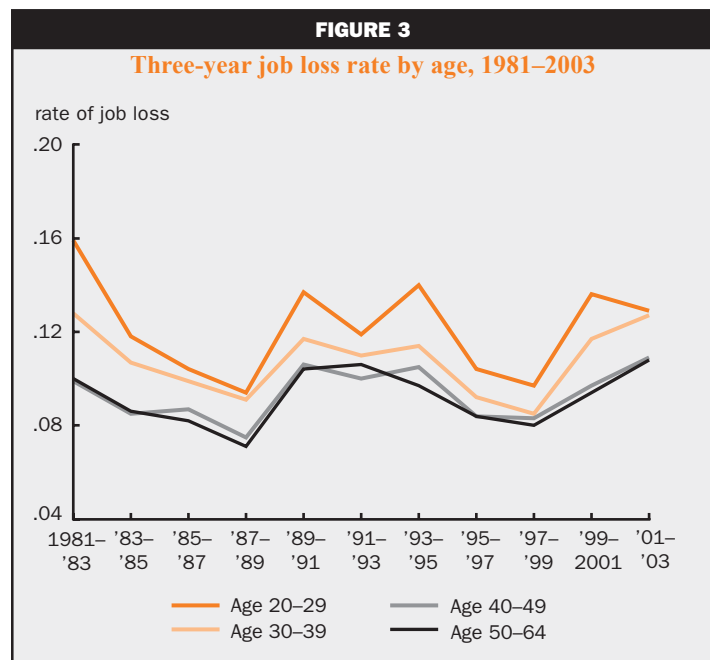
Figure 3 contains three-year job loss rates by year for four age groups in a range from 20 to 64. Job loss rates are highest for the youngest workers (20–29) and generally show the standard cyclical pattern. The job loss rates of the two oldest groups, ages 40–49 and 50–64, are very similar. There is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

### *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 rates did decline substantially beginning in the 1995–97 period and, by 1997–1999, 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 kind 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 defined 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.

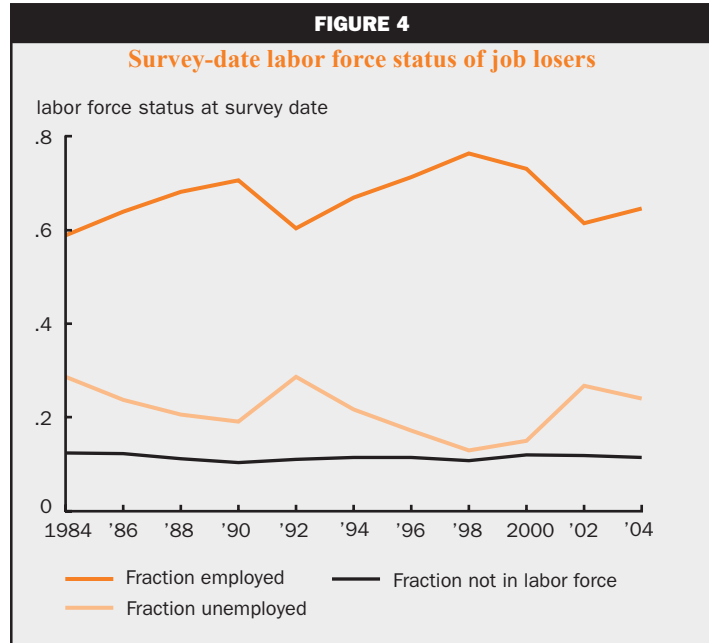
### **The consequences of job loss**

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

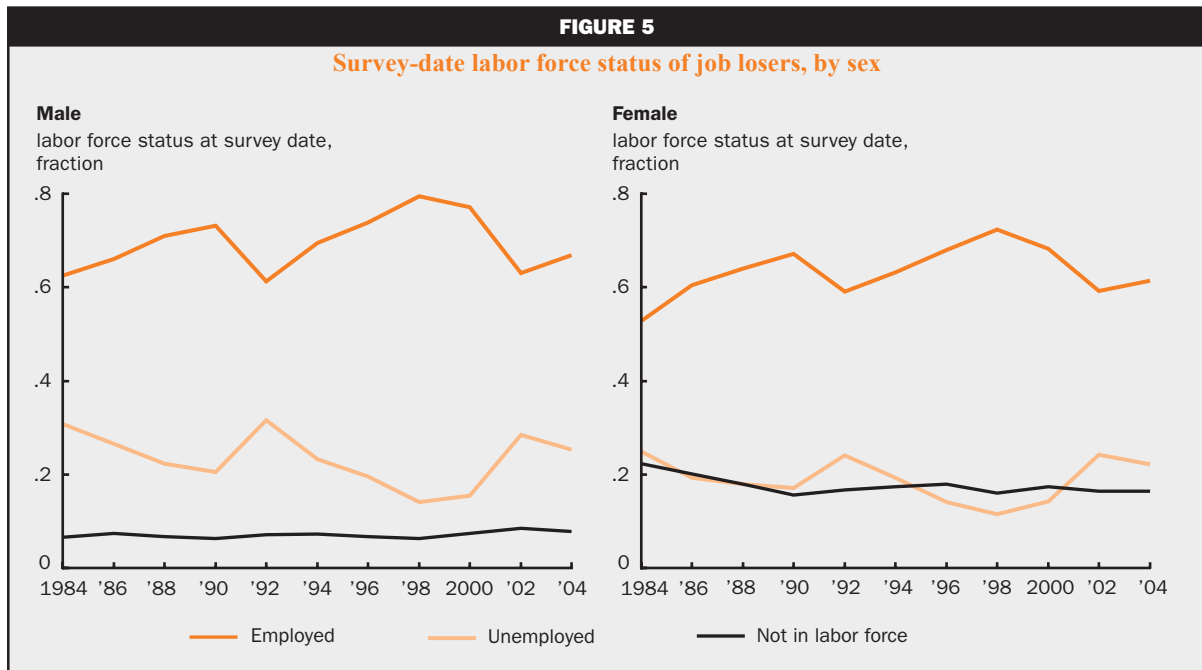


2001 followed a sustained expansion that lasted for almost ten years and was of quite short duration itself, lasting only eight months or so.<sup>6</sup> The expansion in 2002 and 2003 featured rapid gross domestic product (GDP) and productivity growth but relatively little employment growth and only 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 reemployed workers.

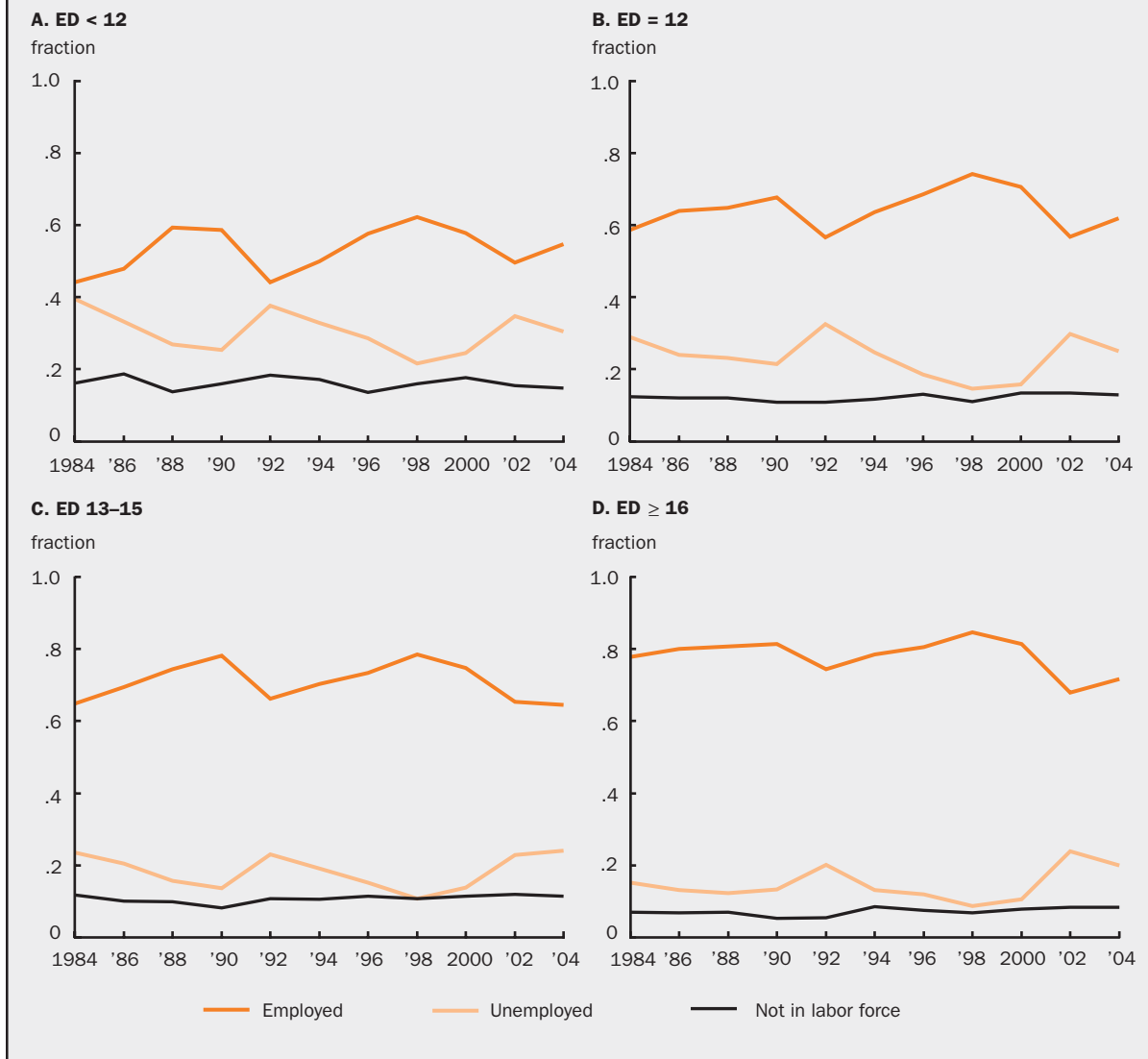


The design changes in the DWS since 1994 complicate the analysis of the consequences of job loss. Most importantly, the follow-up questions designed to gather information on the characteristics of the lost job and experience since job loss were asked only of job losers who reported one of the following three reasons for the job loss: slack work, plant closing, or position/shift abolished. I term these the “big three” reasons. Workers who lost jobs due to the ending of



**FIGURE 6**

**Survey-date labor force status of job losers, by education**



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 1984–92 DWS whose reported job loss was more than three years prior to the interview date.

**Post-displacement labor force status**

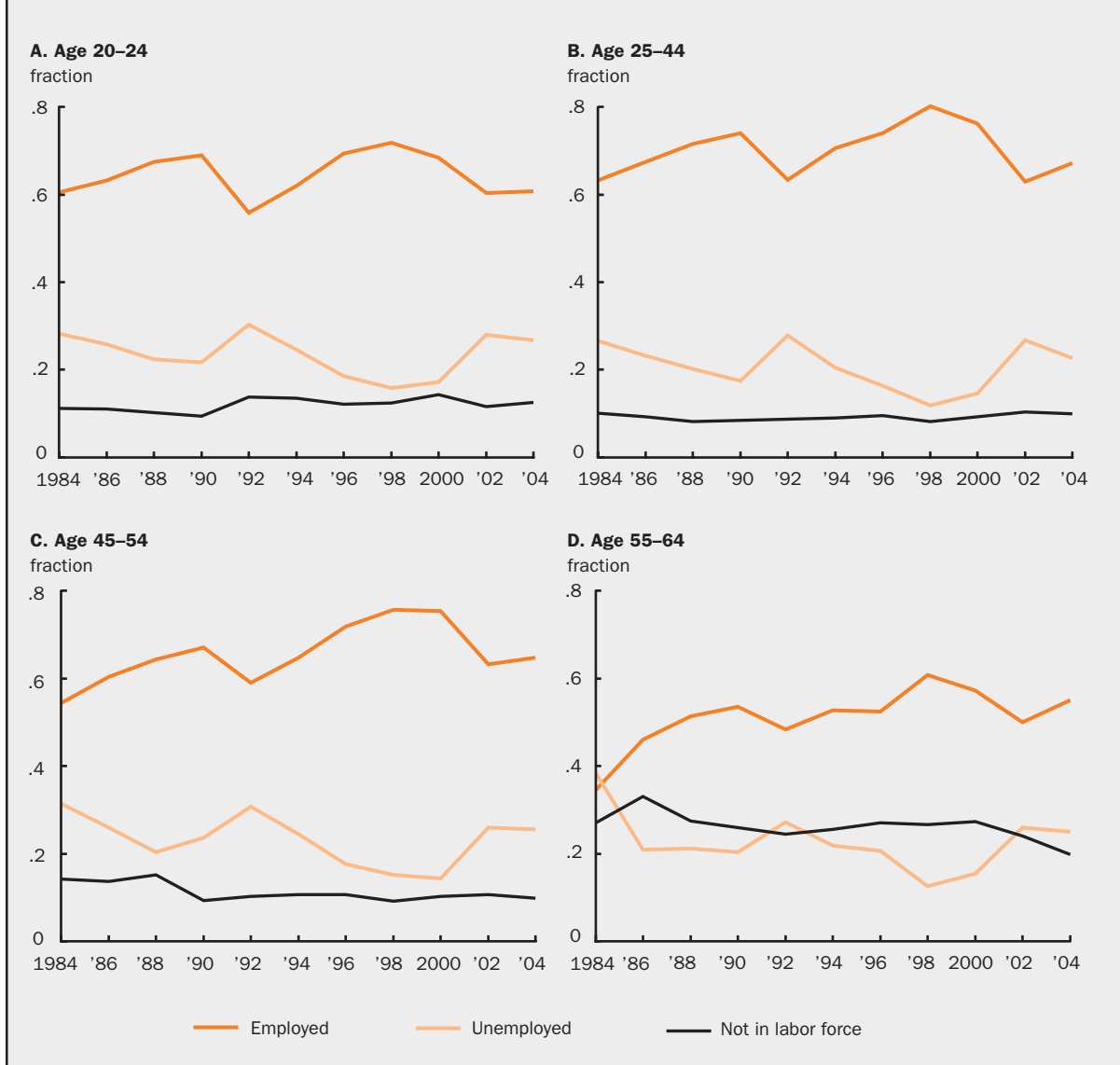
In this section, I examine how the distribution of survey-date labor force status of workers has varied over time and with other factors, including sex, education,

and age. Figure 4 contains plots of the fraction of job losers employed, unemployed, and not in the labor force at each DWS survey date. It is clear from this figure that the post-displacement employment rate is procyclical, with relatively low rates in the slack labor markets of 1984 and 1992. The figure also shows that the post-displacement employment rate has been increasing since 1992, reaching its highest levels in 1998 before declining slightly in 2000 and then more sharply in 2002. The fraction employed increased slightly at the most recent (2004) survey date.

Not surprisingly, the survey-date unemployment rate among job losers moves counter-cyclically, with peak unemployment rates at the 1984, 1992, and

**FIGURE 7**

**Survey-date labor force status of job losers, by age**



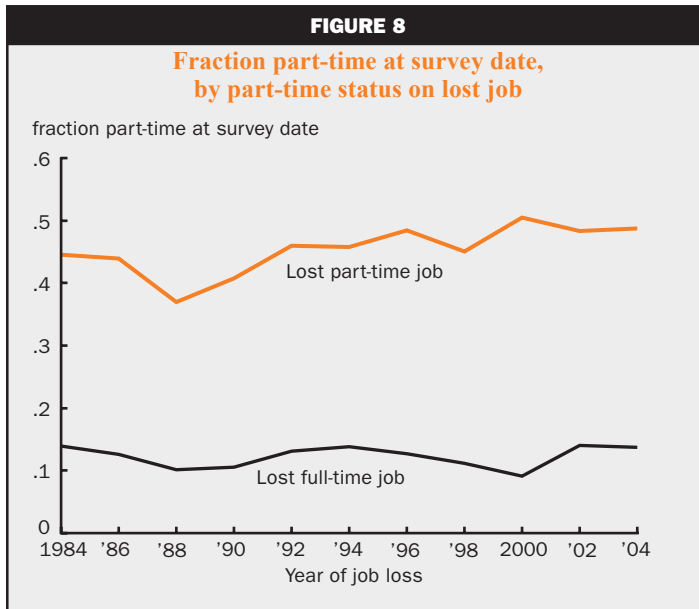
2002 survey dates. This mirrors the movements noted in the employment fraction. The survey-date fraction of job losers not in the labor force is remarkably constant across all years, at about 10 percent. There is no evidence that job losers are disproportionately discouraged in recessions, leading to 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 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 bearing and raising children. 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 early 1990s, the fraction employed among college graduate job losers fell from a peak of about 82 percent in 1990 to a trough of 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.

#### *Post-displacement full-time/part-time status*

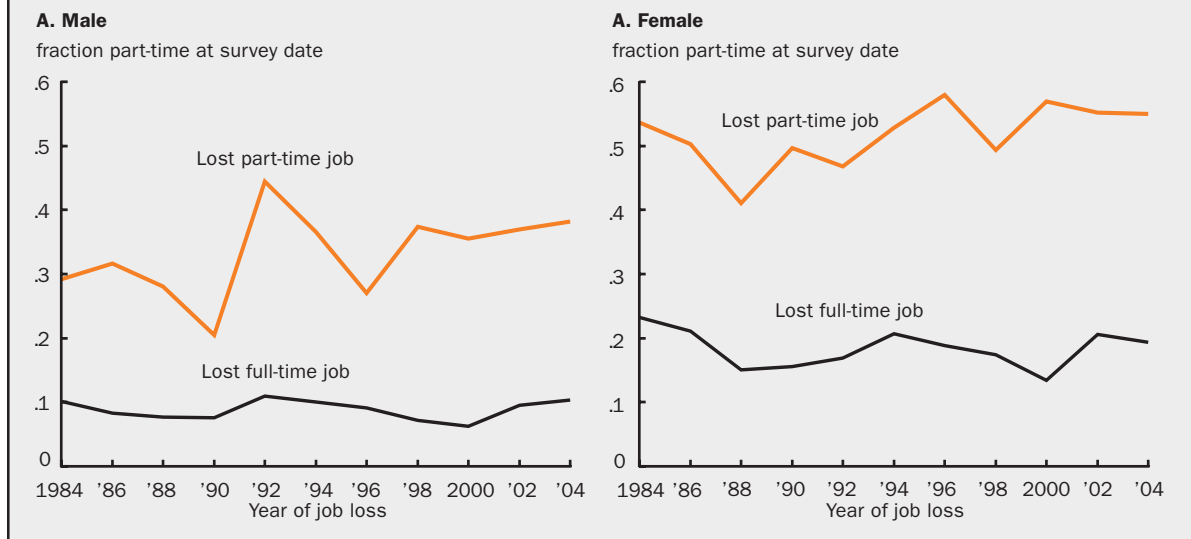
Many reemployed job losers are employed part-time subsequent to job loss. Some of these workers lost part-time jobs but many had lost full-time jobs. In addition to having lower weekly earnings, it is well known that part-time workers have substantially lower hourly wage rates than do full-time workers. The DWS collects 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 of reemployed job losers who are 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 in 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.

In terms of the cost of job loss, a more interesting group to study consists of those workers who lost full-time jobs. About 10 percent of these workers are working part-time at the survey date. It appears that there

FIGURE 9

Fraction part-time at survey date, by sex and part-time status on lost job



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 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 of reemployed job losers that were 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 reemployed and more likely to be out of the labor force. As noted earlier, this may be a labor supply response, reflecting the fact that some women have a richer set of alternative activities.

**The loss in earnings due to displacement**

The analysis of the loss in earnings of reemployed 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, I need a control group of non-displaced workers, and later, I provide such a control group using data from the CPS outgoing rotation groups.

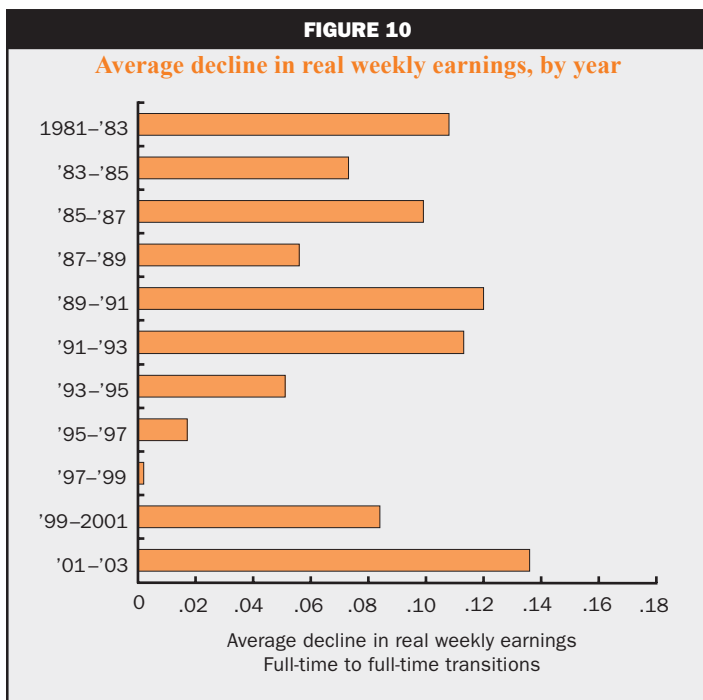
*Difference estimates of the change in earnings as a result of job loss*

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 (that is, lost a full-time job and are reemployed in 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 (1981–91), 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 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>

*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 CPS containing the DWS (period  $t$ ). The data from MOGRG files of the CPS provides the period 0 earnings, and the data from the outgoing rotation groups in the CPS containing the DWS provide the period  $t$  earnings.

More formally, define the change in log real earnings for displaced workers as

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

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

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

where  $d$  refers to displaced workers (the “treatment” group),  $c$  refers to non-displaced workers (the “comparison” 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 is computed as

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

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 ( $\Delta_d$ ).

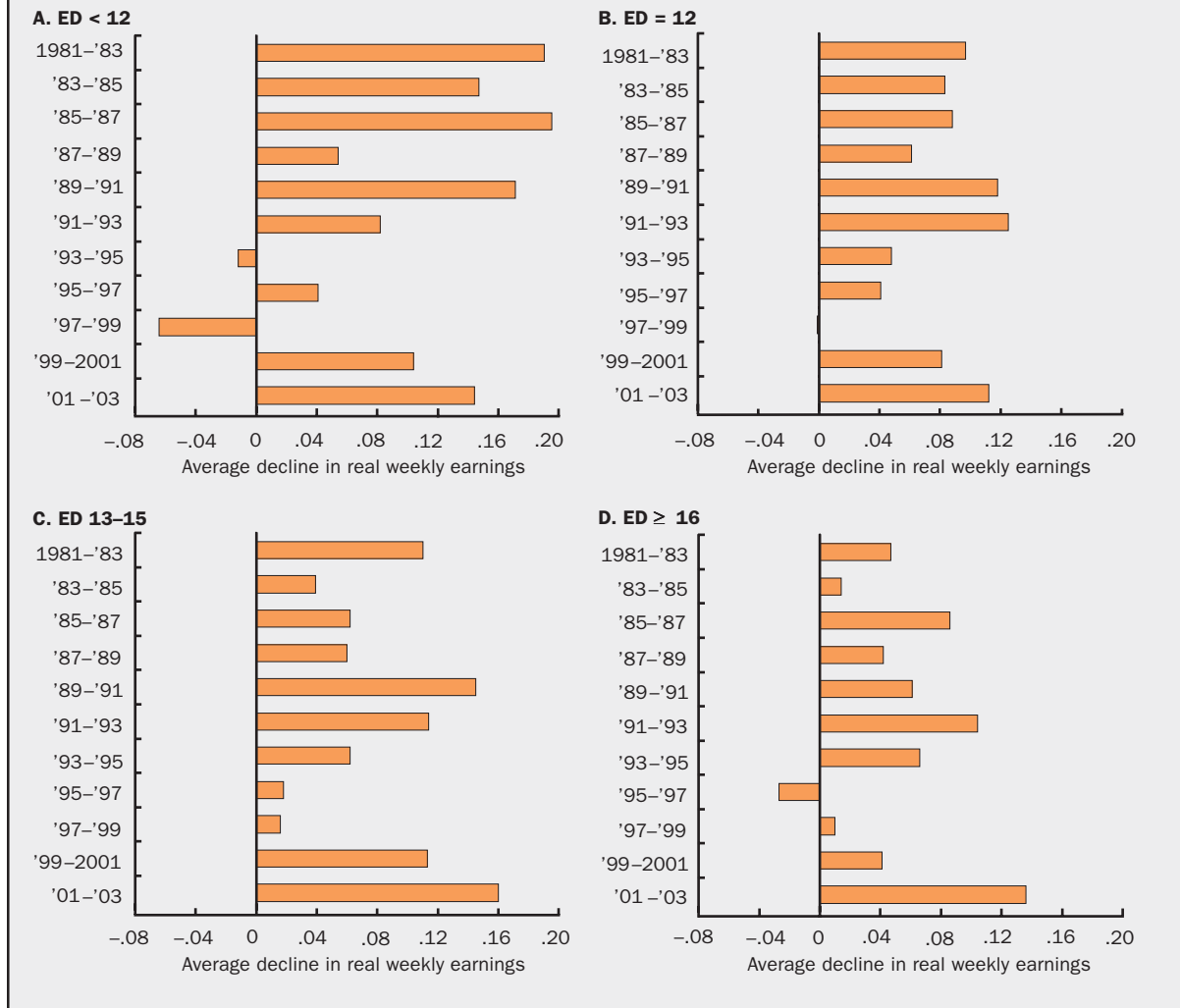
I generate initial earnings for the comparison group ( $\ln W_{c0}$ ) from a random sample from the merged outgoing rotation group CPS file (MOGRG) each year from 1981 to 2003.<sup>12</sup> The resulting comparison sample of initial earnings for full-time workers contains 121,550 observations.

The CPS containing the DWS has two outgoing rotation groups (OGRGs) with earnings data for all workers. These provide the observations on current earnings for the comparison group of non-displaced workers ( $\ln W_{ct}$ ). This sample contains observations on full-time earnings for 119,269 workers at the DWS survey date.

Ideally, these comparison groups would contain only workers who had not lost a job during the relevant

**FIGURE 11**

**Average decline in log weekly earnings, by year and education**



period. While I can identify the displaced workers in period  $t$  (since the data come from the CPS with DWS), 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 comparison group as defined here would lead to biased estimates of earnings growth for a group of non-displaced workers. In order to address this problem, I adjust the estimates based on the outgoing rotation groups to provide unbiased estimates of the earnings change for a comparison group of non-displaced workers. This adjustment is described in the appendix.

The source of data for the treatment group's earnings is clear. These data come from the DWS, where  $\ln W_{dt}$  is survey-date earnings for displaced workers

and  $\ln W_{d0}$  is earnings on the lost job. The pre-displacement 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 post-displacement 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 ( $n = 19,460$ ).

These data are used as described in the appendix to compute the regression-adjusted difference-in-difference estimates of the earnings loss from job loss for full-time workers for each year.

Figure 12 contains the overall difference-in-difference estimates of the earnings loss from job loss for each year.<sup>13</sup> In order for the figure to be clearly readable, the earnings loss for displaced workers in presented

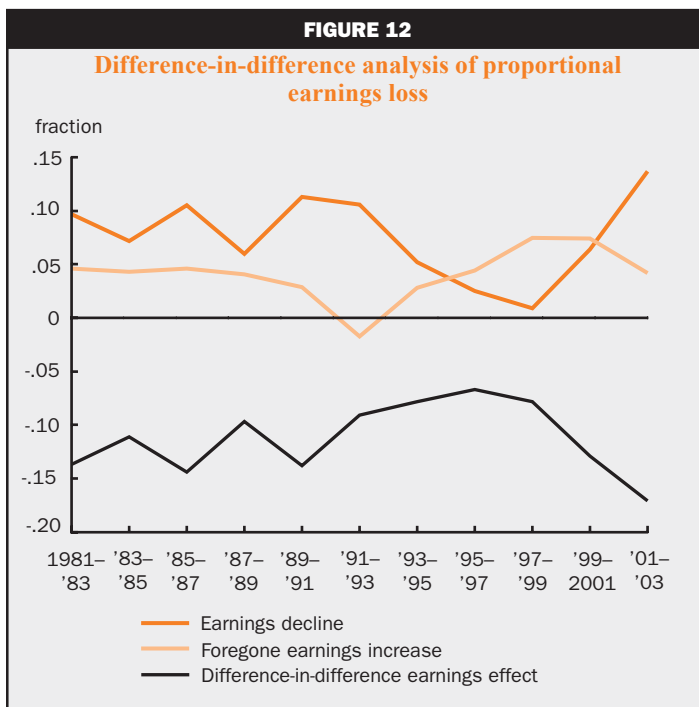
as a positive number (the negative of the earnings change for displaced workers:  $-\Delta_d$ ). The foregone earnings increase is  $\Delta_c$ , and the difference-in-difference earnings effect is  $\Delta\Delta$ . Note that these estimates incorporate the effect of normal growth along the age-earnings 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>14</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 comparison 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>15</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 the 1989–91 period to a statistically insignificant 0.9 percent in 1997–99. During the same period, the earnings growth of the comparison 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 1997–99 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>16</sup> The year-by-year estimates by education level show 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 percent 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.

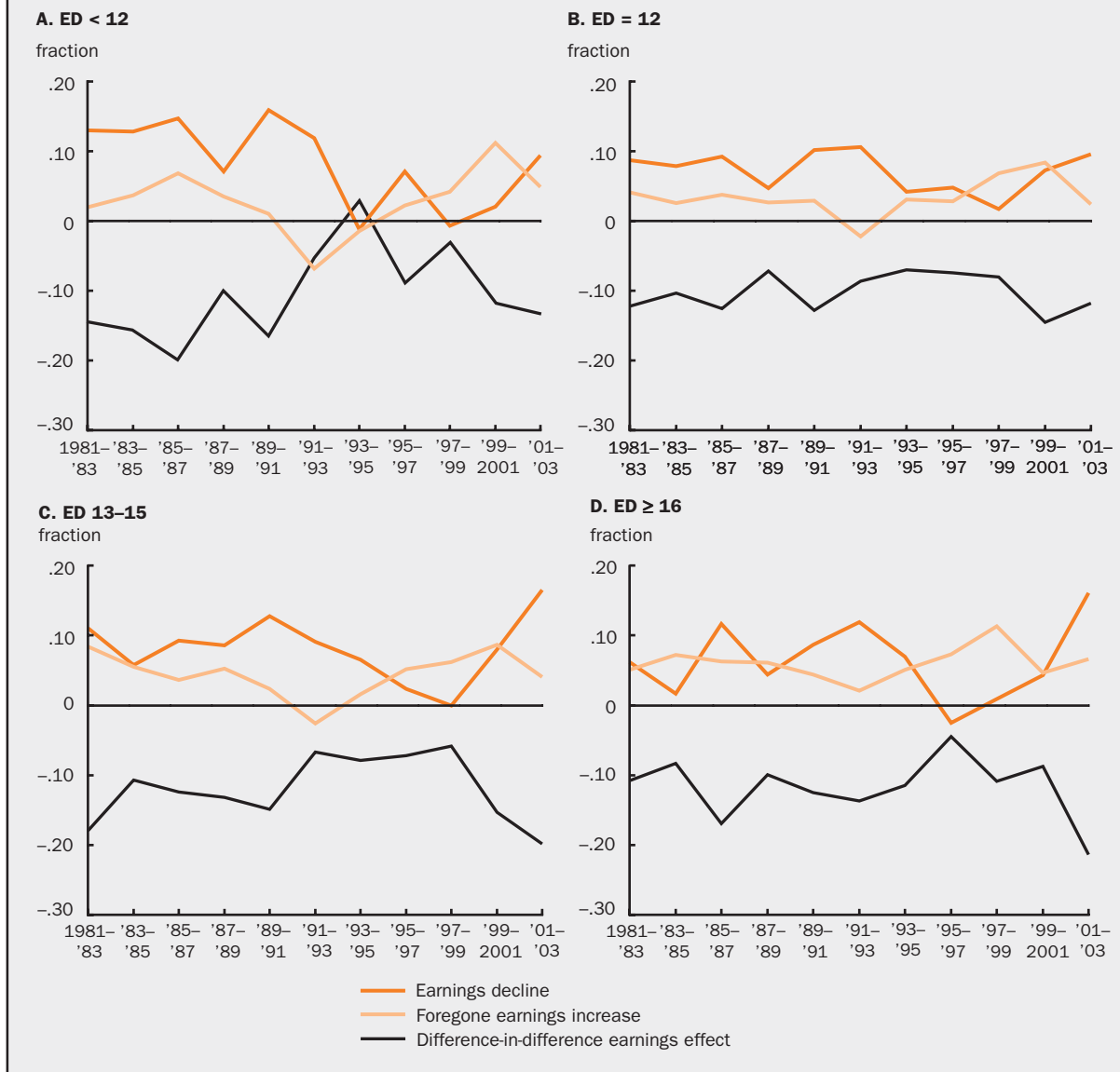
The situation among job losers with more than a high-school education is particularly striking since the late 1990s. The difference-in-difference estimate of the earnings loss associated with job loss for workers with 13–15 years of education increased dramatically to about 20 percent in the 2001–03 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 2001–03. 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 2001–03 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 2001–03. 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



**FIGURE 13**

**Difference-in-difference analysis of proportional earnings loss, by education**



the comparison 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 16 years of education since 1995, but it is a factor in all education groups in the 1995–99 period. Job losers with at least 16 years of education in the 1997–99 period suffered a dramatic real earnings decline on average, while the college-educated comparison 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.

**Conclusion**

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 (2001–03),

- About 35 percent of job losers are not employed at the subsequent survey date;
- About 13 percent reemployed 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 in their new jobs than in the lost job; and
- Counting foregone earnings increases enjoyed by non-losers, full-time job losers who find new full-time jobs earn up to 17 percent less on average in 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 reemployed 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 the relatively low costs of shedding workers in the U.S. are efficiency enhancing, resulting in higher total output. However, these costs 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 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 their communities. 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.

## NOTES

<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 include 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).

<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 percent for the 1984–92 DWS and by 74.8 percent for the 1994 and later DWS. See Farber (1998) for details.

<sup>4</sup>For the numerical values underlying all figures in this study, all counts are weighted using the CPS sampling weights.

<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.

<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. See [www.nber.org/cycles/july2003.html](http://www.nber.org/cycles/july2003.html).

<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 DWS.

<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.

<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.

<sup>12</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 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 (two 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  $(p_{1t})/24$ . Similarly, for the second and third years prior to the DWS, I took random samples with probability  $(p_{2t})/24$  and  $(p_{3t})/24$ , respectively.

<sup>13</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>14</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>15</sup>Because I present the earnings loss rather than the earnings change for displaced workers in the figure, the difference-in-difference estimate is the negative of the sum of the earnings decline for displaced workers and the foregone earnings increase.

<sup>16</sup>These estimates are based on separate regressions by educational category for each year.



APPENDIX: DETAILS OF THE DIFFERENCE-IN-DIFFERENCE PROCEDURE

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

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

where  $\Delta_c$  is the earnings change in the outgoing rotation group sample ( $\ln W_{ct} - \ln W_{c0}$ ) and  $\theta$  is the fraction of workers in the outgoing rotation group sample who lost a job (the displacement rate).

The observable quantities are  $\Delta_c$  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>1</sup> I can compute  $\Delta_c$  with the available data on  $\Delta_c$ ,  $\Delta_d$ , and  $\theta$ . Using equation 4, the change in earnings for the comparison group is

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

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

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

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 needs to be

scaled up by the factor  $\frac{1}{(1 - \theta)}$  to compensate.

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>2</sup> This regression is

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

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  $\varepsilon$  is an error term.<sup>3</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:

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

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

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

<sup>1</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  $\Delta_c$  includes both displaced and non-displaced workers at both time 0 and time  $t$ .

<sup>2</sup>Note that I do not calculate first-differenced estimates for the displaced workers, as I did in the previous section, 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.

<sup>3</sup>The  $X$  vector includes a constant and dummy variables for sex, race, nine age categories, and four educational categories.

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