Preliminary and Incomplete
(Additional References and Concluding Section to Follow)
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Job Loss and Unemployment in the 21st Century: The Great Recession in Labor Market Perspective.[1]

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Abstract

I present summary evidence on the state of the labor market in the recession of 2008-2009 using data from the base Current Population Survey (CPS) from 1976-2010 and the Displaced Workers Surveys (DWS) from 1984-2010. Using the CPS, I examine movement in unemployment rates and employment-population ratios, part-time employment rates, and durations of unemployment. By any of these measures the current labor market is weaker than at any point since the mid-1970s. I also examine employment rates at the household level and reach the same conclusion. Next I examine labor force flows since 1995 in order to shed some light on the stubbornly high unemployment rate and long unemployment durations. I find that both E-U and U-U flows reached a peak in early 2009 and remain at very high levels while U-N flows reached a trough in early 2009 and remain low. I present some preliminary results on geographic mobility of unemployed workers and find that unemployed workers, who generally have relatively high rates of mobility, are less mobile in the current labor market.

I use the DWS to examine the consequences of job loss and find that, relative to earlier recessions, 1) post-job-loss reemployment rates are lower in the recent recession, 2) part-time employment is more common among full-time job losers, and 3) average earnings declines are larger (mainly because of the higher rate of part-time employment among full-time job losers).

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1 Introduction

The "Great Recession" of 2008-2009 continues in the labor market. By any reasonable metric, there is more unemployment and unemployment spells are more severe than at any time since the Great Depression. In this study, I present a summary of current conditions in the labor market in historical perspective based on analysis of micro-date from the Current Population Survey (CPS) from 1976 through 2010q3. I then examine transition rates of workers between labor force states from 1995 through 2010q3 to help pinpoint the sources of persistent unemployment. Not surprisingly, there have been elevated transition rates between employment and unemployment. But what is driving the long durations of unemployment are depressed rates of transition from unemployment to employment reinforced by low rates of transition from unemployment to not-in-labor-force (NILF).

I present some preliminary evidence from matched CPSs on the rate of geographic mobility and find that it is lower in the current recession than in earlier periods. Some might argue that this is evidence that the current unemployment problem is at least in part structural, with workers not moving to take new jobs, perhaps because of problems in the housing market. However, it is equally plausible that unemployed workers are not moving because the weak labor market is geographically broad based and employment opportunities elsewhere are not available. This would imply that deficient demand is an important factor in the current labor market. I present some preliminary evidence from the CPS and the Displaced Workers Survey (DWS) that the lower mobility of the unemployed in the current period is *not* a structural problem related to the housing market.

In order to study the experiences of job losers, I examine data from the January 2010 DWS and contrast these data with information from earlier DWSs since 1984. I find that the rate of job loss (fraction of workers who reported at least one job loss in the previous three years was substantially higher in the 2007-2009 period than in any earlier period (which includes deep recession in the 1981-1983 period). I also find that, relative to earlier recessions, 1) post-job-loss reemployment rates are lower in the recent recession, 2) part-time employment is more common among full-time job losers, and 3) average earnings declines are larger (mainly because of the higher rate of part-time employment among full-time job losers).

2 Basic Labor Force Statistics from the CPS

I created a database of all observations in every monthly CPS from January 1976 - September 2010. This database contains 44,466,301 observations with information on the usual CPS labor force items, and it serves as the basic resource for my analysis of employment and

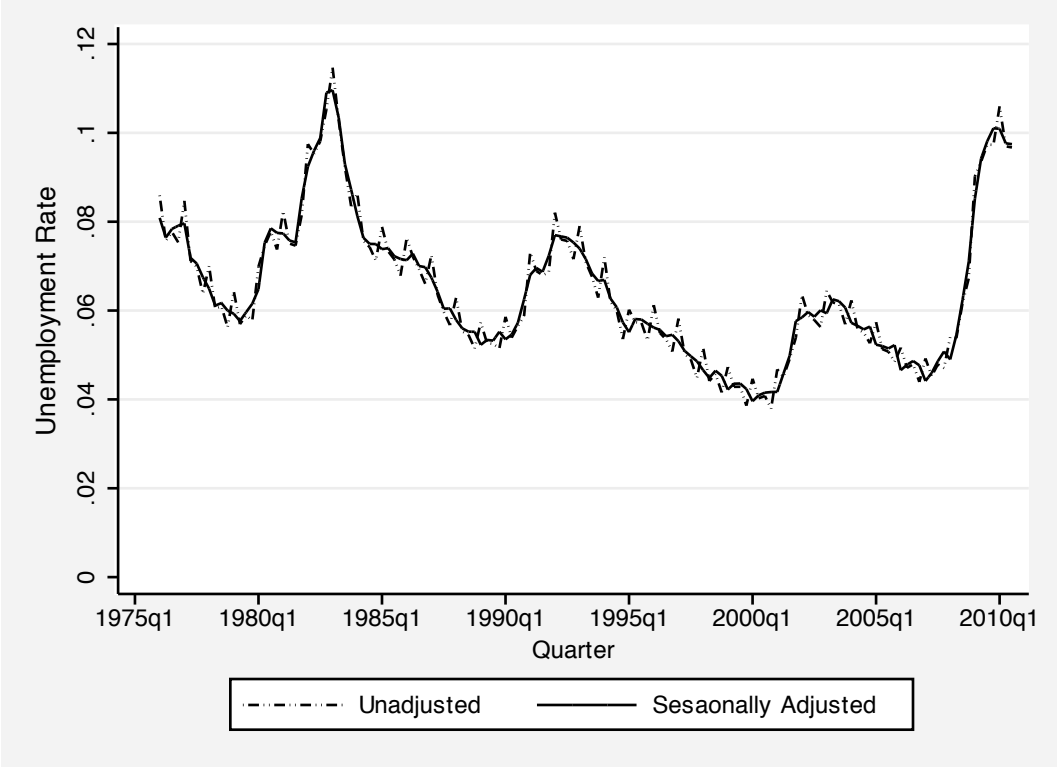

Figure 1: Quarterly Unemplolyment Rate, 1976q1-2010q3

unemployment status.

2.1 The Unemployment Rate

Figure 1 presents the seasonally adjusted aggregate unemployment rate (U3) quarterly from 1976q1-2010q3. These are based on my own calculations using the individual level CPS data available for this period. I weight by the CPS final sampling weights, and I seasonally adjust using a very simple model.[1] Figure 1 also presents the seasonally unadjusted series for comparison. This figure shows the very high level of the unemployment rate since early 2009.

The standard unemployment rate, presented in figure 1 and called U3 by the Bureau of Labor Statistics (BLS), is one of several measures the BLS produces.[2] Some others include

[1] In order to seasonally adjust a series Y_t with overall mean $\bar{Y}$, I regress Y_t on a complete set of seasonal dummy variables and calculate the residuals, e_t. I then compute the seasonally adjusted series as $Y_t^{sa} = \bar{Y} + e_t$.

[2] See United States Department of Labor, Bureau of Labor Statistics (2008) for a summary of the BLS measures of unemployment.

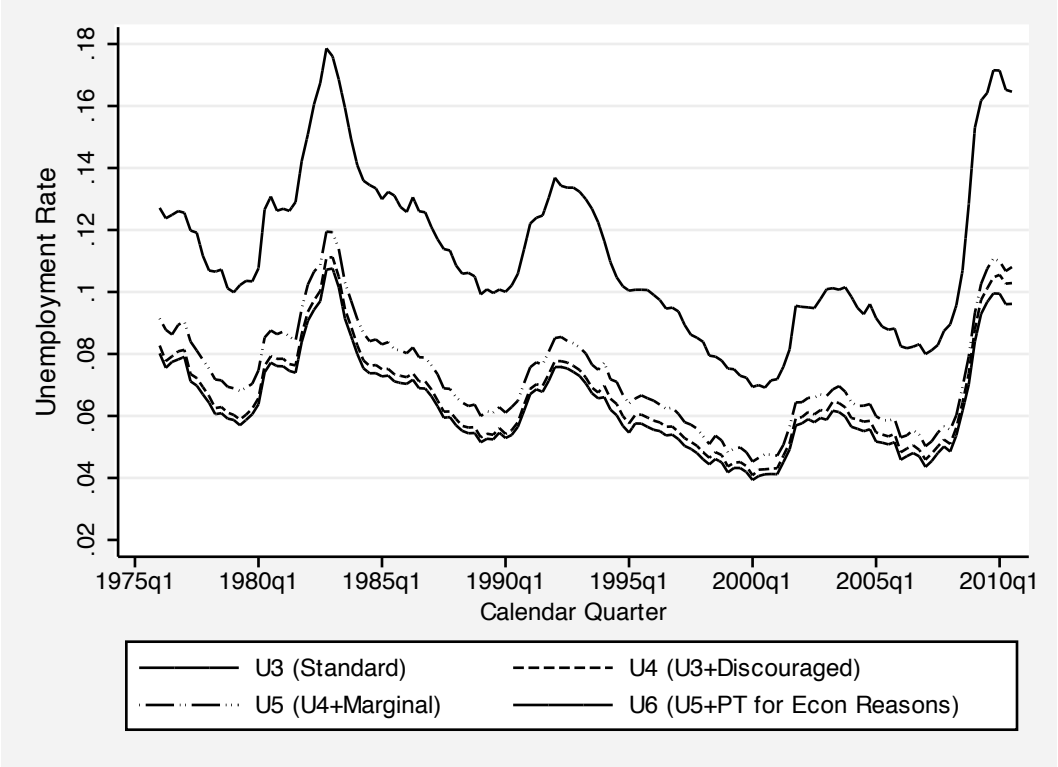

Figure 2: Quarterly Unemployment Rate, various measures (s.a.)

- U3 – Unemployed as share of labor force (the official rate)[3]
- U4 – (Unemployed + discouraged) as share of (labor force + discouraged)[4]
- U5 – (Unemployed + discouraged + "marginally attached") as share of (labor force + discouraged + "marginally attached")[5]
- U6 – (Unemployed + discouraged + "marginally attached" + employed part-time for economic reasons) as share of (labor force + discouraged + "marginally attached")

The three alternative measures (U4, U5, and U6) cumulatively add additional individuals both to the pool of unemployed and to the labor force. As shown in figure 2, they yield

[3] To be counted as unemployed, and, hence, part of the labor force, an individual who is not working has to have searched for work during the reference week (or past month?).

[4] Discourage workers are those who report they want a job but have stopped searching because they believe no job is available.

[5] "Marginally attached" workers are those who want a job and are available to work, have looked for work in the past year, but have not looked for work in the past month for a variety of reasons beyond discouragement.

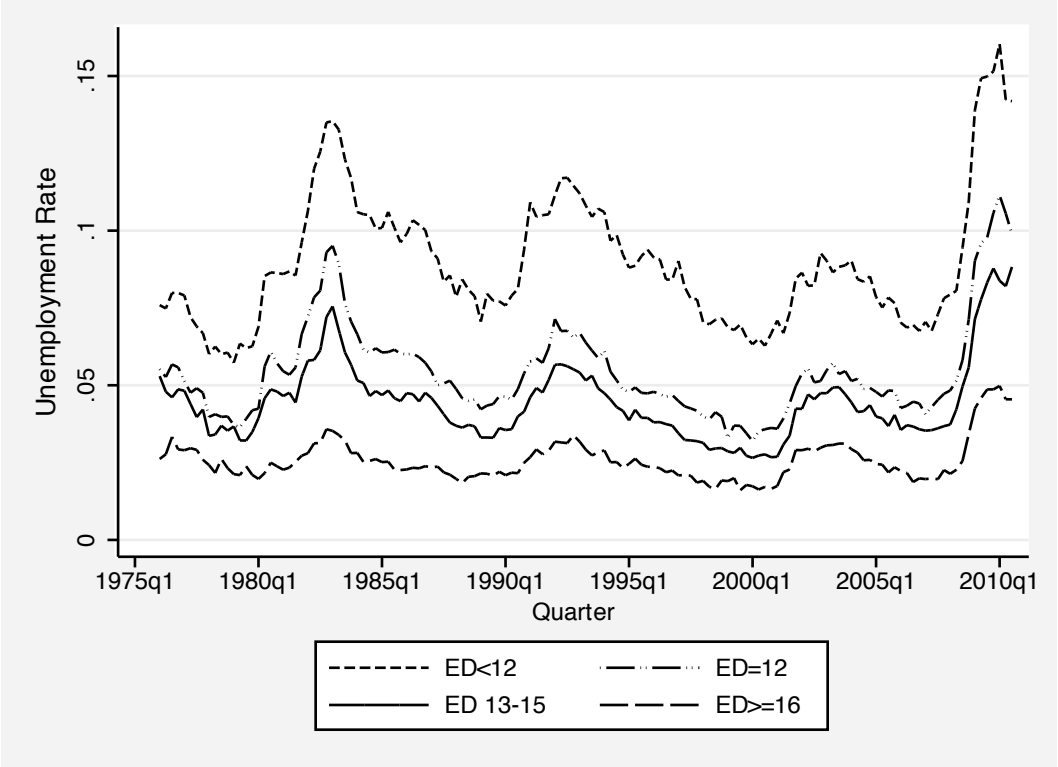

Figure 3: Quarterly Unemployment Rate, by Education (s.a.)

progressively higher unemployment rates. Interestingly, adding discouraged workers and marginally attached workers adds very little to the unemployment rate. However, U6, which includes workers who are working part-time for economic reasons as if they were unemployed, is substantially higher than U3 (by 7.1 percentage points in 2009q4). This is more fairly called an "underemployment rate," but, by any name, it suggests that currently about one in six workers in the U.S. are not working as much as they would like. Since the time-series patterns of U3 and U6 are very similar (the simple correlation is 0.98), In what follows, I focus on the standard unemployment rate (U3).

Figure 1 shows that the aggregate unemployment rate in the current recession did not reach the level seen in the recession in 1982-83 (10.1 percent in 2009q4 vs. 11.0 in 1983q1 for U3). However, this comparison understates the relative severity of the current recession. There have been compositional changes in the labor force in the last quarter century toward groups (notably the more educated) with historically lower levels of unemployment.

In order to illustrate this point, figure 3 contains plots of the quarterly unemployment rate separately for four educational groups. Not surprisingly, the unemployment rate is inversely related to education. Currently (2010q3) the unemployment rate is 9.9 percent for high school graduates and 4.5 percent for college graduates. A key point to take away from

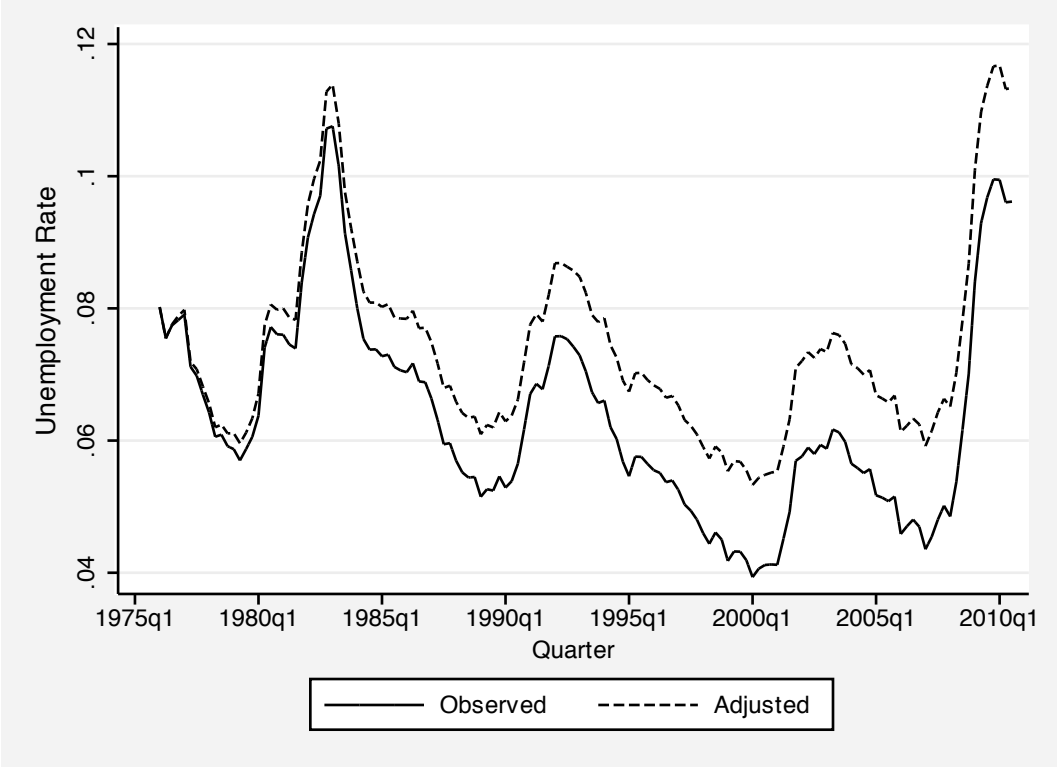

Figure 4: Quarterly Unemployment Rate, Adjusted for Education (s.a.)

figure 3 is that the unemployment rate is currently higher than the earlier peak in 1983q1 for *all* education groups. That the aggregate unemployment rate has not reached its earlier peak reflects the increased educational attainment of the workforce. For example, 57 percent of the labor force had 12 or fewer years of education in 1983. This fraction has fallen to 40 percent by 2010. The fraction with at least 16 years education increased from 20 percent to 30 percent over the same period.

In order to investigate the magnitude of the effects of the increase in educational attainment, I created an unemployment series that accounts for education levels.[6] This education-adjusted unemployment rate is plotted along with the observed unemployment rate in figure 4, and it shows a substantial gap emerging between the two seres beginning in the early 1980s. Figure 4 also shows that the adjusted unemployment rate is currently higher than

[6] There is a long history of calculating demographically adjusted unemployment rates as weighted averages of sub-group unemployment rates where the weights are labor force shares at a fixed date. See, for example, Summers (1986). I created my adjusted series somewhat differently by regressing the unemployment rate on a complete set of dummy variables for quarter and a set of dummy variables representing four education categories. I then subtract the difference between the coefficient on the dummy variable for the first quarter in my sample (1976q1) and the 1976q1 unemployment rate from the coefficients of each of the quarter dummies. This matches the series to the observed unemployment rate in 1976q1 without changing its shape.

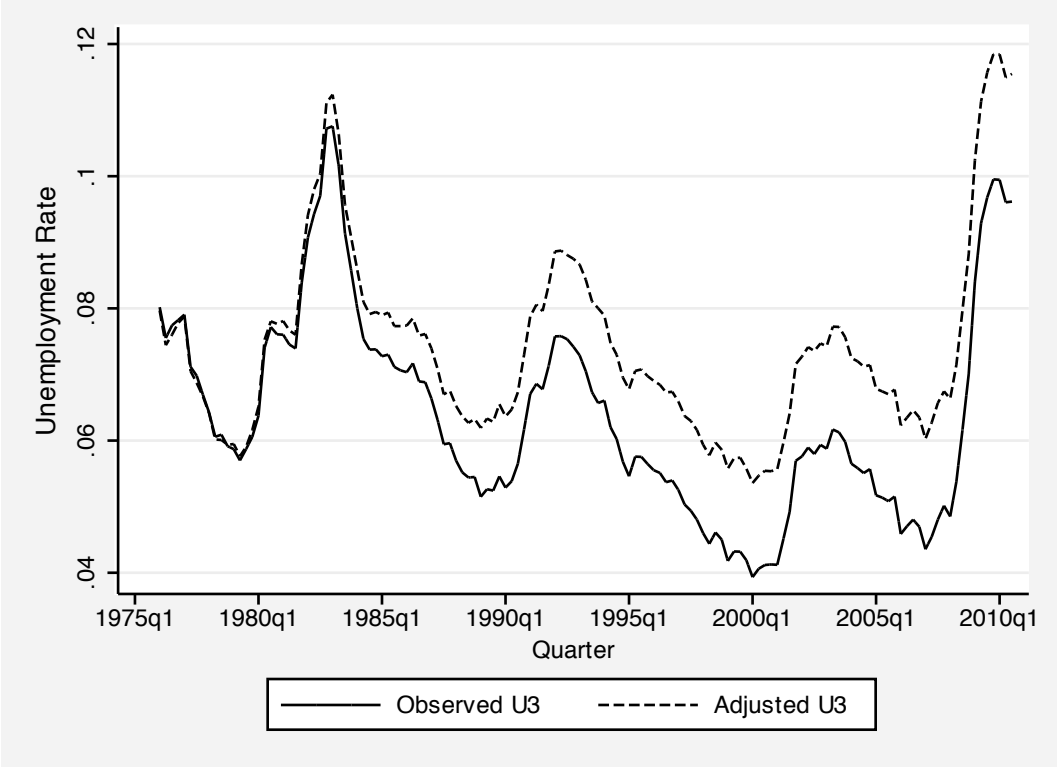

Figure 5: Quarterly Unemployment Rate, Adjusted for Age, Race, Sex, and Education (s.a.)

the 1983 peak (11.7 in 2009q4 vs. 11.3 in 1983q1). Not surprisingly, the adjusted series shows the same sharp cyclical pattern as the unadjusted series.

I repeat this exercise adjusting for age (7 categories), race, and sex as well as eduction. The results are presented in figure 5. The adjusted series looks almost identical to that presented in figure 4 accounting for changes in education alone. This suggests that changes in the age, race, and sex composition of the labor force over time have had little effect on the unemployment rate, a conclusion that can be verified by examining an adjusted series that accounts only for changes in age, race, and sex (and does not account for changes in education). While not presented here, such an adjusted series looks very close to the unadjusted series.

2.2 The Employment Rate

Figure 6 presents the seasonally adjusted employment-population ration (EPOP) overall and by sex. The EPOP was increasing from at least the mid-1970s through 2000, and this increase resulted from a rapid increase in employment among females partially offset by a slow decline among men. There is an obvious cyclical component to the EPOP with declines

Figure 6: Quarterly Employment-Population Ratio, by Sex (s.a.)

overall and for both sexes in slack periods. Since 2000, there has been no secular increase in the female EPOP, and the overall EPOP has been in decline for the last decade. The drop was especially steep in the recent recession, with the overall EPOP falling from about 0.76 mid-decade to about 0.72 since 2009. This decline is shared by both men and women.

Interestingly, a decomposition of the decline in the EPOP similar to that presented above for the unemployment rate suggests that increase in the female share of the workforce can account for almost none of the movement in the overall EPOP. The unadjusted and adjusted-for-sex EPOPs are shown in figure 7, and it is virtually impossible to distinguish the adjusted and unadjusted rates. The intuition for this is that females continue to have a lower EPOP than males so that the increase in female share while female EPOP is growing offsets the decline in the EPOP among males while male share is falling.

It turns out that much of the growth in the EPOP prior to 2000 can be accounted for by changes in educational attainment. The unadjusted and adjusted-for-education EPOPs are shown in figure 8, and they are sharply different. The adjusted series shows much less growth through 2000 and about the same decline since. This results from a combination of two factors. First, more educated workers have always had higher EPOPs and education levels are growing. Second, females' education levels have been increasing faster than males',

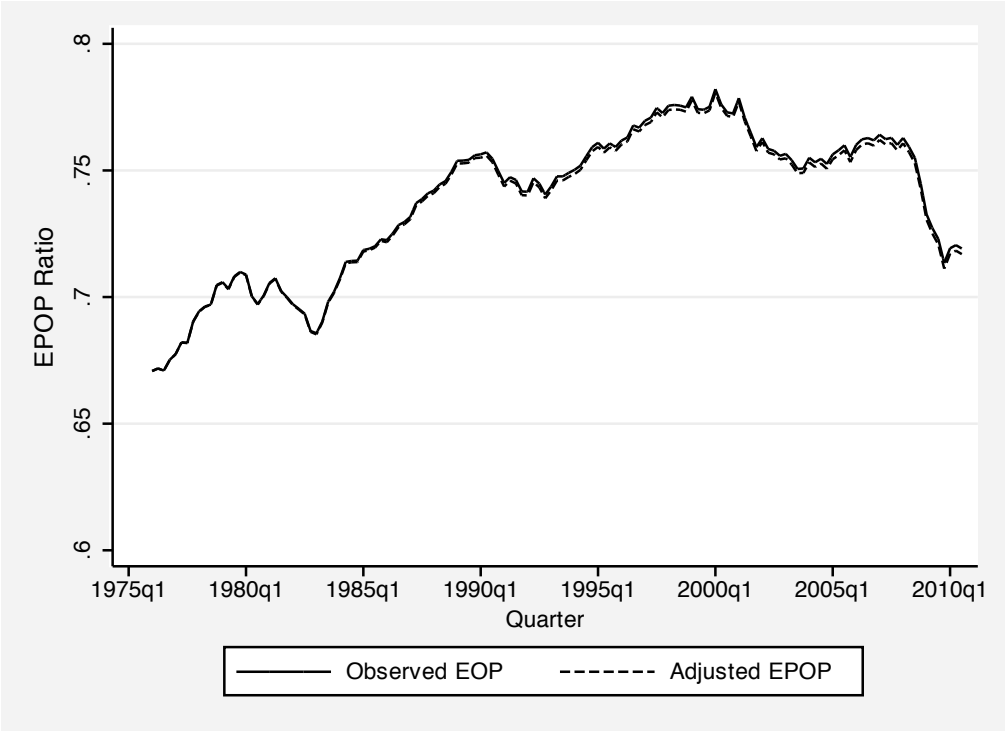

Figure 7: Quarterly Employment-Population Ratio, Adjusted for Sex (s.a.)

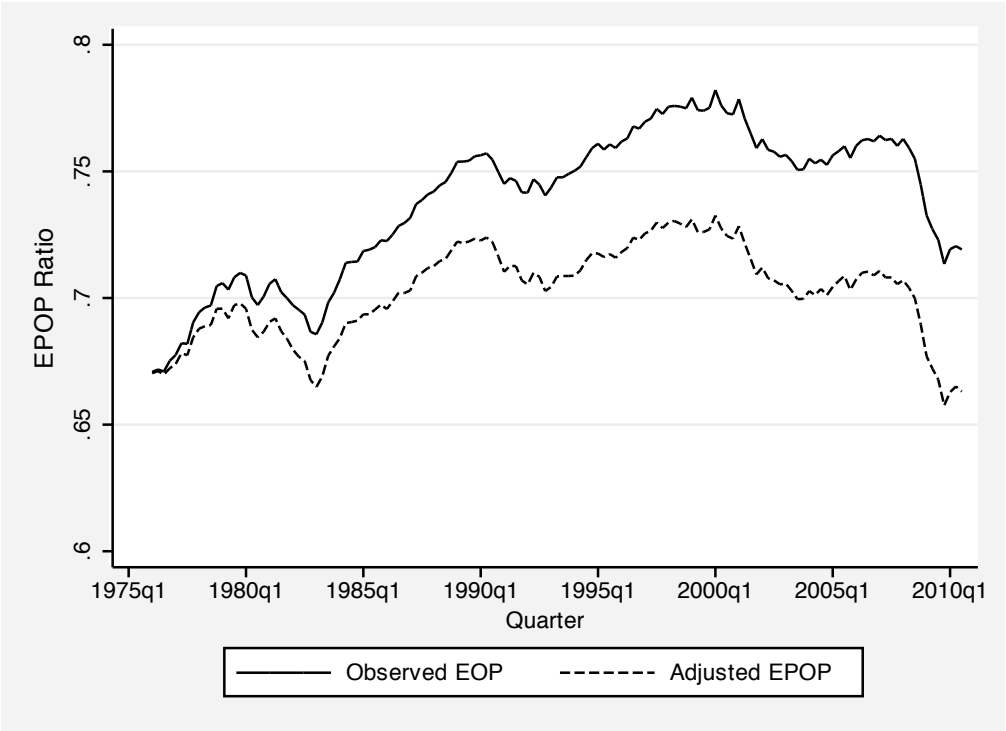

Figure 8: Quarterly Employment-Population Ratio, Adjusted for Education (s.a.)

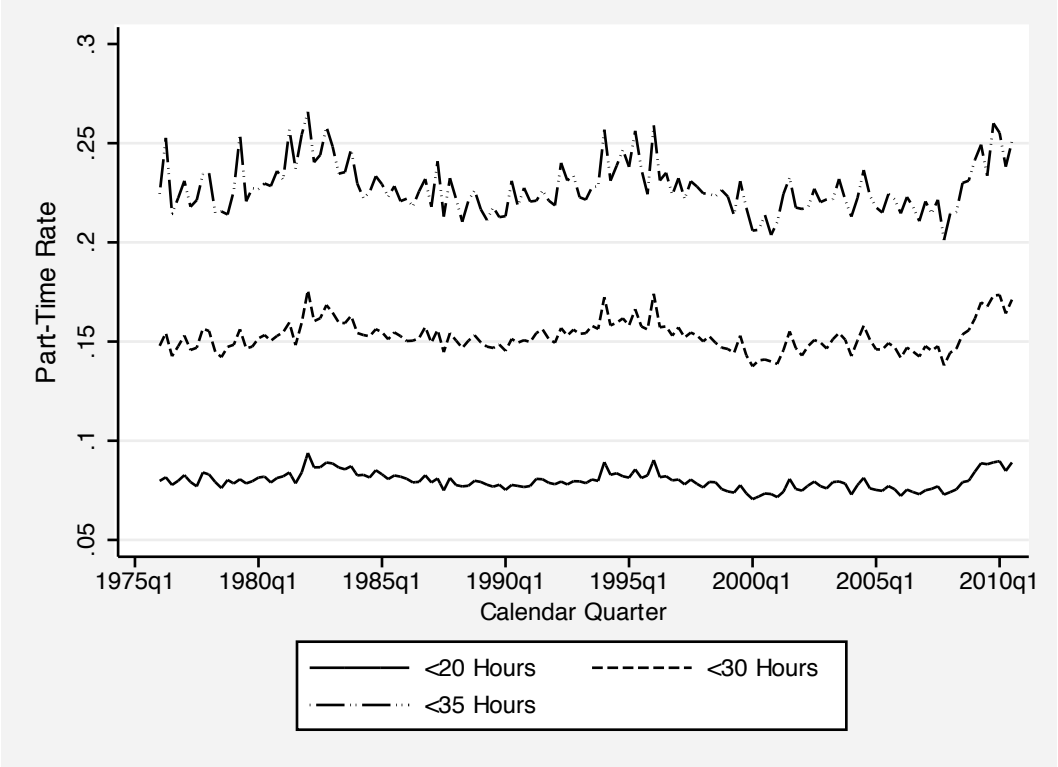

Figure 9: Quarterly Fraction Part-Time (s.a.)

and the female share of the labor force has been growing.

While not shown here, adjusting for age and race does not have much effect on the EPOP. That there is no affect of adjusting for age is is a bit surprising given the trend toward earlier retirement. One potential explanation is that over most of the sample period the baby-boom generation is moving through their prime working years and the trend toward earlier retirement involved relatively smaller older cohorts.

2.3 Part-Time Work

As was clear from figure 2, U6, the "underemployment rate," which includes those working part-time for economic reasons as unemployed is much higher than the usual unemployment rate. In 2009-2010, one in six workers are underemployed by the U6 definition. Figure 9 presents information on the part-time fraction of employment using three different measures of part time: < 20 hours weekly, < 30 hours weekly, and < 35 hours weekly.[7] All three

[7] The seasonal adjustment of the part-time work series required accounting for third quarters where September 1 was a Tuesday so that the Labor Day holiday falls in the second week of September. Since the second week of the month is the CPS reference week, reported hours worked tend to be lower when a holiday

measures show a substantial up-tick since 2008, suggesting that an additional cost of the recession is in hours reduction. For example, the fraction of workers reporting working fewer than 30 hours per week increase from 14.5 percent in 2007 to 17.0 percent in 2010. Females are more likely to be working part-time than males, and, while not shown here, the part-time rates for females and males separately show substantial increases since 2008.

2.4 Employment Outcomes at the Household Level

It is important to understand employment consequences of recession at the household level. Households are an appropriate financial unit, and there is mutual insurance within households. The structure of the CPS allows me to link individuals within households and consider labor market outcomes at the household level. My CPS sample from January 1976-September 2010 contains 17,177,028 monthly observations on households with at least one adult aged 23-64.

I consider,in turn, three groups of households by number of adults aged 23-64.

1. One Adult – 36.8 percent
2. Two Adults – 56.6 percent
3. Three or more Adults – 6.7 percent

Figure 10 contains the zero-employment rate (fraction of households with no adult 23-64 working for households with one adult overall and by sex. There are several striking features of this graph.

1. The overall zero-employment rate is very high at about 30 percent.
2. The overall rate was declining from the mid-1980s through the late-1990s.
3. The gap between the zero-employment rate for females and the rate for males (over 20 percentage points in 1980) has declined dramatically (to less than 5 percentage points in 2009.
4. There has been a sharp increase in the zero employment rate in the current recession, from 27.5 percent in 2007 to 32.5 percent in 2010.

It is clear that single-headed households are quite disadvantaged in the labor market, a condition that is only exacerbated by the recession.

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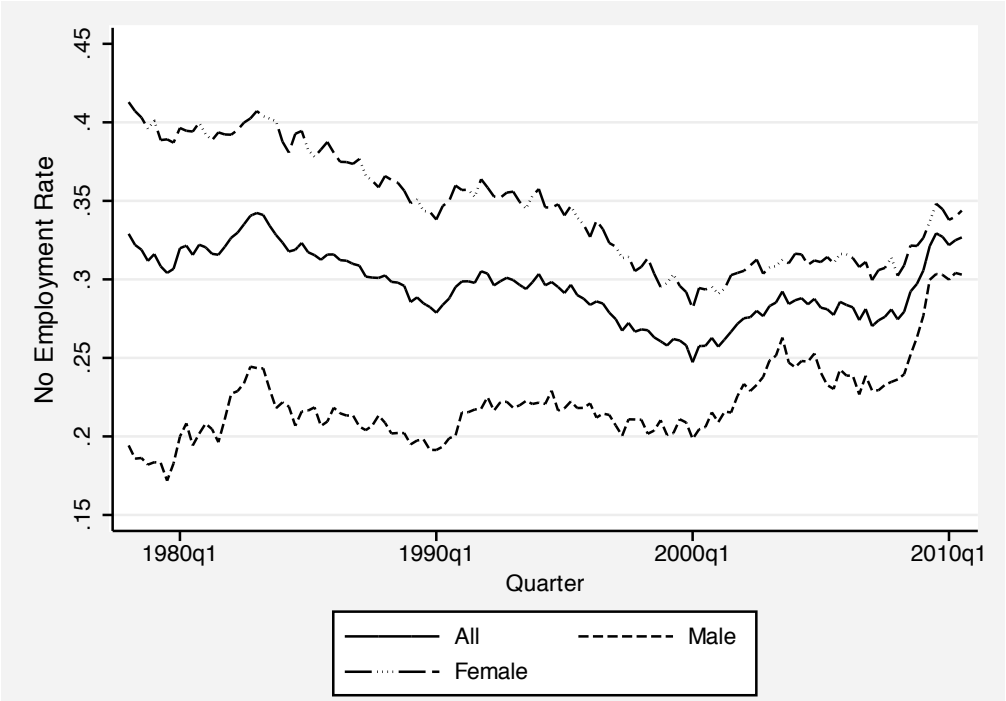

Figure 10: Zero Employment Rate, Households with One Adult (s.a.)

Figure 11: Employment Rates, Households with Two Adults (s.a.)

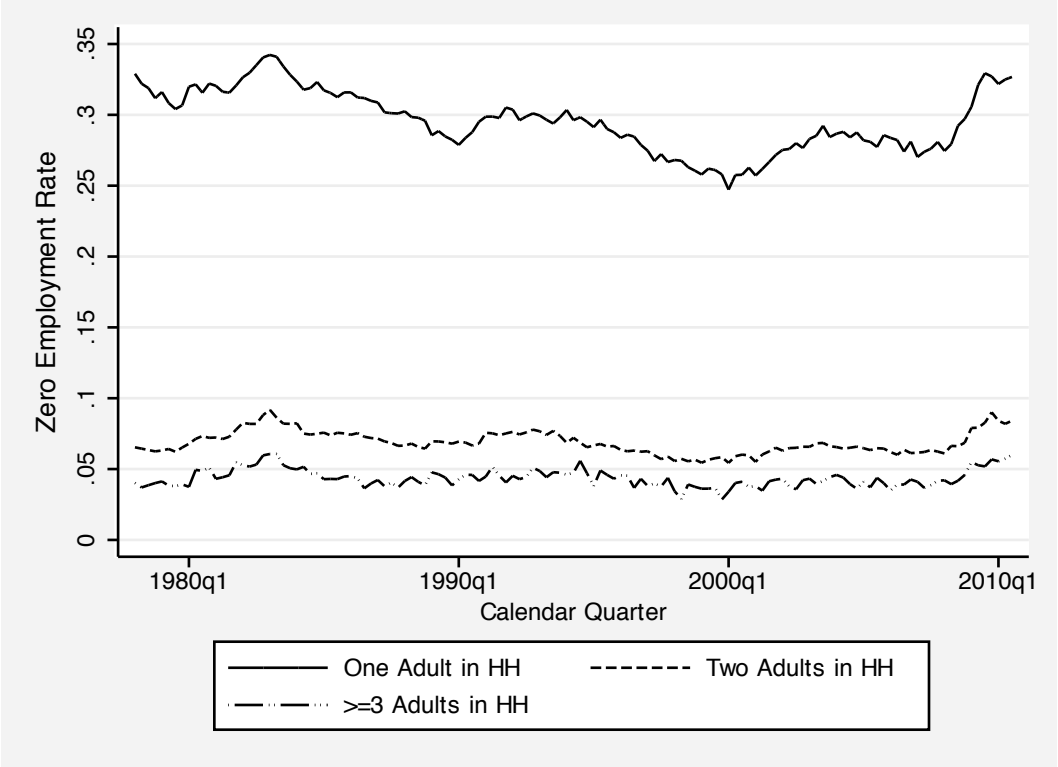

Figure 12: Zero-Employment Rate, by Number of Adults in Household (s.a.)

Figure 11 contains zero-employment, single-employment, and double-employment rates for households with two adults. About 95 percent of these households have one adult male and one adult female. The zero-employment rate of two-adult households is relatively steady at 5 to 10 percent with a strong counter-cyclical component. The zero-employment rate increased from 6.2 percent in 2007 to 8.3 percent in 2010. There was a downward trend through 2000 in the single-employment rate and an upward trend through 2000 in the double-employment rate in two-adult households. This reflects the increased employment rate of females in two-adult households. In the current recession, there has been an increase in the single earner rate (from 31.6 percent in 2007 to 34.5 percent in 2010) and an offsetting larger decrease in the double earner rate (from 62.1 percent in 2007 to 57.2 percent in 2010). This reflects job loss in double-employment households. It is clear that two-adult households are better able to insure themselves than single-adult households in the recession. The zero employment increased by 2.1 percentage points in two-adult households compared with an increase of 5 percentage points in one-adult households.

I do not consider households with three or more adults in detail because they comprise only 6.7 percent of all households. However, figure 12 contains a summary plot of the zero-employment rates for single-, two-, and three-or-more-adult households. This figure clearly

shows the dramatically higher zero-employment rate of single adult households as well their increased vulnerability to job loss in recessions. Interestingly, households with three or more adults have zero-employment rates that are only slightly lower than do households with two adults.

While I do not show the results here, analysis of zero-employment rates by maximum education level among the household's adults shows a sharply negative relationship. Households where maximum education is higher have substantially lower zero-employment rates.

3 Job Loss Rates from the Displaced Workers Survey

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). I utilize data on 1,058,244 individuals between the ages of twenty and sixty-four from the 14 DWSs conducted as part of January or February CPSs in even years from 1984-2010.[8] I discuss in appendix I to this paper some important issues of measurement and interpretation that arise when comparing job loss rates calculated using the DWS over time.

3.1 The Rate of Job Loss

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 rates of job loss 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.

Figure 13 contains plots of adjusted three-year job loss rates computed from each of the fourteen DWSs from 1984-2010 along with the average civilian unemployment rate for each three-year period.[9] The cyclical behavior of job loss is apparent, with job-loss rates clearly positively correlated with the unemployment rate ($\rho = 0.42$). It is clear from figure

[8] These are January CPSs in 1984, 1986, 1988, 1990, 1992, 2002, 2004, 2006, 2008, and 2010 and February CPSs in 1994, 1996, 1998, and 2000. Examples of earlier work using the DWS includes Farber (1993, 1997, 1998, 1999b), 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 some of this literature in Farber (2004).

[9] All counts are weighted using the CPS sampling weights.

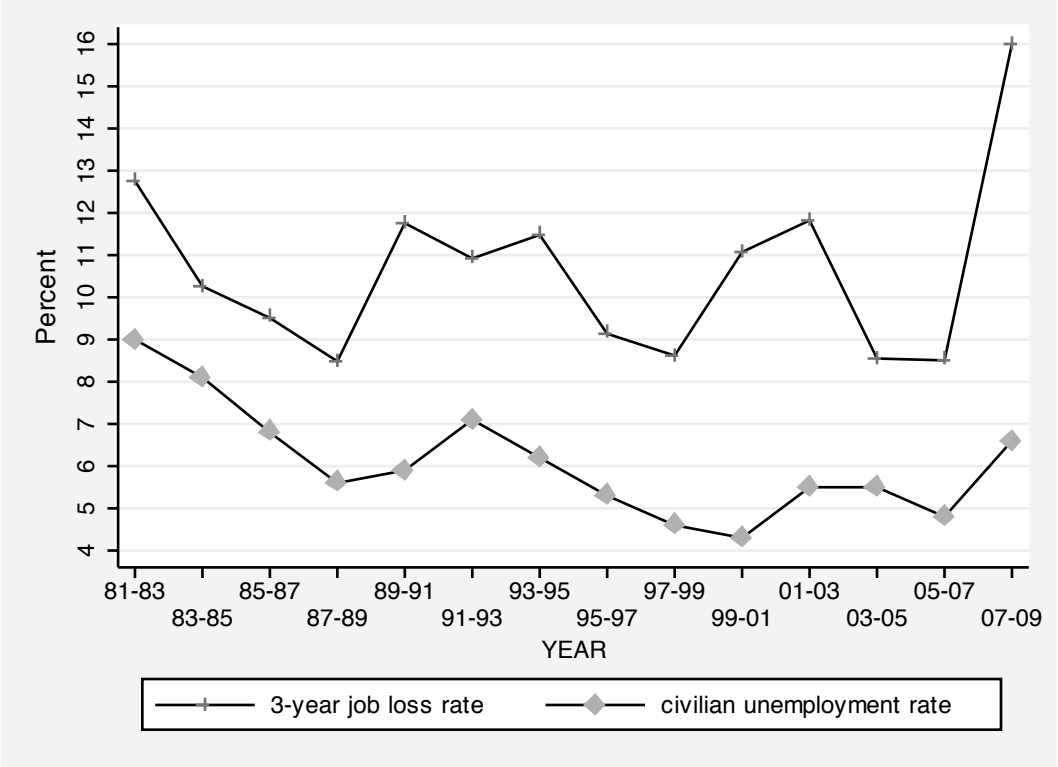

Figure 13: Unemployment and Job Loss Rates, by Year

13 that the unemployment rate has trended downward since 1981. A simple regression of the unemployment rate on a time trend has an R^2 of 0.44. There is not significant time trend in the job loss rate. It is also clear that the job loss rate is more variable than the detrended unemployment rate. The coefficient of variation is 0.199 for the job loss rate and 0.163 for the detrended unemployment rate.

With regard to the current recession, the job-loss rate in 2007-2009 has reached its highest level, with 16 percent of workers reporting that they had lost a job sometime during the three year period. The previous maximum job-loss rate was 12.8 percent in the 1981-1983. period.

There is substantial heterogeneity in job loss rates across workers. Figure 14 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 9.0 percent in 1997-99 (the lowest in the sample period) compared with 14.3 percent in 1981-83 and 19.4 percent in 2007-2009. In contrast, the job loss rate for workers with at least sixteen years of education was 6.7 percent in 1997-99 compared with 6.9 percent in 1981-83 and 11.0 percent in 2007-2009. Prior to

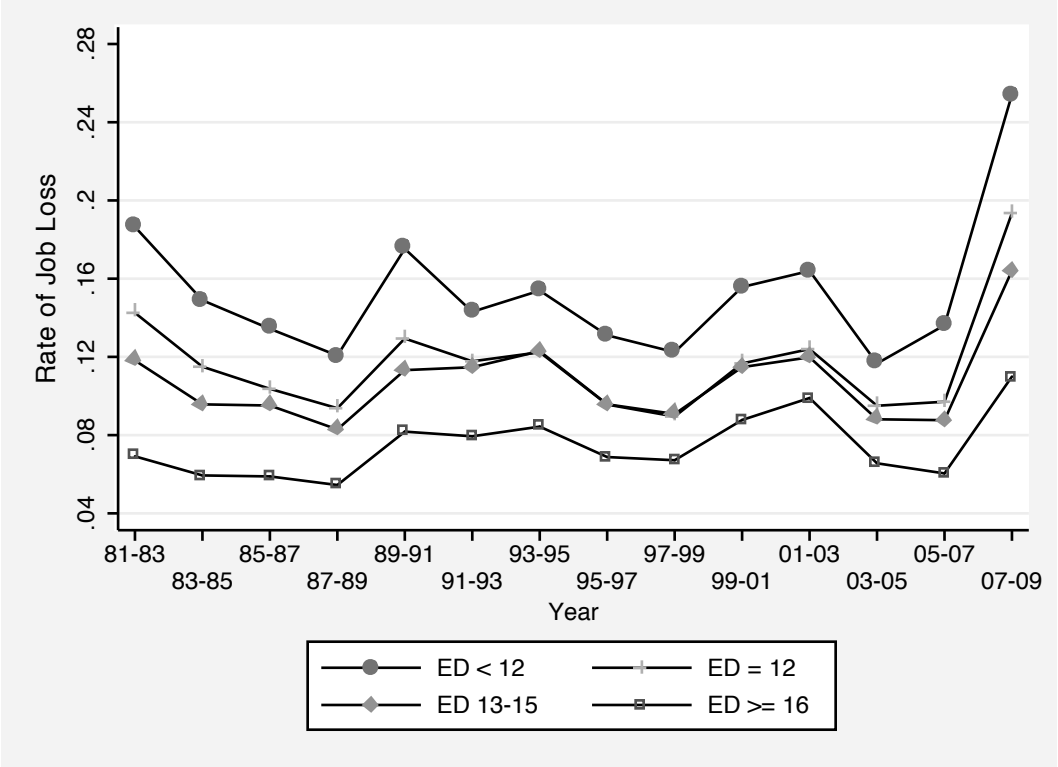

Figure 14: Three-Year Job Loss Rate by Education, 1981-2009.

the most recent period, there was some convergence of job loss rates by education. The gap between the job loss rates for the high-school educated and the college educated fell from 7.3 percentage points in the 1981-83 period (a serious recession) to less than 3 percentage points in the 1996-2005. However, the education gap in job loss rates has reasserted itself, increasing to 8.4 percentage points in the most recent period.

Figure 15 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 a strong cyclical pattern. The difference in rates of job loss by age group have converged over time. In 1981-83, the difference in job loss rates between the youngest and oldest group was 5.9 percentage points. This difference fell to 3.2 percentage points by 2007-09. The rates of job loss are higher for every age group in the current recession than in earlier recessions.

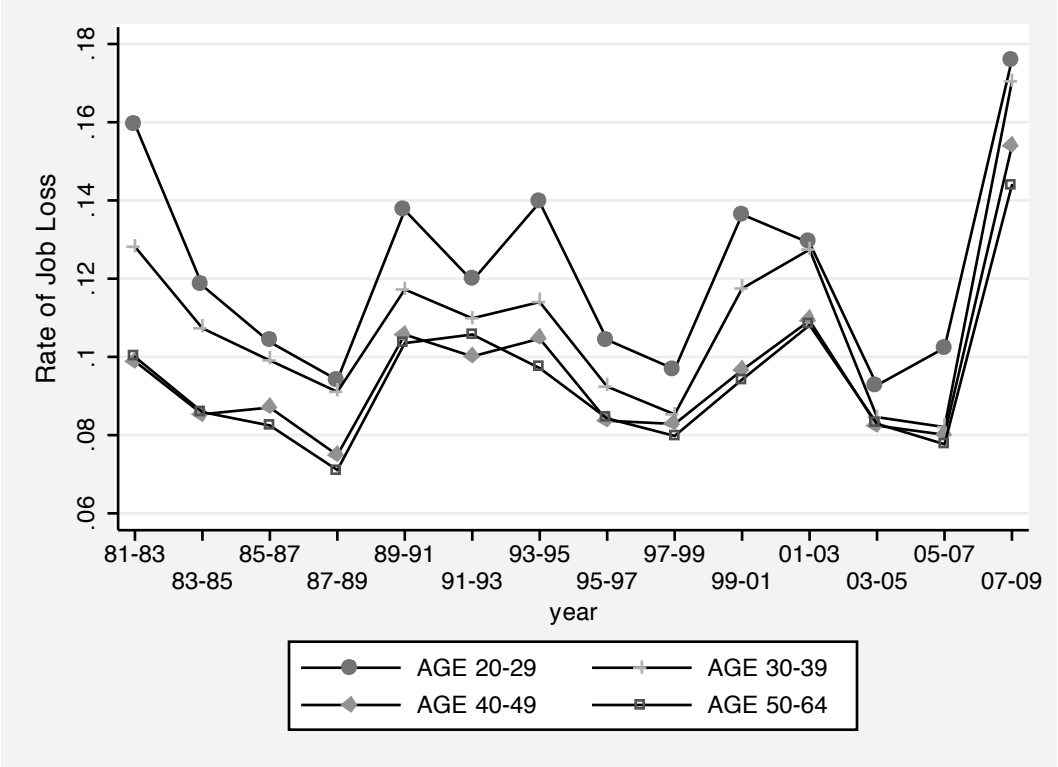

Figure 15: Three-Year Job Loss Rate by Age, 1981-2009.

4 The Duration of Unemployment

Perhaps the most striking feature of the current recession is the long duration of many unemployment spells. Figure 16 presents plots of the mean, median, and 75th percentile reported durations of unemployment. The mean duration of an in-progress spell of unemployment is at 33.3 weeks with a median of 21 weeks and a 75th percentile value of 52 weeks. These figures are much higher than even those seen in the weak labor market of 1983.[10]

The extreme length of spells of unemployment in the current recession raises the important question of why they are so long. The old common categories of explanations for unemployment suggest themselves.

1. (Frictional) The extended duration of unemployment benefits may have encouraged

[10] Note that these are not durations of completed spells. If, on average, the completed duration of a sampled in-progress spell is twice the duration of a randomly selected point in the spell (as one might characterize the CPS data on durations), then the average duration of a completed spell of unemployment will be 66 weeks. See Akerlof and Main (1980) for a discussion of this method of estimating completed durations data on incompleted spells. However, there is a bias in the other direction in that longer spells are more likely be sampled in the first place (length-biased sampling). This is well known in the literature on durations. See Kaitz (1970) and Salant (1977) for early references.

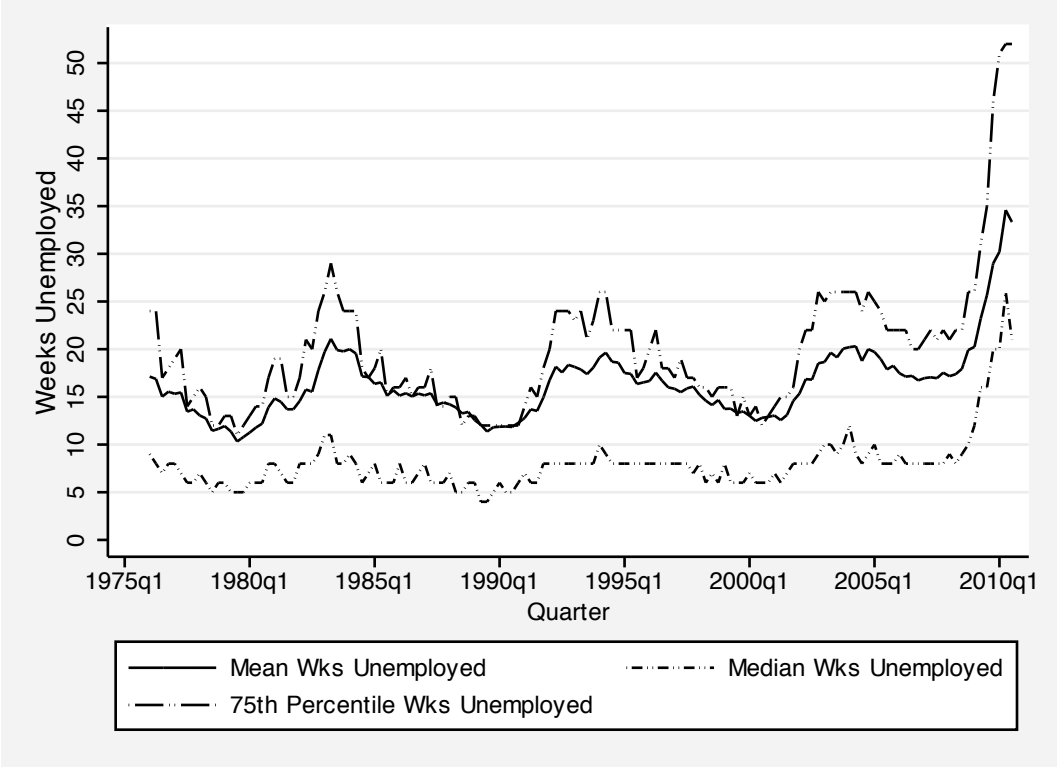

Figure 16: Duration of Unemployment Spells, by Quarter

some of the unemployed to search longer.

2. (Structural) There may be a mis-match, either geographically or by skill level between available workers and the jobs available to them.

3. (Deficient Demand) Employers may simply not be hiring due to insufficient product demand.

I cannot hope to resolve this question completely, but some of the available evidence points the way.

4.1 Labor Market Flows

One helpful set of facts is on transition rates between labor market states. In order to analyze these labor force dynamics, I created a database that matches CPS observations month-to-month. Recall that the CPS has a rotation-group structure where individuals living at sampled addresses (approximately 60,000 each month) are surveyed for four consecutive months (rotation groups 1-4), left alone for eight months, and interviewed again for four consecutive months (rotation groups 5-8). If a household/individual changes residence at any

Figure 17: Average Monthly Transition Rates from Employment (s.a.)

point during this 16 month period, whatever new households/individuals at that address are interviewed. With some exceptions, since September 1995 it is straightforward to determine whether individuals in rotation groups 2-4 and 5-8 (the continuing rotation groups) are the same individual surveyed in the previous month.[11] The overall individual match rate for those in eligible rotation groups (2-4 and 6-8) is 94.8 percent. The matched sample includes 12,823,102 observations matched month-to-month.

In order to start, I present the average monthly transition rates from employment in figure 17. The E-E flow shows the sharp decline in the probability of remaining employed (read from the left-hand axis) early in the current recession. The E-E transition probability fell from 0.960 to 0.955 after 2007q4. At the same time the probability of moving from employment to not-in-the-labor-force (the E-N flow, read from the right-hand axis) fell from 0.028 in 2007q4 to 0.026 in 2009q2. Since the three transition probabilities sum to one, it

[11] There were several months since September 1995 where linking variables changed and it was not possible to match. It is possible to match observations prior to 1994 (before computer-aided interviewing was introduced for the CPS), but it is more difficult and match rates are lower. See Peracchi and Welch (1995) and Madrian and Lefgren (1999) for discussions of matching in the CPS. I intend to extend the match further back in time in a revised version of this paper.

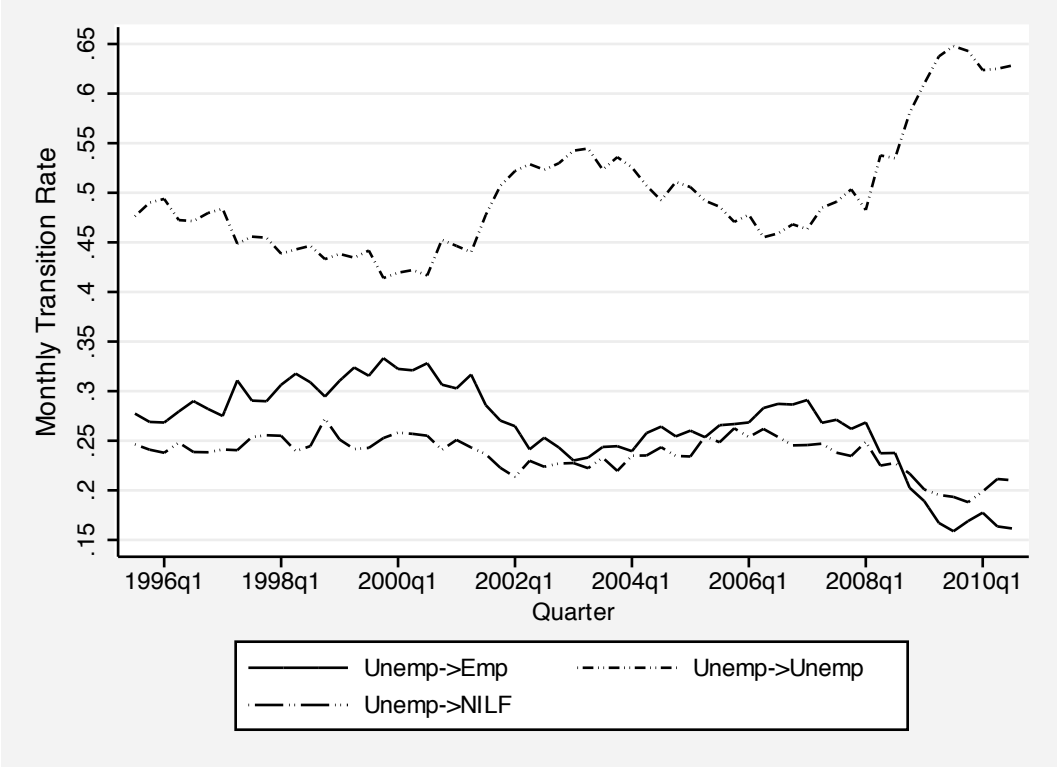

Figure 18: Average Monthly Transition Rates from Unemployment (s.a.)

is the case that the probability of a transition from employment to unemployment (the E-U flow, again read from the right-hand axis) increased substantially, 0.012 in 2007q4 to 0.018 in 2009q2. These may seem like small changes, but they need to be evaluated understanding that the pool of employed workers in 2007 was 19 times larger than the pool of unemployed workers. A small increase in the transition rate from employment to unemployment implies a much larger proportional increase in the stock of unemployed workers.

It is of particular interest to examine the transition rates from unemployment. Figure 18 presents the average monthly transition probabilities from unemployment by quarter. These transition rates show the usual cyclical pattern during the recession of the early 2000s. What is striking is the sharp upward movement in the U-U transition rate from about 0.47 in 2006-2007 to 0.63 in 2009-2010. This is due to the combination of a sharp drop in the U-E transition rate from 0.28 to 0.17 and a substantial drop in the U-N transition rate from 0.25 to 0.20 over the same period.

4.1.1 Geographic Mobility of the Unemployed

It is worth investigating the extent to which unemployed workers move and the extent to which such movement is lower than expected in the current recession. If mobility rates are

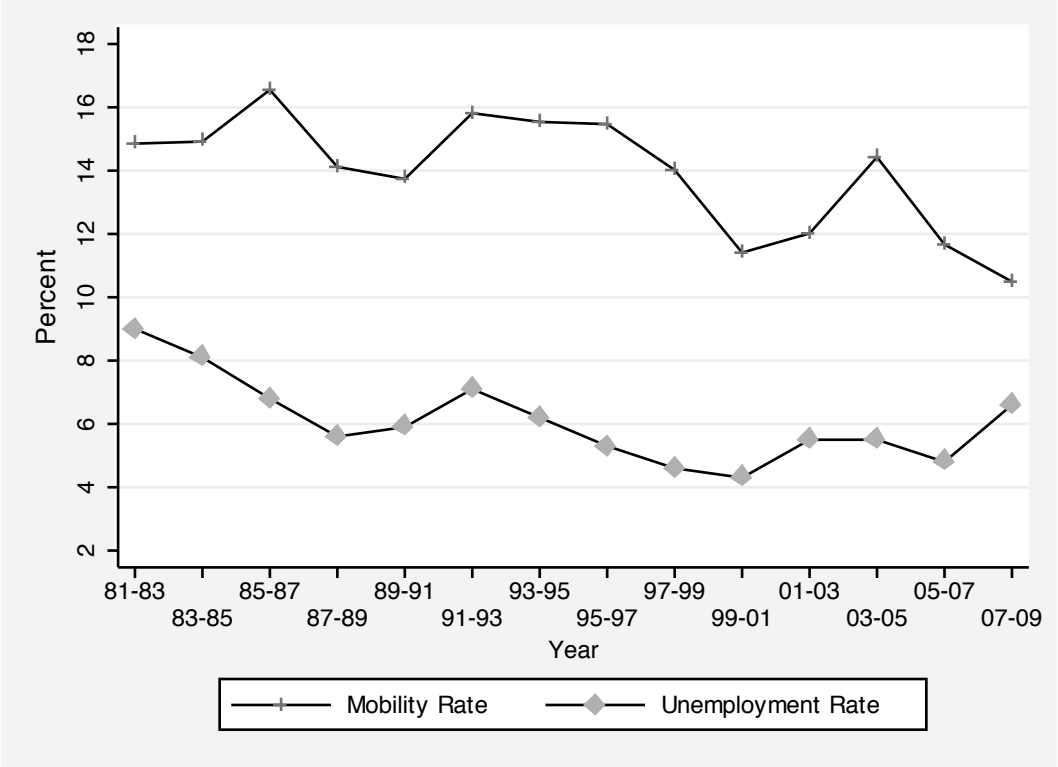

Figure 19: DWS Geographic Mobility Rate, Job Losers

lower than expected, this could reflect one of two factors:

1. (Structural) Some of the long unemployment durations we are seeing is due to mobility constraints on job losers, who are moving at lower rates than in earlier periods.

2. (Deficient Demand) A lack of jobs generally gives workers less reason to move to find work than in earlier periods.

One source of information is the DWS, where job losers are if they moved to a different county or state subsequent to their job loss. The average mobility rate by DWS year are presented in figure 19. I also present the average unemployment rate in each 3-year period in order to help focus on the cyclical nature of the mobility rate of job losers. Interestingly, the mobility rate of job losers has been trending downward since the mid-1990s, a phenomenon that deserves further attention, particularly as it may relate to the housing market. There is a positive correlation between the mobility rate and the unemployment rate so that job losers are more likely to move in weaker labor markets. The correlation between the mobility rate and unemployment rate is 0.43. The 2007-2009 period is an exception. The mobility continued to decrease (to its lowest level in the sample period) despite an increase in the unemployment rate. The correlation between the mobility rate and unemployment rate

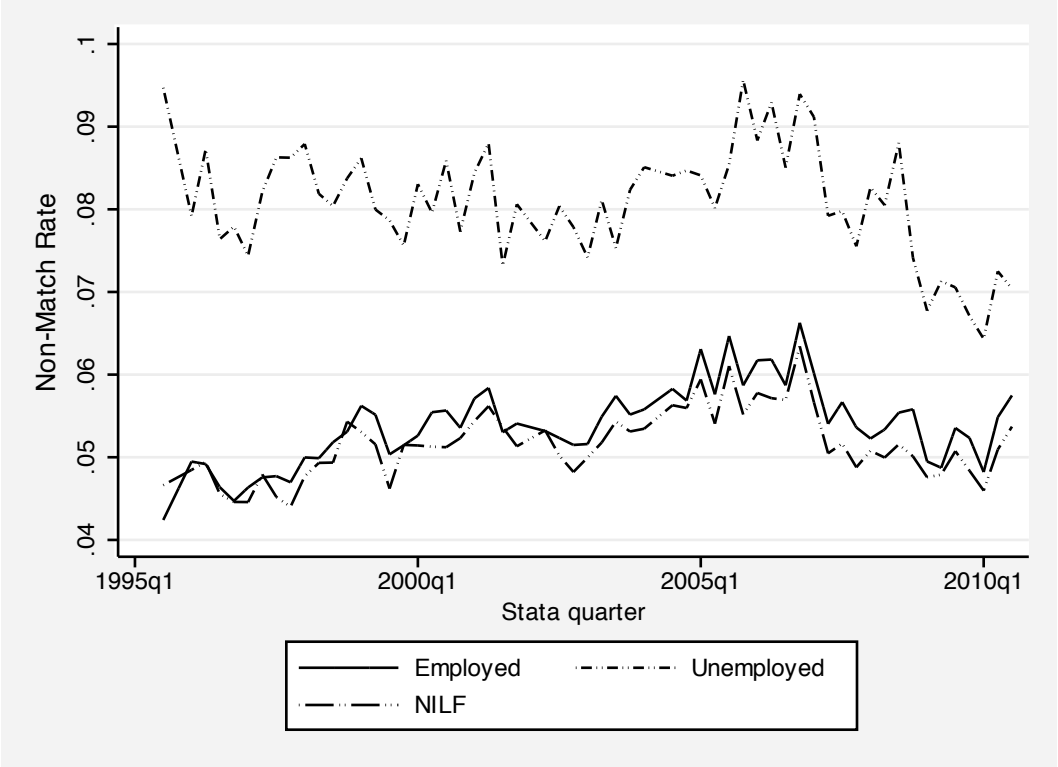

Figure 20: CPS Non-Match/Mobility Rate, by Labor Force Status (s.a.)

excluding this last observation increases substantially to 0.58. The low level of mobility among job losers in the most recent period is clearly unusual.

I derive more information on mobility by exploiting the rotation-group structure of the CPS (described above). The major reason an individual in a continuing rotation group (2-4 or 6-8) cannot be found at the same address in consecutive months is that the individual has moved to a new address. Such a move may be within the same area, but it may also be to another area. In any case, it represents mobility, and I use this as a crude proxy for geographic movement.

I examine the non-match rates in the CPS over time in order to investigate the extent to which unemployed workers are changing residence in the month following a month in which they report being unemployed. To this end, figure 20 contains the non-match/mobility rates of individuals by labor force status. Interestingly, unemployed individuals have a substantially higher rate of residential mobility than do either the employed or those not in the labor force. The mobility rates of workers in all labor force states has declined in the last several years, but it has declined particularly sharply for the unemployed. The month-to-month mobility rate for the unemployed declined from about 8.5 percent in 2006-2007 to 6.9 percent in 2009-2010. The current mobility rate for unemployed workers is the lowest

in my sample, since 1995. This is consistent with the findings on mobility among job losers from the DWS.

I can use a combination of data from the DWS and matched CPS to provide some preliminary evidence distinguishing the structural and deficient-demand interpretations of the low mobility rates among the unemployed in the current period. One explanation for a structural restriction on mobility of the unemployed in the most recent period is that the collapse of the housing market may make it difficult or impossible for unemployed homeowners to move to a new location to search for or take a job. This would suppress both the post-job-loss mobility rate and the the U-E transition rate.

To the extent that the structural interpretation of the low mobility rate of job losers is due to the housing market, then the probability of a move by a homeowner who loses a job will be lower in the current period than it was earlier. I turn to such a calculation.

While it is difficult to get data on home ownership together with labor force data, data from some CPS's are available on this question. While this information is not available in the basic monthly CPS release, it is available in some CPSs with supplements, including the January 2008 and January 2010 DWS.[12] To get some idea of the relationship between home ownership, job loss, and subsequent unemployment, I compare the 2008 and 2010 data. Overall, the fraction of of individuals 20-64 reporting that they lived in owner-occupied units was steady between 2008 and 2010, at 70 percent in 2008 and 69 percent in 2010.

Ideally, we would like to know the ownership status of the dwelling at the time of job loss, but this is not available. However, with some assumptions and with the application of Bayes' Rule we can say something tentative about how the likelihood of moving given home ownership status has changed. By Bayes' rule,

$$P(O=1|M=1) = \frac{P(O=1) - P(O=1|M=O)P(M=O)}{P(M=1)}, \tag{4.1}$$

and

$$P(M=1|O=1) = \frac{P(O=1|M=1)P(M=1)}{P(O=1)}. \tag{4.2}$$

Substituting equation 4.1 into equation 4.2 yields

$$P(M=1|O=1) = 1 - \frac{P(O=1|M=0)P(M=0)}{P(O=1)}, \tag{4.3}$$

where M is an indicator for a move and O is an indicator for home ownership. It is reasonable to assume that the observed *ex post* home rental rate for job losers who do not move is a good proxy for the *ex ante* home rental rate of non-movers ($P(O=1|M=0)$). The rate of

[12] The CPS asks respondents each month about whether they own or rent the housing unit they occupy. For unknown reasons, this information is not made available on a monthly basis.

Table 1: Probability of Mobility of Workers Who Lose Jobs, by Homeowner Status

		2008	2010		2008	2010
(1)	$P(O=1\|M=0)$	0.585	0.570	$P(O=0\|M=0)$	0.299	0.325
(2)	$P(M=0)$	0.883	0.895	$P(M=0)$	0.883	0.895
(3)	$\Delta P(M=1,O=1)$		0.006	$\Delta P(M=1,O=0)$		-0.027
(4)	$\Delta P(M=1\|O=1)$		0.011	$\Delta P(M=1\|O=0)$		-0.068

O is an indicator for home ownership. M is an indicator for mobility. $P(O|M=0)$ is derived from DWS data on geographic mobility and basic CPS data on homeownership. $P(M)$ is derived from DWS data on geographic mobility For job losers. The third line is calculated from equations 4.5 and 4.7. The fourth line is calculated from equations 4.4 and 4.6 assuming that $P(O=1)=0.6$.

non-movement ($P(M=0)$) is directly observable in the data. The problem is that there is not a good proxy for the *ex ante* overall home ownership rate of job losers ($P(O=1)$).

If I am willing to assume that the *ex ante* home ownership rate of job losers is constant between two years, say 0 and 1, I can express the change in the probability of mobility conditional on home ownership, using equation 4.3, as

$$\Delta[P(M=1|O=1)] = \frac{P_0(O=1|M=0)P_0(M=0) - P_1(O=1|M=0)P_1(M=0)}{P(O=1)} \quad (4.4)$$

Multiplying equation 4.4 by $P(O=1)$ yields the change in the joint probability of moving and owning a home as

$$\Delta[P(M=1,O=1)] = P_0(O=1|M=0)P_0(M=0) - P_1(O=1|M=0)P_1(M=0). \quad (4.5)$$

Analogous application of Bayes' rule to non-owners yields the change in the probability that job loser who rents moves as

$$\Delta[P(M=1|O=0)] = \frac{P_0(O=0|M=0)P_0(M=0) - P_1(O=0|M=0)P_1(M=0)}{P(O=0)} \quad (4.6)$$

Multiplying equation 4.6 by $P(O=0)$ yields the change in the joint probability of moving and not owning a home for job losers as

$$\Delta[P(M=1,O=0)] = P_0(O=0|M=0)P_0(M=0) - P_1(O=0|M=0)P_1(M=0). \quad (4.7)$$

Table 1 shows the calculation of the change in the joint probability of mobility and homeownership and the change in the joint probability of mobility and non-homeownership between 2008 and 2010. Th results clearly show that home ownership did not adversely affect the mobility of job losers in 2010 relative to 2008. The third line of table 1 shows 1) that there was virtually no change in the joint probability of mobility and homeownership and 2) that

there was a decrease of 2.7 percentage points in the the joint probability of mobility and non-homeownership. Assuming a common probability of home ownership for job losers of 0.6, the fourth line of the table rescales these changes to reflect the probability of mobility conditional on homeownership and the probability of mobility conditional on non-homeownership. This suggests, counter to expectations, that a homeowner's probability of moving subsequent to job loss increased by 1.1 percentage points between 2008 and 2010 while the probability that a non-homeowner moves subsequent to job loss fell by 6.8 percentage points over the same period.

The finding that rates of mobility fell more for renters than for homeowners suggests that the collapse of the housing market has not been an important factor in preventing job losers from moving. A more likely cause is deficient demand generally so that there is less incentive to move.

5 Post-Displacement Experience of Job Losers

5.1 Post-Displacement Labor Force Status

Figure 21 contains plots of the fraction employed, unemployed and not in the labor force at the DWS survey dates for job losers in each of the DWSs from 1984-2010. It is clear from this figure that the post-displacement employment rate is pro-cyclical, with relatively low rates for job loss in slack labor markets. Job losers in the current recession have the lowest reemployment rate over the period surveyed, with only 50 percent of job losers in the 2007-2009 period employed in January 2010. In contrast, 58 percent of job losers in the 1981-1983 recessionary period were employed in January 1984. These movements are mirrored in the survey-date unemployment rate among job losers, which moves counter-cyclically. Almost 37 percent of job losers in the 2007-2009 period were unemployed in January 2010 while 29 percent of job losers in the 1981-1983 period were unemployed in January 1984. There is no evidence from the DWS that job losers are disproportionately discouraged in recessions, leading to withdrawal from the labor force. The fraction of job losers reporting that they are not in the labor force at the subsequent interview shows very little movement over time.

The use of aggregate fractions in figure 21 masks some important differences in labor force status across workers by sex, education, and age. Figure 22 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. Female job losers have higher higher fractions not in the labor force and somewhat lower unemployment rates. The substantial drop in post-displacement employemt rates and the substantial increase in post-displacement unemployment rates in the current

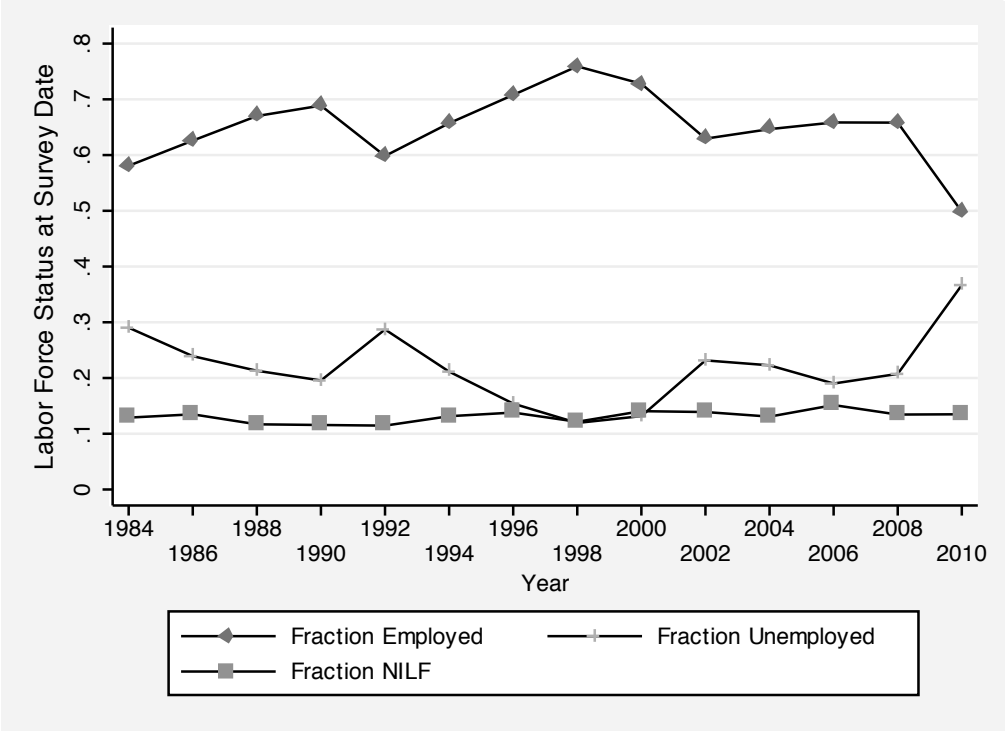

Figure 21: Survey Date Labor Force Status of Job Losers

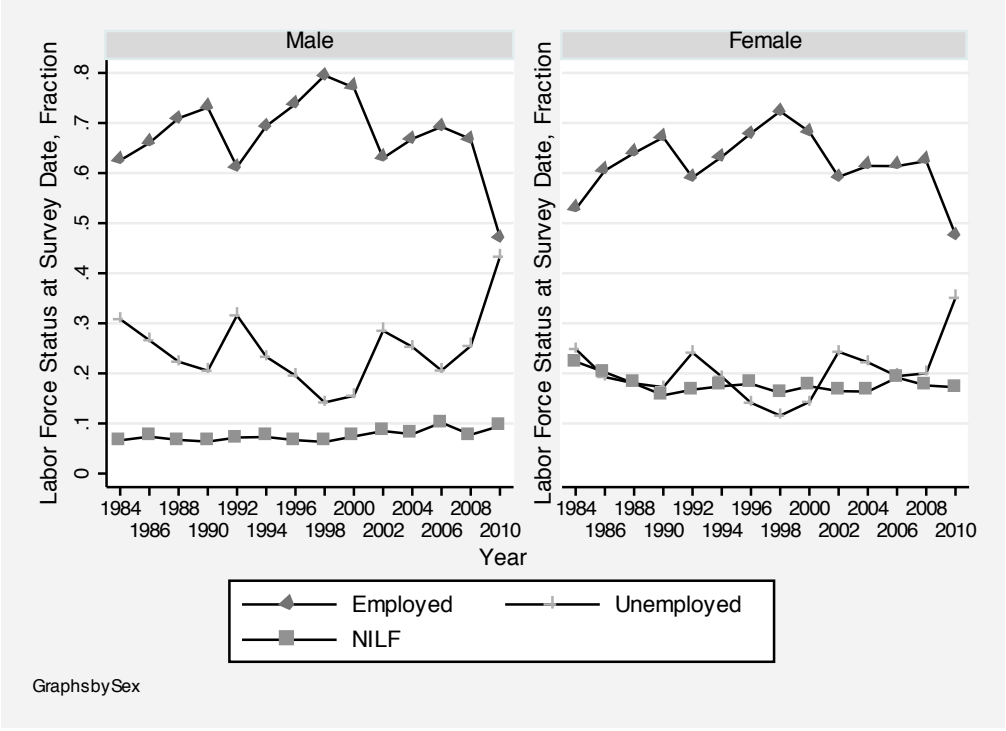

Figure 22: Survey Date Labor Force Status of Job Losers, by Sex

recession is shared by workers of both sexes.

Another important dimension along which there are differences is education. Figure 23 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 rates and education.

The usual cyclical pattern of both the employment and unemployment fractions exists at all education levels. There generally has been somewhat 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 current recession, the fraction employed among college graduate job losers fell from a peak of about 76 percent in 2006 to 61.5 percent in 2010, a decline of 15.5 percentage points. Over the same period, the fraction employed among high school graduate job losers fell from 62 percent to 43.2 percent, a decline of 17.5 percentage points. These patterns are mirrored in post-displacement unemployment rates. In the current recession, college graduates have a post-displacement unemployment rate of about 30 perent while high-school graduates have a post-displacement unemployment rate of about 40 percent.

There are also strong differences in post-displacement labor force status by age. Figure 24 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. Older job losers (55-64 years of age) are substantially more likely than younger job losers to be out of the labor force, perhaps reflecting a move to retirement.

One possibility that finds mixed support in the DWS is that older job losers might be more likely to remain in the labor force than in the past due to pension and other losses of wealth suffered in the recent financial crisis. It does not appear from figure 24 that older job losers are substantially less likely to leave the labor force. However, they are remaining unemployed at much higher rates than in the past (as are workers in the other age groups).

In order to investigate movement of unemployed workers out of the labor force (U-N), I return to the matched CPS data with information on U-N flows for four age groups. This information is presented in figure 25. While the U-N flow rates have declined for all age groups in the last five years, the decline is particularly sharp for workers older than 65. Five years ago, almost half of unemployed workers aged 65 or older moved out of the labor force

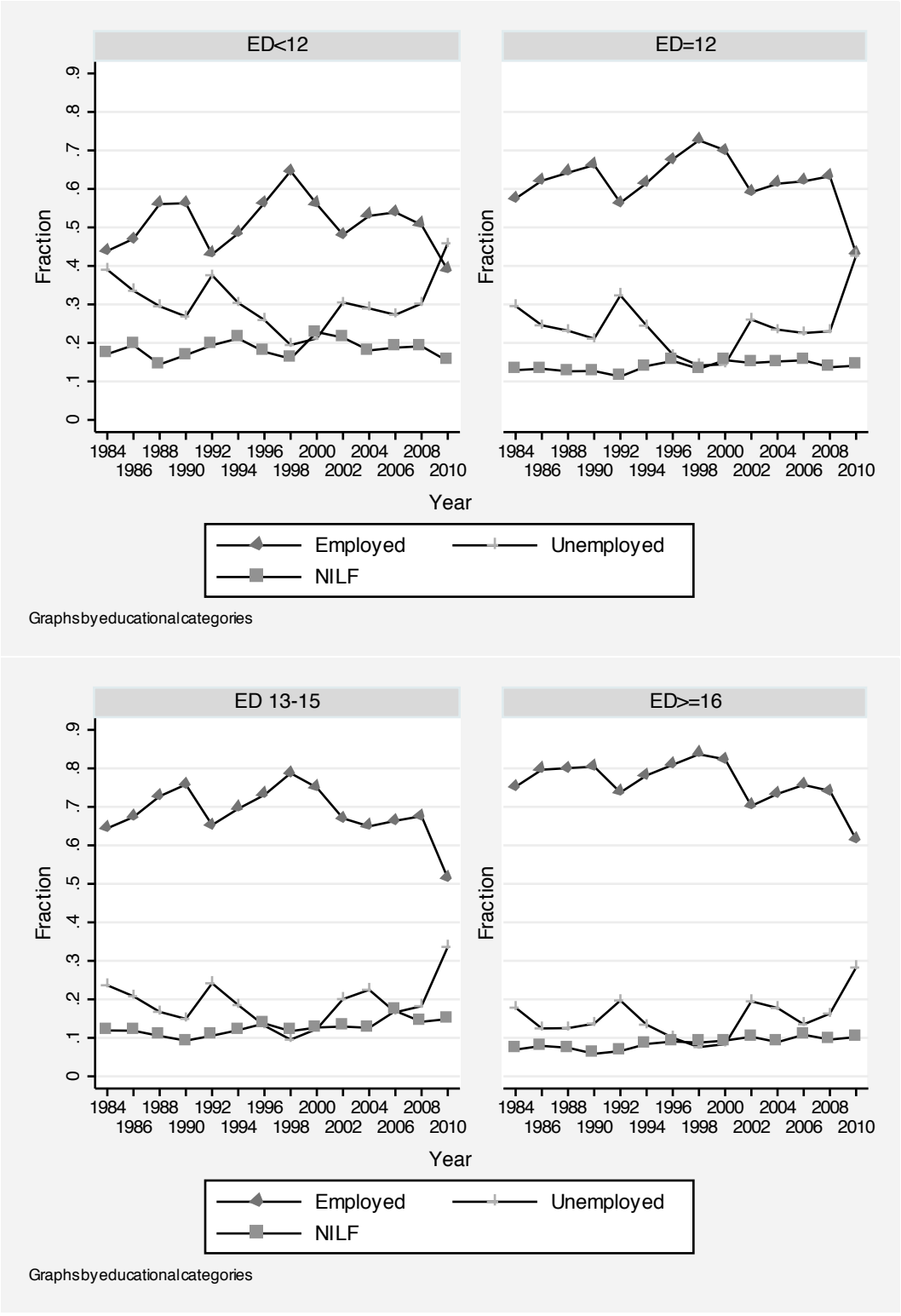

Figure 23: Survey Date Labor Force Status of Job Losers, by Education

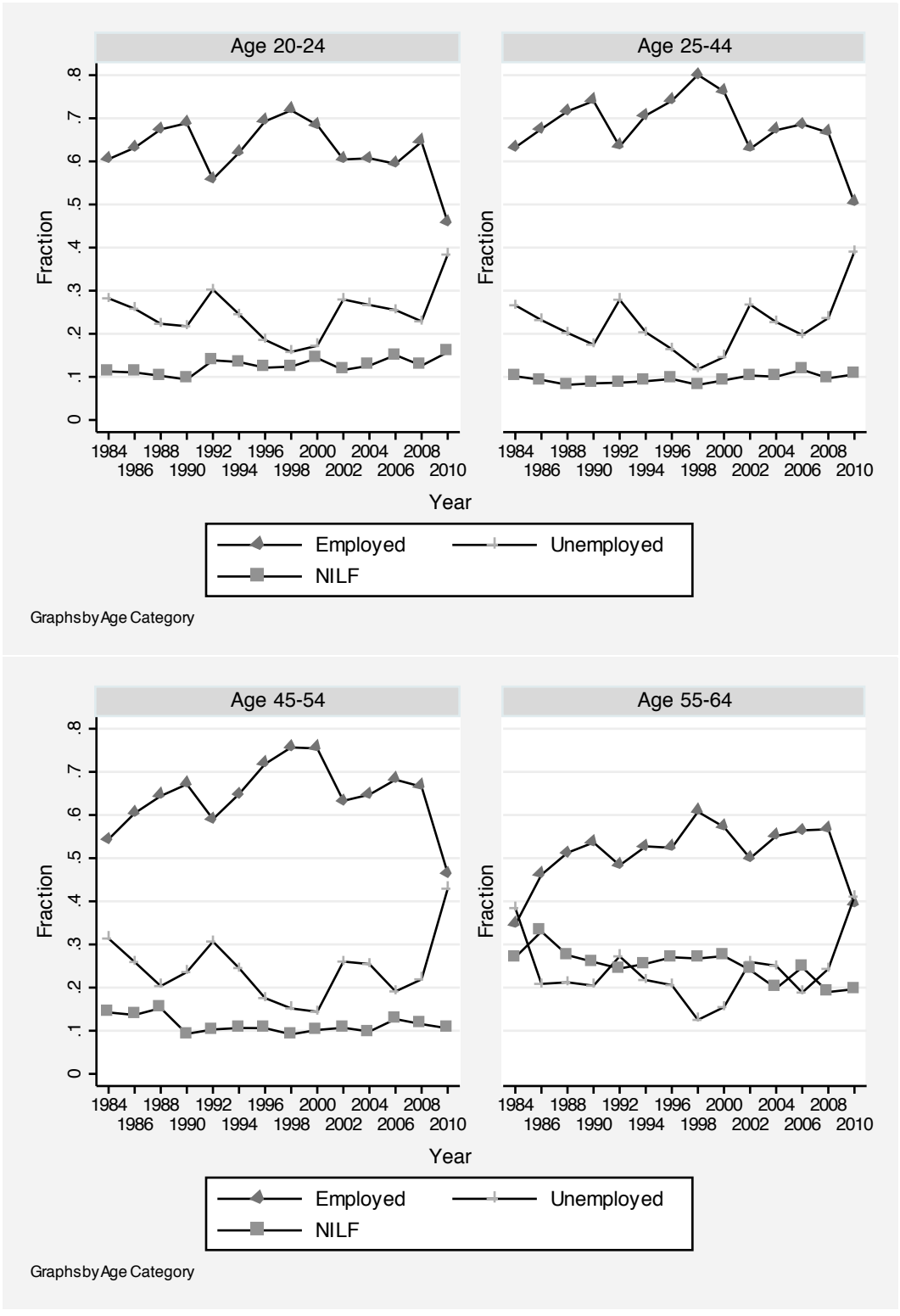

Figure 24: Survey Date Labor Force Status of Job Losers, by Age

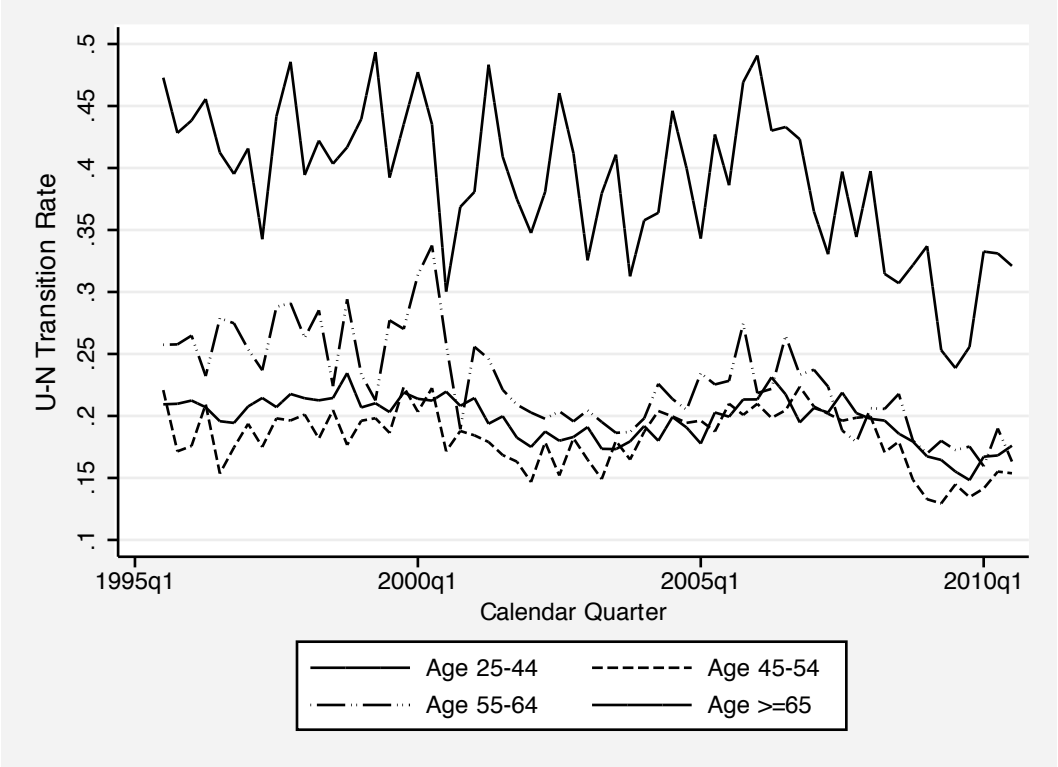

Figure 25: Transition Rate of Unemployed Workers to NILF, by age (s.a.)

(presumably to retirement). This is particularly striking given that these are high frequency (one month) transition rates). The U-N transition rate fell from 44 percent in 2006 to 27 percent in 2009 before rebounding to 33 percent in 2010. Younger workers, even those 55-64 have much lower U-N flow rates, and these flows have also been declining for several years. Interestingly, among the "younger" age groups, the decline was sharpest for workers 55-64, where the U-N transition rate fell from 23.5 percent in 2006 to 17.4 percent in 2009 and 2010 with no rebound in 2010. This is consistent with older job losers remaining in the labor force as a result of pension and other wealth losses in the financial crisis.

Another indication that the financial crisis is having the effect of keeping people in the labor force would be a reduction in flows directly from employment to out of the labor force (as would be the case in retirement), particularly by older workers. In order to investigate this possibility figure 26 contains plots of E-N flows by age group. Not surprisingly, the flows from employment to out of the labor force of older workers are much higher than those for younger workers. What is interesting is that the monthly flow directly from employment to NILF for workers aged 65 and older (presumably retirement) has declined quite substantially, from 10.8 percent in 1995 to 7.4 percent in 2009 and 2010. The E-N flow for workers 55-64 has also declined from 3.1 percent to 2.5 percent over the same period. However, there is no

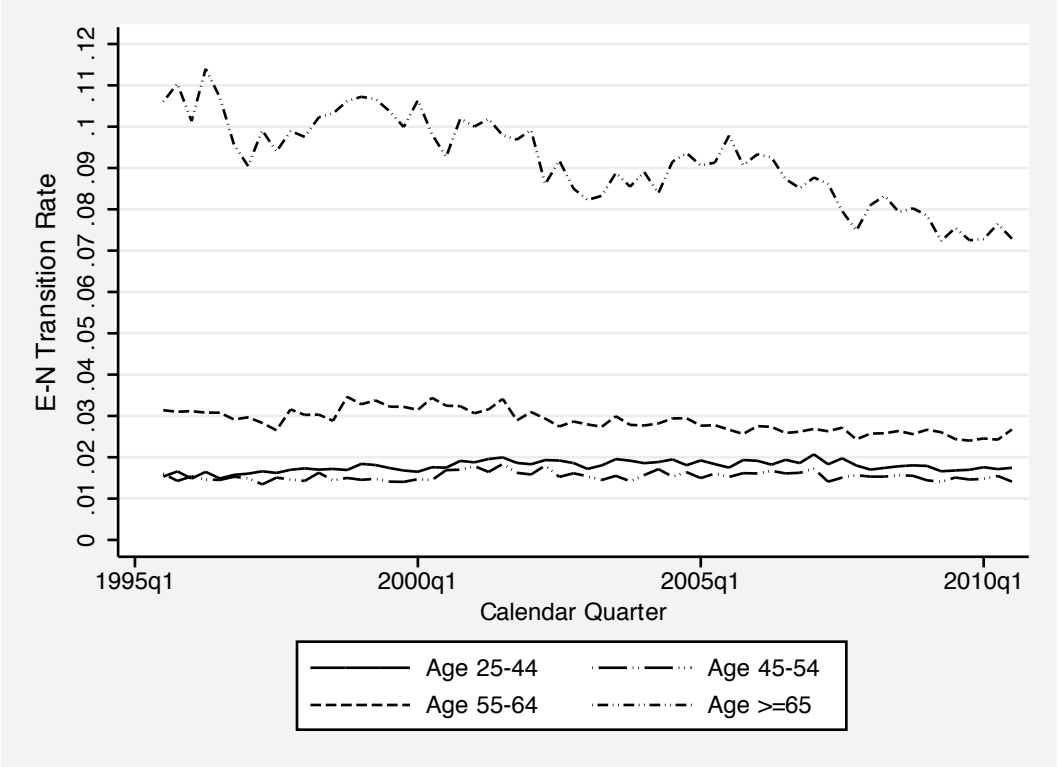

Figure 26: Transition Rate of Employed Workers to NILF, by age (s.a.)

evidence that the financial crisis of the last few years has had an effect on these flows.

5.2 Post-Displacement Full-Time / Part-Time Status

An important cost of job loss in a recession (or any job loss, for that matter) comes in the form of the deterioration of wages and working conditions subsequent to reemployment. I start by considering the full-time / part-time status on new jobs held by job losers.

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 then 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 27 contains a plot of the fraction of employed job losers who are employed part-

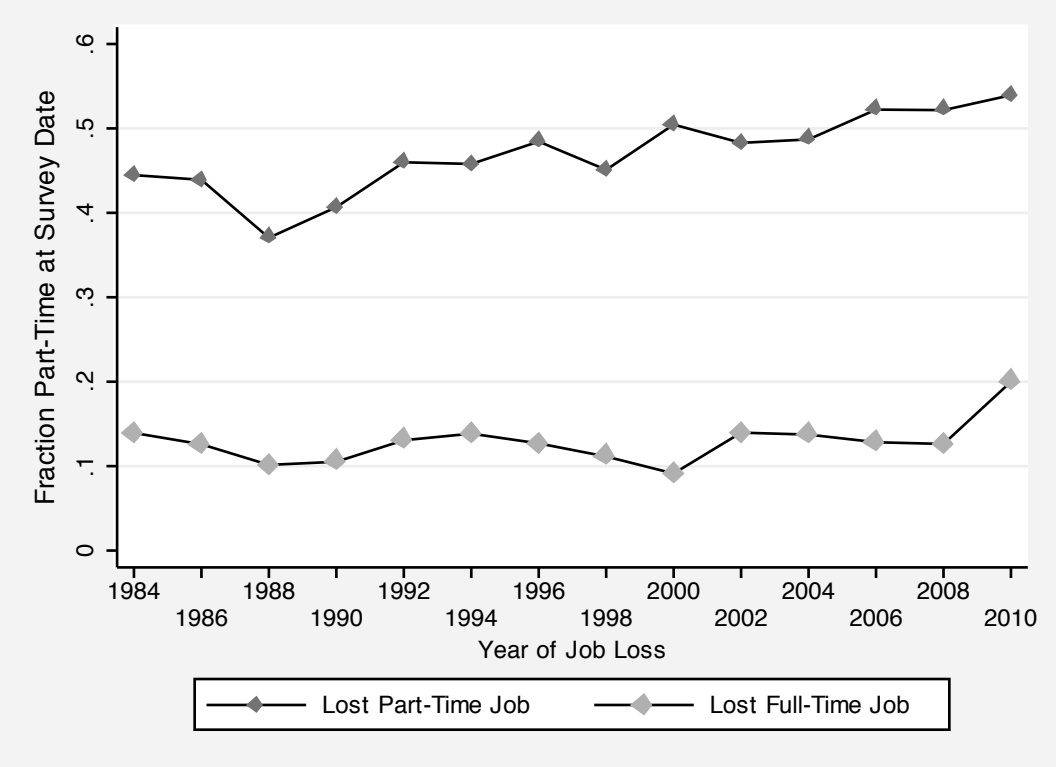

Figure 27: Fraction Part-Time at Survey Date, by Part-time Status on Lost Job

time at each survey date conditional on part-time status on the lost job.[13] 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 more than 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 ten percent of these workers are working part-time at the survey date. There is a clear cyclical component to the ability of full-time job losers to find full-time employment. In the current recession, about 20 percent of re-employed full-time job-losers are working part-time in January 2010. This is the highest-part time rate observed since 1984, and it is consistent with the very high rate of underemployment (U6) shown in

[13] Note that there is a problem of temporal comparability of the data on part-time employment at the survey date. The computer-aided 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.

figure 2

5.3 Coverage by Health Insurance

The DWS contains information on health insurance coverage both on the lost job and at the survey date, regardless of employment status. Unfortunately, the questions are not directly comparable. The question regarding the lost job was "Were you including in a group health insurance plan in that job?" in the early years and "Did you have health insurance at that job?" in the later years. The question regarding health insurance at the survey date was "Are you covered by any group health insurance?" in the early years and "Other than Medicaid or Medicare, do you now have health insurance?" in the later years. Thus, the pre-loss health insurance question refers to health insurance on the lost job while the post-loss question refers to health insurance, virtually regardless of source. The central ambiguity is that people who appear to have gained health insurance (people were not covered by health insurance on the lost job and are covered at the DWS survey date) may have been covered even prior to the job loss by some other source (e.g., health insurance from a spouse's job). However, it is still useful examine health-insurance transitions in these data because such an examination sheds some light on whether job losers are also losing health insurance.

Figure 28 contains plots by year of the fraction of job losers in four categories:

1. Job Losers who lost health insurance (were covered on the lost job and are not covered at the DWS Survey date).

2. Job Losers who had health insurance neither on the lost job nor at the DWS survey Date.

3. Job Losers who had health insurance both on the lost job and at the DWS survey Date.

4. Job Losers who "gained" health insurance (were not covered on the lost job but are covered at the DWS Survey date).

There has been a secular decline in the last decade (sharper in the most recent period) in the fraction of job losers in category 3 (covered at both dates). This fraction has fallen from over 40 percent in 2000 to less than 30 percent in 2010. Since 2004, the fraction with health insurance neither on the lost job nor at the DWS survey date (category 2). This fraction increased from about 24 percent in 2004 to about 33 percent in 2010. Interestingly, health insurance "gainers" (category 4) have outnumbered health insurance losers (category 1) outside of periods with slack labor market. This is likely due to many of these job losers being covered pre-job-loss by health insurance from another source. The apparent gain is not

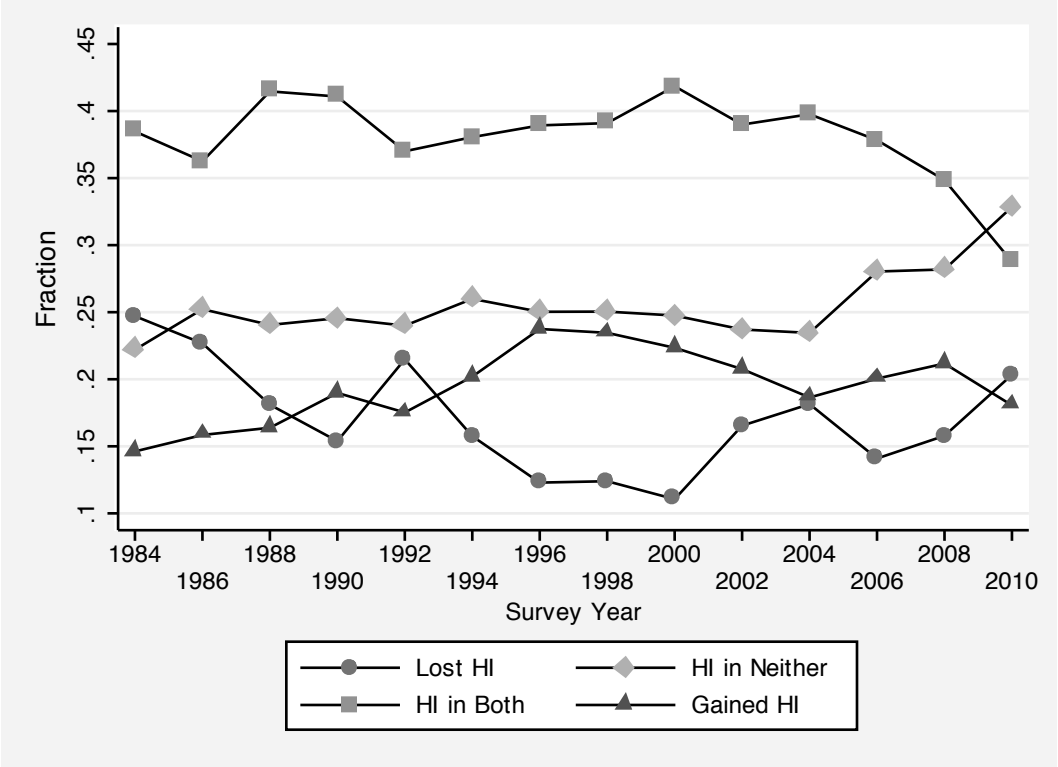

Figure 28: Job Loss and Health Insurance Status (from the DWS)

a gain at all but equivalent to category 3 (health insurance in both periods). The fraction who reported losing health insurance (category 1) is about 20 percent in the current period, its highest level since 1992.

My conclusion from the analysis of health insurance among job losers is that coverage by employer-provided health insurance has been on the decline for at least ten year among workers who are at risk of job loss. Loss of health insurance among covered workers appears to be a substantial component of the cost of job loss.

5.4 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

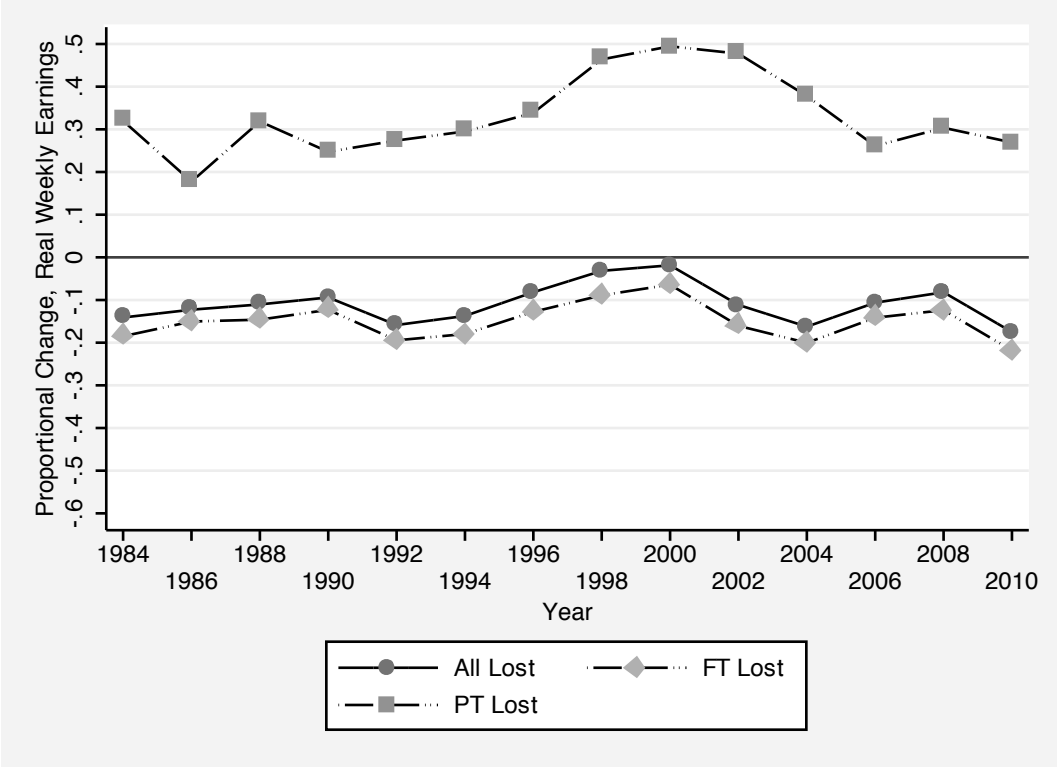

Figure 29: Proportional Change in Real Weekly Earnings, All Job Losers

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.

5.4.1 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.[14] I begin my analysis by considering the average decline in weekly earnings for workers who lost a full-time job. The solid line in figure 29 shows the average proportional decline, by survey year, in real weekly earnings between the lost job and the survey-date job for all workers who lost a job, were re-employed at the survey date, and were not self-employed on either the lost job or the new job. It is clear that there is a cyclical component to the earnings decline, with larger declines in slack labor market periods. The average earnings decline in the current recession is the largest since 1984 at 17.5 percent. This compares with a decline

[14] 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.

of 14.1 percent in 1984 and 15.9 percent in 1992.

Because my measure of earnings is weekly, part of the measured earnings change reflects voluntary or involuntary hours change (movement to or from full-time work). The lower dashed line in figure 29 is the average earnings change of full-time job losers. Not surprisingly, this closely parallels the earnings change of all job losers (correlation 0.986) because most reported loss is of full-time jobs (almost 90 percent). The reason full-time job losers have larger average earnings declines than the average is that some full-time workers are re-employed on part-time jobs (see figure 27). The upper dashed line in figure 29 is the average earnings change of part-time job losers. this is positive in every period because many losers of part-time jobs are employed subsequently on full-time jobs (48 percent overall). The overall finding is that, on average, job losers suffer substantial earnings declines, and the average decline is largest in the most recent period.

Given that large majority of job losers lost full-time jobs, I focus on the experience of these workers. The solid line in figure 30 reproduces the lower dashed line in figure 29 which is the average earnings change of full-time job losers. The upper dashed line in figure 30 is the average earnings change of job losers who make a full-time to full-time transition. This closely parallels the earnings change of all full-time job losers (correlation 0.956) because most re-employed full-time job losers are re-employed full time. (87 percent). The lower dashed line in figure 30 is the average earnings change of job losers who have made a FT-PT transition. This is substantial and negative, because of the decline in weekly hours in moving from full-time to part-time.

All of these series show a cyclical pattern, which larger earnings declines in weaker labor markets. That this decline is largest in the most recent period is due entirely to the higher incidence of part-time employment on the new job among both full-time and part-time job losers. The earnings decline holding FT-PT status fixed is not particularly large in the current period relative to other slack labor market periods.

Figure 31 contains the average proportional change real weekly earnings between the lost job and the survey-date job for workers for all job losers 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 are generally not statistically significant. There was a general decline in the earnings loss across educational categories during the 1990s that has reversed in the early 2000s. Earnings losses are again substantial for all education groups in the most recent period, with high-school graduates seeing a 22.3 percent average decline in year weekly earnings and even college graduates suffering a 15 percent decline. An important point here is that since the early 1990s through the current

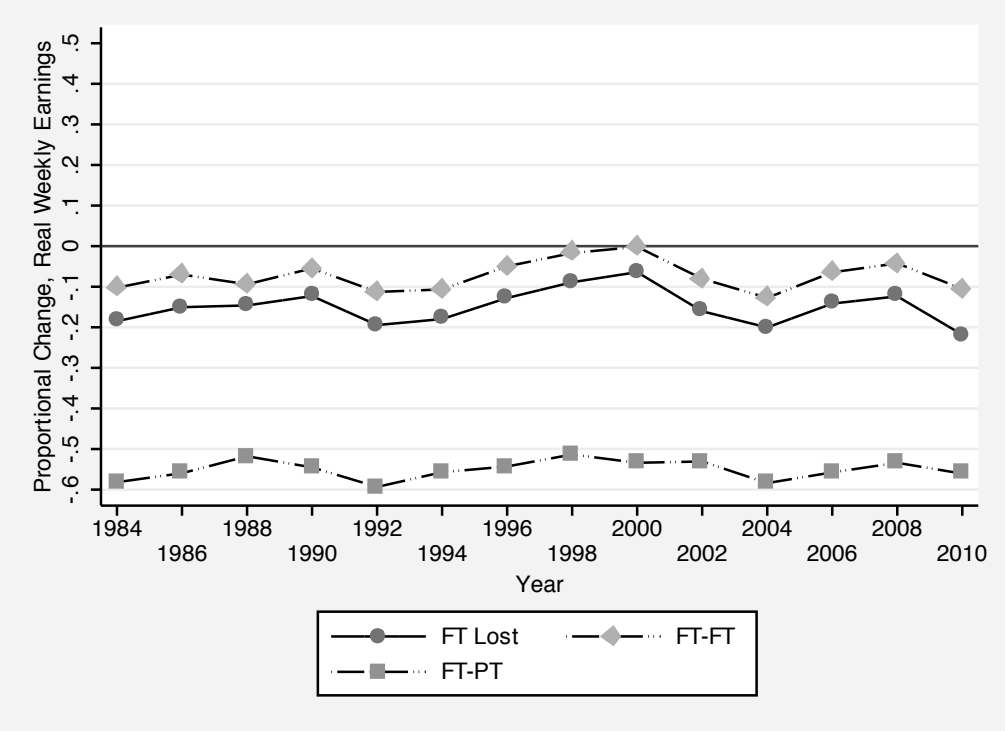

Figure 30: Proportional Change in Real Weekly Earnings, Full-Time Job Losers

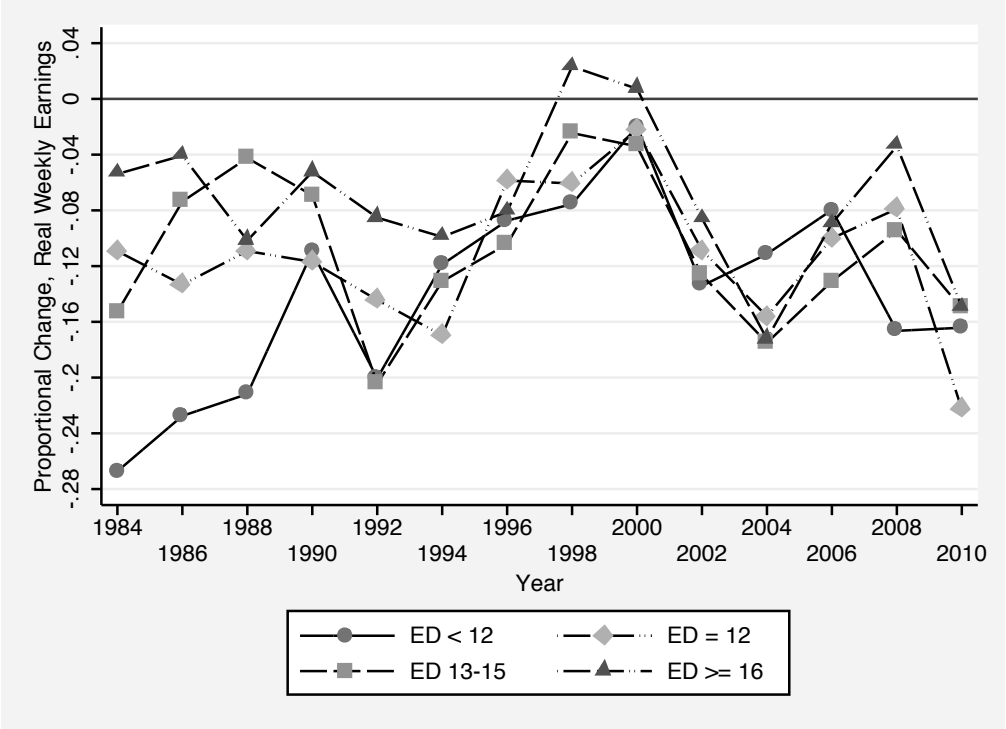

Figure 31: Average Decline in Log Weekly Earnings, by Year and Education

period earnings losses have a strong cyclical component across all education groups.

While not presented here, I carried out a multivariate regression analysis of the earnings change of displaced workers, controlling for year, education, age, race, sex, and tenure on the lost job. This analysis shows no significant relationship with race or sex.[15] There a strong relationship between age and the change in real earnings, with older workers suffering larger earnings declines. Job losers aged 55-64 earn 16 percent less than do job losers aged 25-34. Additionally, there is a very strong relationship between the change in earnings and tenure on the lost job. The average earnings loss is much larger when the worker had accumulated substantial tenure on the lost job. I estimate that workers who lose a job with 15 or more years of job tenure have an average earnings loss 27 percentage points larger than that of workers with less than one year of tenure on the lost job. This is consistent with the destruction of job or industry specific human capital when a long-term job ends.[16]

5.4.2 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.

This analysis is restricted to full-time workers. In particular, the job losers considered are only those who are reemployed and make full-time to full-time transitions. As such, it will understate the true earnings loss of displacement for two reasons. First, it considers only those who are reemployed (50 percent of job losers in the most recent period). Second, it ignores the fact that many full-time job losers are reemployed in part-time jobs (about 20 percent int eh most recent period), offset to some extent by those part-time job losers who are re-employed in full-time jobs.

Define the change in log real earnings for displaced workers as

$$\Delta_d = (lnW_{dt} - lnW_{d0}), \tag{5.1}$$

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

$$\Delta_c = (lnW_{ct} - lnW_{c0}), \tag{5.2}$$

[15] See Farber (2004) for presentation of regression results on the earnings change through the 2002 DWS.

[16] Kletzer (1989), Neal (1995), and Parent (1995) address the issue of job loss and specific capital, both at the firm and industry level.

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

$$\Delta\Delta = \Delta_d - \Delta_c. \tag{5.3}$$

Assuming average earnings would have grown rather than declined in the absence of displacement, Δ_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 (Δ_d).

I generate initial earnings for the comparison group (lnW_{g0}) from a random sample from the merged outgoing rotation group CPS file (MOGRG) each year from 1981-2009.[17] The resulting comparison sample of initial earnings for full-time workers contains 154,272 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 comparison group of non-displaced workers (lnW_{gt}). This sample contains observations on full-time earnings for 150,935 workers at the DWS survey date.

Ideally, these comparison groups 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. 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 control group of non-displaced workers. This adjustment is described in Appendix II.

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

[17] 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.

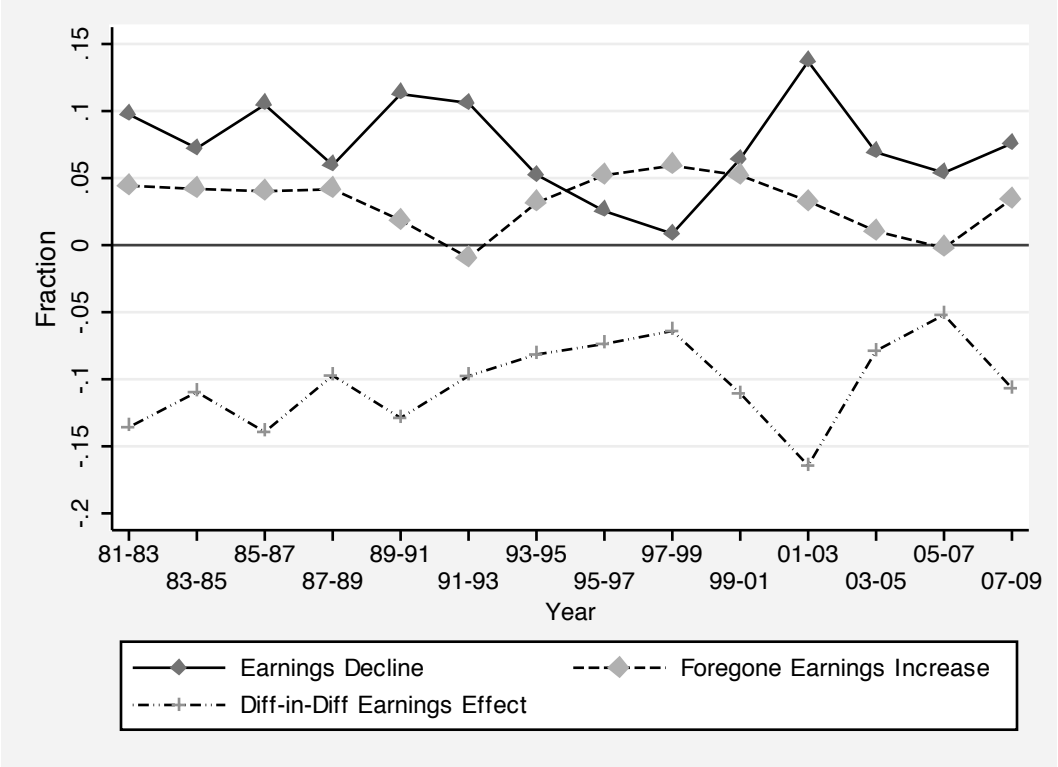

Figure 32: Proportional Earnings Loss, Difference-in Difference Analysis, FT-FT transitions.

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=26,788). 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=24,057).

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

Figure 32 contains the overall difference-in-difference estimates of the earnings loss from job loss for each year.[18] 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 Δ_c, and the difference-in-difference earnings effect is $\Delta\Delta$. Note that these estimates incorporate the effect of normal

[18] 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 procede using these transformed measures.

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.[19]

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.[20] The 1990s show a different 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 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 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 changed in the last ten years. The foregone earnings increase fell somewhat from 7.5 percent in 1997-1999 to zero in 2005-2007 while the earnings decline suffered by displaced workers increased substantially from zero in the 1997-99 period to 13.7 percent in 2001-03 before declining to 5 percent in 2005-2007. In the most recent period, the earnings decline of job losers making a FT-FT transition is about 7 percent with a foregone earnings increase of about 4 percent. This implies a total earnings loss from job displacement for these workers of about 11 percent, which is not unusually large by historical standards.

[19] 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.

[20] 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.

6 References (incomplete)

Esposito, James L. and Sylvia Fisher. "A Summary of Quality-Assessment Research Conducted on the 1996 Displaced-Work/Job-Tenure/Occupational-Mobility Supplement," Draft Working Paper, U.S. Bureau of Labor Statistics, December 1997.

Farber, Henry S. "The Incidence and Costs of Job Loss: 1982-91," *Brookings Papers on Economic Activity: Microeconomics*, (1993,1), 73-119.

Farber, Henry S. "The Changing Face of Job Loss in the United States, 1981-1995," *Brookings Papers on Economic Activity: Microeconomics*, 1997: 55-128.

Farber, Henry S. "Has the Rate of Job Loss Increased in the Nineties?" *Proceedings of the Fiftieth Annual Winter Meeting of the Industrial Relations Research Association*, Volume 1, 1998: pp. 88-97.

Farber, Henry S. "Alternative and Part-Time Employment Arrangements as a Response to Job Loss," *Journal of Labor Economics* 17 (October 1999): pp. S142-S169.

Farber, Henry S. "Job Loss in the United States, 1981-2001," *Research in Labor Economics* 23 (2004), pp. 69-117.

Gardner, Jennifer M. "Worker Displacement: A Decade of Change," *Monthly Labor Review* 118 (April 1995): pp. 45-57.

Hipple, Steven. "Worker Displacement in the mid-1990's," *Monthly Labor Review* 122 (July 1999): pp. 15-32.

Kletzer, Lori G. "Returns to Seniority after Permanent Job Loss," *American Economic Review* 79 (June 1989): pp. 536-543.

Neal, Derek. "Industry-Specific Capital: Evidence from Displaced Workers," *Journal of Labor Economics* 13 (October 1995): pp. 653-677.

Parent, Daniel. "Industry-Specific Capital: Evidence from the NLSY and the PSID," Working Paper No. 350, Industrial Relations Section, Princeton University, November 1995.

Podgursky, Michael and Paul Swaim. "Job Displacement Earnings Loss: Evidence from the Displaced Worker Survey,"" *Industrial and Labor Relations Review* 41 (October 1987): pp. 17-29.

Polivka, Anne E. and Stephen M. Miller. "The CPS After the Redesign: Refocusing the Lens," in *Labor Statistics Measurement Issues*, John Haltiwanger, Marilyn Manser, and Robert Topel, eds., University of Chicago Press, 1998. pp. 249-289.

Topel, Robert. "Specific Capital and Unemployment: Measuring the Costs and Consequences of Job Loss," *Carnegie Rochester Conference Series on Public Policy* 33 (1990): pp. 181-214.

Summers, Lawrence. "Why is the Unemployment Rate So Very High near Full Employment," *Brookings Papers on Economic Activity* Vol 1986, No 2 (1986), pp. 339-396.

United States Department of Labor, Bureau of Labor Statistics, *Issues in Labor Statistics, Summary 08-06*, June 2008.

7 Appendix I - Adjusting the DWS Job Loss Rates

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

1. 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 (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.[21]

[21] 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.

8 APPENDIX II – 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

$$\Delta_g = (1-\theta)\Delta_c + \theta\Delta_d, \tag{8.1}$$

where Δ_g is the earnings change in the outgoing rotation group sample ($lnW_{gt} - lnW_{g0}$) and θ is the fraction of workers in the outgoing rotation group sample who lost a job (the displacement rate).

The observable quantities are Δ_g and Δ_d, but calculation of the difference-in-difference estimate of the earnings change due to job loss requires both Δ_d and Δ_c (equations 5.1 and 5.2).[22] I can compute Δ_c with the available data on Δ_g, Δ_d, and θ. Using equation 8.1, the change in earnings for the comparison group is

$$\Delta_c = \frac{\Delta_g - \theta\Delta_d}{(1-\theta)}, \tag{8.2}$$

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

$$\Delta\Delta = \frac{\Delta_d - \Delta_g}{(1-\theta)}. \tag{8.3}$$

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.

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.[23] This regression is

$$lnW_{is} = X_{is}\beta + \gamma_1 T_s + \gamma_2 D_i + \gamma_3 T_s D_i + \epsilon_{is}, \tag{8.4}$$

---

[22] Note that I do not use the information on who is displaced that is available in the DWS outgoing rotation groups. My estimate of Δ_g includes both displaced and non-displaced workers at both time 0 and time t.

[23] Note that I do not calculate first-differenced estimates for the displaced workers, as I did in section 5.4.1, 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.

where lnW_{is} measures log real full-time earnings for individual i in period s (either 0 or t), X is a vector of individual characteristics, β 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 ϵ is an error term.[24] The parameters γ_j are used along with information from the DWS on job loss rates (θ) to compute estimates of the earnings effects as follows:

$$\Delta_d = \gamma_1 + \gamma_3, \tag{8.5}$$

$$\Delta_c = \gamma_1 - \frac{\theta\gamma_3}{(1-\theta)}, \quad \text{and} \tag{8.6}$$

$$\Delta\Delta = \frac{\gamma_3}{(1-\theta)}. \tag{8.7}$$

[24] The X vector includes a constant, dummy variables for sex, race, nine age categories, and four educational categories.