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Long-Term Earnings Losses due to Job Separation During the 1982 Recession: An Analysis Using Longitudinal Administrative Data from 1974 to 2004

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Long-Term Earnings Losses due to Job Separation During the 1982 Recession:

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Abstract

We present new estimates of the long-run earnings consequences of job separations that occurred during the 1982 recession based on a representative sample of workers drawn from Social Security administrative earnings data ranging from 1974 to 2005. Workers permanently leaving their long-term employer in the period from 1980 to 1985 experienced large and persistent earnings reductions lasting 15 to 20 years compared to workers of similar age and earnings potential who did not leave their employer. Earnings losses last up to 15 years even for workers displaced in better economic times or after shorter job tenure. These losses arise both due to reductions in employment as well as to reductions in annual earnings for those working. These preliminary estimates appear to confirm results from single U.S. states or limited time periods suggesting that job loss can be very costly for affected workers.

1.   Introduction

Job displacements through layoffs or plant closures are a common feature of the U.S. labor market. Conservative estimates suggest each year about 10% of workers leave their job involuntarily (e.g., Farber 2003), although the actual fraction may be much higher (e.g., Hildreth, von Wachter and Weber 2005, Farber 2007). Although job separations are so common, existing studies give conflicting estimates of the costs of job loss. While work based on the Displaced Worker Survey (DWS) suggests the cost of job loss in terms of reduced earnings are small, increasing evidence from other data sources suggests that at least some groups of the labor force bear long-lasting consequences from job loss. In particular, studies based on large administrative earnings data sets from several U.S. states suggest earnings losses after job displacements may be large and long lasting (e.g., Ruhm 1991, Jacobson, Lalonde, and Sullivan 1993, Schoeni and Dardia 2002, Couch 2006). In addition, it has been shown that job losses reduce job stability, consumption and access to health insurance.[1]

An added difficulty with the existing estimates of the cost of job loss is that they are either based on short and small survey data sets or from administrative data covering only certain time periods and regions. Moreover, both data sources are typically too short to allow an evaluation of the long-term consequences of job loss. At present, there are no representative estimates of the long-term effects of job loss on earnings for the United States. We exploit access to a new data source that contains longitudinal information on earnings and employment histories for a large random sample of the U.S. population spanning over thirty years. Using this data, we evaluate the long-term effect of a job separation on the development of earnings and employment. Our data set is ideal for this purpose, since it contains information on workers' employers, allowing us to date separations. Moreover, it allows us to focus on workers separating from stable jobs and follow their career developments for over twenty years.

As in existing data sources, it is difficult to clearly establish the cause of job separations with the information in our data. Here, we focus on job separations of mature workers in stable jobs occurring during the 1982 recession, the largest recession since the Great Depression. Given the steep rise in unemployment and the drop in economic activity,

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[1] Gruber (1997), Browning and Crossley (2001), Olson (1992).

it is unlikely that many workers moved voluntarily during this period. Moreover, most voluntary job mobility occurs within a few years of the start of a job, i.e., mobility drops sharply with job tenure. By focusing on separations from stable jobs, we are likely to exclude many voluntary moves. However, there is likely to be at least some voluntary job mobility. In so far as voluntary job movers are likely to experience wage gains, our estimates may understate the true costs of involuntary job separation.

Any empirical analysis of the effect of involuntary job separations has to address two additional concerns. First, to assess the cost of job loss, we have to establish a counterfactual indicating how earnings would have developed in the absence of a separation. To do so, we compare the earnings development before and after job separation to the earnings of various groups of workers remaining in stable employment. Thus, we define stable workers as persons who are employed by the same employer for 3 or 6 years. Second, if firms selectively fire their least able workers, the pool of job separators is a non-random draw of the population and may differ systematically from the control group of stable workers. Our rich data set that extends over three decades allows us to approach this problem by including worker fixed effects, an approach that has become standard in the literature (e.g., Ruhm 1990, Jacobson, Lalonde, and Sullivan 1993). Thereby, we control for the potential of selection by essentially matching job separators with workers not losing their jobs who have similar long-run earnings potential.

We obtain three preliminary results. First, we find job separations during the early 1980s led to large and persistent earnings losses that last over twenty years. Those workers in stable employment from 1974 to 1979 who left their jobs during 1980 to 1985 had – compared to workers with no permanent job separation during that period – initial earnings losses of 30%. These losses decline to 20% after ten years and drop below 10% only after 15 years; they have not completely faded 20 years after a job loss. Second, for workers with lower pre-separation tenure or workers separating from their employers in better economic times, losses are still substantial and last up to 15 years. Third, our results indicate that the decomposition of job separators changes as we consider different time periods and tenure durations. This confirms the need for a strategy to control for selective job separations.

The rest of the paper proceeds as follows. Section 2 presents the data and summarizes our core descriptive results. The section begins with an examination of trends in the rate of job separation, goes on to assess the baseline characteristics of job separators, and

then presents our main results on the long-term earnings trends of job separators. Section 3 then summarizes the statistical analysis of earnings losses at job separation; there we compare the earnings trends of job separators and stable workers while controlling for permanent heterogeneity in earnings potential using worker fixed effects. Section 4 presents some essential sensitivity analysis. The last section indicates directions of future research on this project.

2.   Data and Sample

The sample of workers used for our analysis of the long-term consequences of job separations is based on three data sets. The three sources are the 2004 Continuous Work History Sample (CWHS) active file, a 1% extract from the Master Earnings File (MEF), and a 1% extract from the Longitudinal Employee-Employer Data (LEED). The 2004 CWHS gives us the baseline sample universe and basic demographic information for 1% of individuals covered by Social Security from 1957 to 2004. In a first step, we merge this baseline sample with information on workers' total uncapped annual earnings for each job held in a given year beginning in 1978 through 2004 obtained from the MEF. Besides annual earnings and an identification number for each employer (EIN), the MEF also contains information on industry for each job. In a second step, we complement this data on uncapped earnings with information on annual earnings for each job from 1974 to 1977 from the LEED. See the Data Appendix for more detailed information.

Our sample was explicitly chosen to be comparable to the seminal work of Jacobson, Lalonde, and Sullivan (1993) (henceforth JLS), who studied the effect of job loss of workers in stable employment from 1974 to 1979 during the early 1980s in Pennsylvania. JLS have become the benchmark in the literature on the effect of job loss, and we will compare our estimates explicitly to theirs below. To be comparable to JLS, however, we have to ensure that information from the LEED is comparable to that of the MEF. This is achieved in two steps. First, earnings in the LEED are capped at the Social Security taxable maximum. We follow a simple imputation procedure described in Kopczuk, Saez, and Song (2007) to make the earnings levels from the LEED comparable to those in the MEF.

Second, coverage of Social Security was extended in the late 1970s and early 1980s to encompass public administration and other sectors. To maintain consistency of our sample over time, we thereby exclude job separations from public administration and several social

services (such as health and legal services) from our sample. Following Kopczuk, Saez, and Song (2007) we also exclude job separations from agriculture. To avoid censoring of our earnings observations, these sectors remain as sources of post-separation employment. Excluding those sectors also helps to avoid changes in employer identification numbers (EIN) occurring due to administrative reasons. The exclusions also help to smooth the incidence of job separation considerably in the period from 1980 to 1987, when public administration was gradually added to the sample, and in 1978, the year we change data sources for uncapped earnings.

From this sample, we extract two groups of male workers with high attachment to their employer. First, our main sample contains workers in stable employment from 1974 to 1979. Second, we also keep a sample of workers in stable employment from 1978 to 1980. The latter sample has the advantage that it only includes data from the MEF, and is thus entirely based on an internally consistent data source. Moreover, the comparison of the effect of job separation for workers with high job tenure (six years) with workers with shorter job tenure (three years) is of intrinsic interest. In our sensitivity analysis, we will also consider alternative cohorts of workers with high job attachment throughout the 1980s and 1990s.

In our final restriction we follow JLS and impose that workers are born in or after 1930. This implies that the average age at the time of job separation is roughly 40 years, and that the majority of the sample is in their prime working years during the follow-up period. Thereby, we avoid having to explicitly model retirement for our immediate follow-up. Clearly, our data series is so long that we cannot avoid the phenomenon that an increasing fraction of workers drops out of the labor force. This will be apparent in some of the results we discuss below. In the future, we will be able to directly examine the phenomenon of the receipt of public pension and disability insurance using administrative information on benefit receipt from the Master Beneficiary Record (MBR).

A crucial step in our analysis is the dating of job separations. We have experimented with alternative definitions of separation from the stable job held in the late 1970s. The most straightforward definition is simply a change in EIN from one year to the next. However, there are many cases in which longer employment spells at the same EIN are interrupted for a single year. This occurs either due to a transition to non-employment – such as in the case of temporary layoffs – or because a worker receives more earnings from another employer.

Since we are interested in permanent separations from the long-term job, an alternative definition is to consider the first separation that is permanent. After some experimentation summarized in the sensitivity analysis, we have settled on defining job separations as occurring when the first separation is also permanent. This is the cleanest definition, and avoids possible intermediate cases, such as when a worker leaves the firm and then receives severance pay a year later. As shown below, the last two definitions yield almost identical results; the first definition also yields similar results.

2.   Trends in Job Separations and Average Characteristics of Separators

We begin our descriptive analysis with a description of separation rates and the average characteristics of workers separating from long-term jobs. As a way of introducing our new data source, Figure 1 shows the average job separation rate according to our first definition (any change in EIN; in estimates not shown, we show that the vast majority of changes in EIN are permanent). Panel A shows the total annual separation rate and the rate of transition between two EINs. The figure contains three messages. First, the job separation rate is high, fluctuating around 35%. This is actually somewhat lower than other estimates of the rate of job separation using administrative data (e.g., Anderson and Meyer 1994). Second, as found by others, the job-separation rate is highly pro-cyclical, suggesting that the bulk of job separations are driven by voluntary job mobility (e.g., Shimer 2004, Solon et al. 2007). Third, an important part of the level and movements of overall job separations are driven by job-to-job transitions. This confirms that a large share of job transitions are voluntary. Panel B of Figure 1 shows the same patterns by age group. As is typically found, job separation rates are highest and most pro-cyclical for younger workers (e.g., Topel and Ward 1992). However, they remain significant for ages between 30 and 50, as well as for workers above age 50.

We next examine the transitions from jobs into non-employment, where non-employment is defined as a year without any earnings (see Figure 2). Given that most non-employment spells are short, this is an underestimate of the job-to-non-employment transition rate. The transition into non-employment is a measure of involuntary job loss, albeit an imperfect one. Many involuntarily displaced workers find a job immediately, and thus it understates involuntary job loss. On the other hand, some transitions into non-employment are voluntary, though this is less of a concern for male workers in prime

working age and is more important for older workers and women. Consistent with this interpretation, Panel A of Figure 2 shows that transitions to non-employment jumped dramatically in 1982, a strong recession. Similarly, they rose in the run-up to the 1991 recession, and rose quite considerably between 2000 and 2002. The figure also shows a declining trend in the transition rate to non-employment. Panel B suggests that this trend is likely to be in part due to the slowing in the trend towards early retirement among older workers. Similarly, since younger workers have much lower transition rates to non-employment it may have been due to a reduction in the overall age of the population as the baby boom cohort entered prime working age. In either case, Panel B clearly demonstrates that all age groups experienced a large increase in the transitions to non-employment in 1982.

The main message of Figures 1 and 2 is that changes in the overall job separation rate mask changes in the composition of the group of separators. Although the rate of overall job separations declines in recessions (Figure 1), the fraction of involuntary separators among these is likely to rise sharply in economic downturns (Figure 2). Given annual job to non-employment transitions are likely to severely understate involuntary job loss (both because the vast majority of non-employment spells are short and because many job losers may immediately find a job), it is fair to assume that an important fraction of job separations in the 1982 recession was involuntary. Clearly, this will not be the case for all workers, something that is explicitly addressed in our analysis of the effect of job separations on earnings.

The annual rate of job separation for our two samples of high-attachment workers at stable jobs in 1974-1979 or 1978-1980 appears in Figure 3. The figure shows two definitions of job separation – any separation (our first definition) or cases where the first separation is permanent (our preferred definition). As is found in other studies, permanent job separations decline sharply with tenure; thus, Figure 3 shows the rate of job separation is higher for workers with three years of tenure (in a stable job from 1978-80), and declines over time. Similarly, the frequency of any job separation is higher on average than that of permanent separation due to temporary layoffs or delayed payments such as severance pay.

Our definition of job separation will pool both voluntary job moves as well as involuntary job displacements. If the scope for voluntary job mobility declines in recession, workers separated from their jobs in the early 1980s should be mostly involuntary movers.

In that case, an important concern is that employers may selectively lay off their least productive workers. Moreover, in the early 1980s, most firms – whether unionized or not – were bound by seniority rules. Table 1 shows that there are indeed significant differences in characteristics of workers permanently leaving their long-term employer in 1980-1985 relative to other workers not experiencing a permanent separation during that period. Job separators – whether with six or with three years of job tenure – are on average younger and have 15-20% lower annual earnings in 1979.[2] Table 1 also shows the industry distribution for job separators and non-separators. Job separations are more likely in construction and trade and less likely in manufacturing and transportation. Given these significant pre-separation differences, it is important to control for the potential of selective job displacement when comparing the earnings developments of job separators with a suitable control group, something we will address below.

3.   Long-Term Earnings Trends of Job Separators

We begin with a descriptive analysis of earnings of workers leaving their stable job between 1981 and 1982, the trough of the largest recession since the Great Depression. Thus, given our definition of job separation, 1981 is the last year these workers receive the majority of earnings from their current employer. Our dating of separation implies that for many workers, 1980 is likely to be the last year they received full-time earnings from their stable job. For example, if a worker left their employer in, say, March of 1981 and had no other job that year, we would assign 1982 as date of separation. If he had earnings from another employer in 1981 that exceeded the earnings in that year from his long-term job, we would assign 1981 as separation date. Alternatively, many workers may leave their long-term employer during 1982, but still have the majority of earnings from that employer during that year. In that case, we assign 1983 as displacement date.

Trends in total annual average earnings (including zero earnings values) for workers separating from their long-term employer in 1982 appear in Panel A of Figure 4. Several features of the data stand out. First, one can see a rise and decline in earnings prior to 1982 in tune with the business cycle. Second, the figure shows a decline in earnings from 1980 to 1981, followed by another drop in 1982. The fact that earnings drop prior to the actual

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[2] Given our dating of separations, workers separating from the employers in 1980 are likely to have reduced earnings in 1979. This depresses somewhat our measure of 'baseline' earnings for job separators.

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assigned date of separation is a by-product of our definition of job separations. Third, one can see some recovery until the late 1980s. However, in the long run a clear gap in earnings relative to the pre-separation level remains. Note that to avoid counting transitions into retirement as earnings loss, we have set earnings to missing for workers who are older than 60. This may lead us to undercount earnings losses if job separation leads to earlier retirement in the long run.

To put these earnings losses in perspective, Figure 4 also displays the development of annual earnings for three groups of non-separators. It is not a priori clear which group of workers yields the ideal counterfactual earnings trend. The comparison with each different control group yields another answer to the question of the cost of job loss. The most flexible control group is simply the group of workers who did not separate from their employer in 1982. Figure 4 also shows earnings developments for two alternative groups. One group was required to have some positive earnings each year from 1980 to 1985. The other group consists of workers who had no permanent job separation from 1980 to 1985.

Three results are apparent from the consideration of non-separators. First, as noted in Table 1, non-separators' earnings are higher prior to separation, and more so for the group of stable workers. Second, had separators not left their jobs, their earnings would have remained stable throughout the early 1980s and trended upwards. Third, the gap between the earnings of separators and non-separators is largest relative to workers not leaving their employer from 1980 to 1985. Overall, independently of which control group is chosen as counterfactual, it is apparent from the figure that even 15-20 years after a job separation affected workers have considerably lower annual earnings than workers who stayed with their employer in the early 1980s.

Our results also suggest an increasing convergence in earnings towards the mid to late 1990s (Figure 4A). However, this is mostly due to a decline in average earnings of the control group, and closely related to trends in employment (see Panel B of Figure 4). The figure shows a monotonic downward trend in the fraction of workers with positive earnings who are non-separators. For separators, there is a large decline in the fraction employed at job separation (over 15 percentage points). From there, employment declines, albeit at a slower rate than for non-separators (note that as for earnings, non-employment at age 60 or above is not included in the figures). Thus, part of the decline in earnings of the control group may be a pattern of selective retirement among high wage earners during the 1990s.

We next examine trends in average annual earnings at the main job for separators but *excluding* wage observations with zero earnings (Panel A of Figure 5). Since Panel B of Figure 4 shows that job separation affects employment there is likely to be sample selection; i.e., if the least able workers drop out as a response to a job separation, some of the pattern in Figure 5 may be due to changing average characteristics of the sample, not because of job separation. This is a common problem in the analysis of the effect of job loss on wages. The patterns in Figure 5 are overall quite similar to those in Figure 4, but with some key differences. First, the figure shows a steep decline in earnings from 1980 to 1981, followed by stagnation until 1982. The earnings loss in 1982 is smaller than in Figure 4, suggesting that the difference in the pattern arises because in Figure 5 we exclude workers who do not work immediately after leaving their stable job. Second, the pattern of recovery after separation is stronger, leading to a smaller earnings gap in the long run. Panel B of Figure 5 shows the same figure but for total annual earnings (i.e., including earnings earned from a second employer). The patterns are very similar to those in Panel A.

Figures 4 and 5 only show the pattern for job separations occurring in a single year. In our statistical analysis in the next section, we will pool displacements occurring in several adjacent years to average out idiosyncratic effects of job separations pertaining to particular years. Figure 6 shows the average earnings before and after a permanent job separation occurring between 1980 and 1985 (we consider alternative year ranges in the sensitivity analysis). The figure shows all three earnings measures we use – total earnings including zeros, total earnings without zeros, and earnings at the main employer.

Note that we have scaled years such that zero on the horizontal axis now refers to the *last year a worker received their main earnings from the long-term employer*. This is a definition commonly used in the literature (e.g., Jacobson, Lalonde, and Sullivan 1993, Appendix B). Of course, which date is called the date of separation is somewhat arbitrary. As seen before, given the way we define separations the figure shows a drop at time zero and then a further decline in period 1. Thus, to obtain a measure of the earnings loss at the time of separation, one should compare year -1 (when the individual last received full time earnings from the old principal employer) to year +2 (when the individual, if in stable employment, is likely to receive full time earnings from the new principal employer).

The figure again shows an increase in earnings prior to job loss that is likely due to cyclical conditions. Earnings decline steeply around the year of job separation. There is some

recovery initially that slows after 5 years for total earnings where zeros are included. This is our preferred measure, since there is no risk of sample selection due to the fact that job separation affects the probability of working. The recovery is much faster for workers with positive earnings. As we will see in the next section, this apparent quick recovery is partly due to the business cycle. Earnings losses turn out to be more persistent when we control for the effects of the business cycle using our control group below.

We summarize the results by examining average annual earnings, with and without zeros and for the main employer and all employers, as well as the fraction employed for every two years from 1974 to 2003 (Table 2). The first columns show the values for separators, the right columns show the numbers for the most liberal control group (all workers without a permanent separation from their long-term employer in 1982). The numbers in the table reflect the pattern in the figures. Overall, as measured by the evolution of total annual earnings (including zero earnings to avoid the problem of sample selection), workers separating from their job during the 1982 recession experience considerable long-term reductions in earnings. Table 3 summarizes the patterns corresponding to Figure 6.

4.   The Long-Term Earnings Losses from Job Separation

As documented in Table 1 and apparent from Figures 4 and 5, there are systematic differences in average earnings and age among workers separating from their long-term employment in the early 1980s and workers keeping their job. On the other hand, it is apparent that there are strong cyclical swings and trends in earnings that may confound the effects of job loss. To get a complete picture of the long-term earnings losses of job separators, we need to make a comparison to a control group but at the same time explicitly account for possible systematic differences among workers in a regression framework.

We will estimate various specifications of the following distributed lag model

$$y_{it} = \alpha_i + \gamma_t + \beta X_{it} + \sum_{k \geq -m,} \delta_k D_{it}^k + u_{it}$$

where the outcome variable y_{it} represents a measure of annual earnings, the year dummies γ_t are identified by the presence of workers not separating from their job (the control group), and the error u_{it} represents truly random components affecting the outcome. The coefficients δ_k on the dummies indicating the k-th period before, during, or after job

separation (D_{it}^k) measure the time path of earnings changes of job separators before and after a displacement relative to the baseline and the control group. The ability to estimate the dynamic effect of job separation is of particular interest since it will allow us to obtain summary measures of the overall lifetime cost of job separation.

The displacement effect is identified by the inclusion of workers staying at their employers throughout the period under study (the control group). To interpret the estimated effects δ_k as the causal impact of job separation on earnings, however, we have to assume that conditional on worker fixed effects and included observable baseline characteristics, displaced workers are observationally equal to those workers in the control group. This is the strategy chosen by most classic studies of the effect of job loss (e.g., Ruhm 1990, Jacobson, Lalonde, and Sullivan 1993). If workers are on average remunerated according to their productivity, then a long-run average of earnings should be a good index of their overall earnings potential. In this case, comparing a job separator and a non-separator with similar worker fixed effects would yield a valid estimate of the effect of job loss.

Given the large change in earnings for job separators, this approach is most persuasive in the presence of a long window of observation prior to the job separation. Similarly, it is most appropriate for mature workers whose earnings represent their productivity. For example, in the case of younger workers, wages often do not yet reflect their long-term earnings potential and fixed effect strategies are not viable (e.g., von Wachter and Bender 2006). Since our observation window covers a long time period prior to job separation and the average age of workers in our sample is close to forty, we believe our fixed effect estimation strategy will uncover estimates that yield good first approximations of the causal effect of job separations on earnings.

The coefficients δ_k show the effect of separation on annual earnings before and after the year of employment at the last job (i.e., k=0 during the last year we record the old employer to be the main employer – see Figure 7). Table 4 displays the coefficient estimates for every other year with corresponding standard errors. The figure and table show the results from three specifications: including only year effects (and thereby effectively introducing the control group); including year effects and a fourth order polynomial in current age (and thus accounting for differential age of treatment and control groups); and finally including year effects, age controls, and worker fixed effects. The last is our preferred

specification. The Figure confirms several key observations made in our descriptive analysis, but offers some new insights. First, without worker fixed effects average earnings of job separators are lower than those of the control group prior to job loss; once we control for fixed effects, this long-term difference goes away, and earnings differences prior to job loss are not significantly different from zero. This gives confidence in the fixed effect approach (note that when including worker fixed effects, we have to drop at least one pre/post dummy D_{it}^k; we drop the first, in our sample k=-11). Second, even including worker fixed effects, there are significant long-run losses in earnings. For example, the losses are about $10,000 ten years after job loss, or about 25%. Twenty years after job separations, earnings are about $4000 below the baseline – a long run loss of about 10%. Thus, we find very large persistent earnings losses following job separation.

Second, we find that controlling for year fixed effects alone increases the persistence of earnings losses compared to average losses shown in Figure 6. This result implies that part of the apparent recovery in average earnings observed in Figure 4 is due to cyclical recovery in the mid-1980s. Once we take out year effects, true earnings losses from job separations are more persistent. Third, including age effects does not significantly alter the estimates. Thus, overall we find that job separation during the 1982 recession had very long-lasting effects on annual earnings, and significantly reduced workers' lifetime earnings.

The magnitude of these estimates is on the same order as what Jacobson, Lalonde, and Sullivan (1993) found for workers laid off in Pennsylvania during the same time period. There are key differences between our estimate and theirs, however. First, their preferred estimate considers workers laid off during mass-layoffs at the establishment level. The earnings losses of non-mass layoff separators they find are smaller and less persistent. Second, they impose that workers have some earnings every year after layoff to ensure that they are still present in the Pennsylvania economy (since otherwise they would drop out of their sample). This forces the sample to be composed of more successful workers, and is likely to lead to an underestimate of the effect of job separations.

To show this directly, Figure 8 displays estimates from our preferred specification including worker fixed effects for total earnings as before, positive earnings from the main employer, and total positive earnings (i.e., with zero earnings excluded from the sample); these latter measures are closer to Jacobson, Lalonde, and Sullivan's (1993) definition. Not

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surprisingly, once we exclude zero earnings, the earnings losses are smaller and eventually converge to zero. However, convergence occurs only after a long period, about 16 years. Prior to that earnings losses are large – $6500 after ten years, and still $2700 at 15 years. Thus, both earnings and employment losses every year are substantial and lead to important reductions in life time earnings.

Comparing these losses directly to the estimates in Jacobson, Lalonde, and Sullivan's figures is still difficult, since their estimates refer to quarterly earnings and we pool mass-layoff separators and non-mass layoff separators (their Figures 2 and 3). Our estimates have to be compared to an average between these two estimates weighted by the fraction of job separators affected by mass-layoff. Taking such an average and summing losses within a year, we obtain losses of similar magnitudes. This has two important implications; first, the large earnings losses found for Pennsylvania appear to carry over to a nationally representative sample of job separators. Since the Pennsylvania sample was heavily skewed towards job separations in durable goods manufacturing (e.g., the steel industry), this is an important extension of the earlier results. Second, the earlier paper had only six years of post-separation information on earnings. Our results indicate that convergence in earnings for separators and non-separators continues beyond this period, and that it takes a long time.

However, our results must be viewed with some caution because we exclude certain sectors of the economy that have been growing especially fast in recent decades. Because we exclude the public administration, health, and legal services sectors, among others, our results may not apply to all workers in the economy.

5.   **Sensitivity – Differences over Time and by Pre-Separation Job Tenure**

Alternative Separation Periods We have argued that the earnings losses due to job separations we find should be particularly large because separation occurred during the 1982 recession. If this is true, earnings losses of high-attachment workers should be smaller when they occur in more favorable economic times. Figure 9 shows average earnings losses occurring in five-year time windows ranging from 1980-1985 to 1984-1989. The figure shows average total annual earnings before and after job separations for separators in Panel A (with zeros) and in Panel C (without zeros). Panel B and Panel D show the corresponding coefficient estimates when we control for year effects, a quartic in age, and worker fixed effects. Thereby, to keep the samples comparable, we held the duration of pre-separation job

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tenure constant (i.e., these are workers employed at a stable job beginning with the range 1974-1979, as in our baseline, to the range 1978-1983). There are some differences in average age (workers' average age is higher in the latter years) as well as in the degree of selection. Workers who remain at their jobs during 1978-1983 survived a large recession; similarly, during a boom there may be more successful voluntary separators; last, during a boom the firm is more likely to let its least able worker go. Thus, care has to be taken when interpreting the additional estimates and when comparing them to our baseline results. Nevertheless, if there are strong differences in the effect of job separation across the business cycle, the comparison in Figure 9 should be a useful point of departure.

The figure has three important messages. First, as expected, job separations occurring in times of economic growth lead to long-term earnings losses that are on average smaller than those occurring in recessions. Second, the differences in the long-term earnings losses over time are not large; even job losses occurring between 1984 to 1989 lead to persistent earnings losses that fade only after 15 years (Panel B and D). Third, it appears that average earnings of job separators increase prior to separation once we control for worker fixed effects. Thus, it appears job separators and non-separators may be differentially affected by business cycle trends, or may have different average rates of earnings growth. In this case, worker fixed effects are not sufficient, and one should include individual specific slope coefficients. Note that this increase also implies that although long-term losses are smaller, relative to the pre-job loss level the initial loss is about as large in boom as in recession times.

We explore these differences further by contrasting regression results with and without worker fixed effects for job separations occurring during alternative time ranges (Figure 10). The first two panels (Panels A and B) show that for job separations occurring to an important extent during recession years, separators have on average lower earnings prior to job separations than non-separators. Thus, including worker fixed effects leads to significantly smaller earnings differences. The last two panels (Panels C and D) show that including worker fixed effects makes no difference for the analysis of separations occurring mostly during boom years. The figures also show that, as noted in Figure 9, average earnings of separators rise beyond that of non separators before job separators. Again, this implies worker fixed effects may not be sufficient to control for systematic differences among workers. It may also be that during good economic times a higher fraction of voluntary

separators are included among separators; these may be successful workers experience pre-separation earnings growth. Voluntary separators may be averaged together with less able workers who are responsible for the large observed losses at job separation.

Lower Job Tenure It has long been speculated that part of the persistent earnings losses after a job separation may be due to a loss in job-specific investments that workers and firms incur during a longer employment spell. Since by definition these investments are not productive in the outside market, workers' earnings decline at a job loss. This implies that workers leaving their employer after a shorter employment spell may fare better in terms of post-separation earnings. We thus replicated our main results for workers in stable employment for three years, from 1978 to 1980. Another reason to contrast the earnings losses at job separation is that job separations at three years of tenure are more common than at six years. If we confirm that losses are substantially higher for high tenured workers (e.g., Kletzer 1989) this would also indicate the need to target in particular high tenured job separators with policies aimed to help job losers.

Panel B of Figure 6 shows the average earnings of job separators before and after the last period on their main job for separations occurring between 1980 and 1985. The figure suggests that earnings losses for workers with at least three years of job tenure have actually larger initial losses in earnings. The recovery in average earnings occurs slower at the beginning, but then increases in speed such that convergence occurs at about the same time. These differences hold for all three measures of earnings.

These patterns are reversed once we include worker fixed effects. Panel A of Figure 11 compares estimates with and without worker fixed effects for workers with three years of job tenure and workers with six years of job tenure. (Table 5 displays the coefficient estimates for every other year with corresponding standard errors.) Without worker fixed effects earnings losses are of similar order of magnitude. Once we control for worker fixed effects however, the long-term earnings loss is significantly smaller for workers with shorter amount of job tenure. The estimates still imply long lasting earnings declines – convergence still occurs only after 15 years. However, they also suggest that a larger part of the earnings losses of short tenured workers are due to negative selection. That is, among job separators with shorter tenure spells a larger proportion has lower long-term earnings potential. Once we control for this difference using worker fixed effects, the difference in earnings loss is

smaller. This suggests that firms may have more of a choice when laying off short tenured workers and that in that case they actively discriminate in favor of more productive employees. Panel B of Figure 11 shows estimates of the earnings loss at job separation for workers with three years of job tenure with worker fixed effects for alternative earnings concepts. The pattern of Panel A is confirmed and reinforced; for short tenured workers with positive earnings convergence now occurs after 10 years.

Figures 12 and 13 repeat the comparison of the effects of job separation over time for workers with three years of tenure. As before, we have kept the tenure requirement fixed at at least three years. The results confirm the patterns in Figures 9 and 10. Even short tenured workers separating from their employers during boom times experience considerable and persistent earnings losses. As before, we find that these losses are reduced with respect to losses in a recession. Similarly, we confirm that there seems to be an important degree of negative selection in periods of recessions, but not in periods of boom.

Overall, the results from our sensitivity analysis suggest that persistent earnings losses are not only a feature of separations from very stable jobs occurring in recessions. It appears that large and long-lasting losses even occur for workers at their job for at least three years or workers displaced in boom times. However, there are important distinctions between the different types and years of separation that deserve further study. In particular, the pattern of selection into job separation appears to differ between boom and recessions. There appears to be less negative selection into job separation based on long-term earnings in boom times. This is not surprising, since we would expect there to be more positively selected voluntary movers in periods of economic expansion that offsets any negative selection on the firm side. There also appears to be more negative selection into job separation for workers with shorter job durations at separation. This result is consistent with the notion that firms are more constrained by seniority rules in making layoff decisions regarding high-tenured workers (e.g., Abraham and Medoff 1984).

Alternative Definitions of Separation In the main part of the paper, we consider a worker to be a separator if his first separation from his long-term employer was also permanent. Appendix Figures 1 and 2 show the pre/post earnings development (Figure 6) for the case when we consider any separation or any permanent separation as our definition of job separation. Appendix Figure 1 shows the earnings changes of workers with six years

of job tenure for our three definitions of job separation. The figure suggests it does not make any difference whether we consider any permanent separation or only first separations that are permanent. Earnings losses are slightly smaller for the case of any job separation. This is not surprising, since that definition includes workers only temporarily separating from their main employer. The fact that only the effect on employment is more negative in the first period of separation in the case of any separation suggests that an important number of such short-term transitions involve temporary layoff without alternative employment. Appendix Figure 2 confirms these results for workers separating with at least three years of tenure on their long-term job. The different definitions now yield results that are even more similar.

6.   Preliminary Summary and Suggestions for Further Research

Every year a large fraction of workers lose their job in the U.S. labor market. Yet, despite a long literature attempting to quantify the costs of job loss, no representative and comprehensive estimate of the long-term consequences of job separations exists. This is particularly worrisome because existing estimates based on limited samples or time periods suggest that the costs could be large and persistent at least for some groups of workers. If this were to be upheld in more representative samples and for most time periods, it would have important implications for the costs of economic adjustment in the U.S. economy. In particular, while the ability to fire 'at will' may benefit adjustment in the labor market as a whole, the costs in terms of lost productivity and earnings of individual workers may be much higher than typical replacement rates of unemployment insurance or other programs designed to smooth temporary earnings fluctuations.

We use a longitudinal administrative data source that may not be well known in the research community to study the long-term effects of job separation on earnings for a representative sample of high-attachment workers leaving their jobs during the 1982 recession. Our sample allows us to follow workers who left a stable job for over twenty years after job loss, and compare their earnings developments to the outcomes of workers of similar age and earnings potential that did not separate from their employers. In our present research design, we cannot directly control whether workers leave their employer voluntarily or not. However, our analysis of the incidence of job separations over the business cycle suggests that an important fraction of job separations during the strong 1982 recession were

involuntary. Inclusion of voluntary movers implies that our results may underestimate the true cost of job loss. To control for the potential of negative selection of job separators, the long time period of our data allows us to control for worker fixed effects.

Our preliminary results suggest that job separations during the early 1980s led to large and persistent earnings losses that last over twenty years. Those workers in stable employment from 1974 to 1979 who left their jobs during 1980 to 1985 had – compared to workers with no permanent job separation during that period – initial earnings losses of 30%. These losses decline to 20% after ten years and drop below 10% only after 15 years; for our main sample, earnings losses have not completely faded 20 years after a job loss. Even for workers with lower pre-separation tenure or workers separating from their employers in better economic times, losses are still substantial and last up to 15 years.

We will work on four significant extensions of our analysis. First, our large sample size allows us to analyze the effects of job separation by age, gender, race, region, industry, and socio-economic status. Second, we will make sure that the losses we find are not driven by the fact that separations may occur in lower paying or declining firms or industries. Third, our long time period allows us to control for potential differences in individual long-term earnings trends of separators and non-separators. Last, and most importantly, we will isolate the group of workers who leaves the firm during a major layoff or during a firm closure. Using information on such firm-level events obtained from administrative data, we will be able to isolate workers who are truly involuntarily displaced.

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Data Appendix.

The sample of workers used for our analysis of the long-term consequences of job separations is based on three data sets. The three sources are the 2004 Continuous Work History Sample (CWHS) active file, a 1 percent extract from the Master Earnings File (MEF), and a 1 percent extract from the Longitudinal Employee-Employer Data (LEED).

SSA 1 percent samples are selected by a "stratified cluster design" based on certain serial digits of the Social Security Number (SSN). They are generally considered to be random samples and contain a large number of observations that represent the general population. Individuals are followed through their lives, thereby giving us longitudinal data.

The 2004 CWHS is a 1 percent sample that gives us the baseline sample universe and the matching longitudinal earnings and demographic information. It contains information on Social Security covered ("capped") earnings from 1951 through 2004, uncapped total earnings from 1978 through 2004, and basic demographic characteristics of persons who have any report of covered earnings in 1951 through 2004 as well as those who have any report of uncovered earnings in 1978 through 2004.

The MEF contains information on a worker's total uncapped annual earnings for each job held in a given year beginning in 1978 through 2004 and an identification number for each employer (EIN). It also has information on industry for each job.

The LEED is a longitudinal employee-employer file that starts in 1957. The sampling approach is the same as in the 1 percent CWHS, but individual earnings are reported at the employer level. A record exists for each employer that employed a worker in the sample in each year. The dataset includes basic demographic characteristics as well as compensation information subject to top-coding at the employer-employee record level up to 1978 but with no top-coding after 1978. The dataset also contains information about the employer such as geographic information and a three-digit industry code. The LEED also includes imputed wages above the taxable maximum from 1957 to 1977. The imputation procedure is based on the quarter in which a person reached the taxable maximum and is known as Method II. The idea is to use earnings for quarters when they are observed to impute earnings in quarters that are not observed because the annual taxable maximum has been reached. When the taxable maximum is reached in the first quarter, imputations rely on a Pareto interpolation.

Table 1: Average Characteristics of High Attachment Workers in 1979 Before Permanent Job Separation by Mobility Status in 1980-1985

	Stable Employment 1974-1979		Stable Employment 1978-1980	
	Separators	Non-Separators	Separators	Non-Separators
Number of Workers	13841	23820	30432	40106
Average Age	36.6	37.6	33.5	36.1
Fraction Employed in Mining in 1979	0.02	0.02	0.02	0.02
Fraction Employed in Construction in 1979	0.07	0.05	0.10	0.07
Fraction Employed in Manufacturing in 1979	0.47	0.52	0.40	0.47
Fraction Employed in Transportation in 1979	0.10	0.16	0.10	0.16
Fraction Employed in Trade in 1979	0.20	0.15	0.23	0.17
Fraction Employed in FIRE in 1979	0.07	0.07	0.07	0.07
Fraction Employed in Services in 1979	0.06	0.04	0.07	0.05
Average Earnings At Main Employer in 1979	46,007	55,422	36,557	48,694
Average Earnings at All Employers in 1979	47,137	55,912	37,845	49,210
Median Earnings at Main Employer in 1979	41,846	50,302	32,666	44,246
Median Earnings at All Employers in 1979	42,798	50,695	33,897	44,713
Standard Deviation of Earnings at Main Employer in 1979	30,537	32,857	28,278	31,539
Standard Deviation of Earnings at All Employers in 1979	30,715	33,623	28,882	31,743

Notes:1% Sample Social Security Administrative Data. Earnings are in 2000 Dollars.

Table 2: Average Annual Earnings for Male Job Separators Leaving Firm in 1982 and Non-Separators

| | Stable Employment 1974-1979 | | | | | | | |
| | Job Separators in 1982 | | | | Workers Not Separating in 1982 | | | |
Year-Group	Earnings At Main Employer	Earnings at All Employers	Earnings Including Zeros	Fraction of Years Positive Earnings	Earnings At Main Employer	Earnings at All Employers	Earnings Including Zeros	Fraction of Years Positive Earnings
1974	40,703	40,703	40,703	1	44,426	44,426	44,426	1
1976	45,229	45,229	45,229	1	48,572	48,572	48,572	1
1978	50,000	50,494	50,494	1	54,114	54,538	54,538	1
1980	46,101	46,648	46,648	1	49,511	50,502	48,918	0.97
1982	36,038	40,198	31,518	0.78	48,449	49,328	47,057	0.95
1984	41,944	43,552	34,875	0.80	51,871	52,961	48,726	0.92
1986	45,379	46,837	37,004	0.79	53,480	54,708	49,647	0.91
1988	46,878	48,659	38,131	0.78	56,080	57,320	50,713	0.88
1990	48,381	49,684	38,514	0.77	54,084	55,220	47,922	0.87
1992	48,078	49,288	38,312	0.77	53,490	54,571	47,261	0.85
1994	46,294	47,995	37,477	0.76	52,069	53,253	46,659	0.84
1996	46,499	47,901	38,098	0.76	51,208	52,494	46,289	0.83
1998	48,939	50,520	40,474	0.75	52,243	53,642	47,883	0.81
2000	48,694	50,352	39,592	0.74	52,719	54,221	48,740	0.80
2002	46,498	47,805	38,075	0.72	47,517	48,679	42,623	0.77

Note: Average annual earnings and fraction worked for workers at same employer from 1974-1979. 1% Sample Social Security Administrative Data. Earnings are in 2000 Dollars.

Table 3: Average Annual Earnings Before and After Job Separation of High Attachment Workers Leaving Firm 1980-1985

Years After Before/After Job Separation	Stable Employment 1974-1979			Stable Employment 1978-1980		
	Earnings Including Zeros	Earnings At Main Employer	Earnings at All Employers	Earnings Including Zeros	Earnings At Main Employer	Earnings at All Employers
-10	43.90 (1.53)	43.90 (1.59)	43.90 (1.61)	-- --	-- --	-- --
-8	44.10 (0.82)	44.10 (0.85)	44.10 (0.87)	-- --	-- --	-- --
-6	45.22 (0.60)	45.16 (0.62)	45.22 (0.63)	45.29 (1.13)	44.35 (1.18)	45.29 (1.21)
-4	46.60 (0.52)	46.44 (0.54)	46.60 (0.55)	44.09 (0.58)	43.35 (0.61)	44.09 (0.62)
-2	47.70 (0.52)	47.35 (0.54)	47.70 (0.55)	40.35 (0.38)	39.54 (0.39)	40.35 (0.40)
0	39.40 (0.52)	36.44 (0.54)	39.40 (0.55)	33.24 (0.38)	30.42 (0.39)	33.24 (0.40)
4	35.19 (0.52)	42.80 (0.61)	44.36 (0.62)	32.39 (0.38)	38.42 (0.44)	40.20 (0.45)
6	36.83 (0.52)	45.50 (0.61)	47.00 (0.62)	34.71 (0.38)	41.75 (0.44)	43.56 (0.45)
8	36.38 (0.53)	45.43 (0.62)	46.97 (0.63)	35.16 (0.38)	42.75 (0.44)	44.44 (0.45)
10	36.37 (0.54)	45.80 (0.63)	47.27 (0.64)	35.11 (0.39)	43.35 (0.45)	44.87 (0.46)
12	37.08 (0.56)	46.43 (0.64)	47.74 (0.65)	36.04 (0.40)	44.61 (0.46)	46.13 (0.47)
14	38.47 (0.58)	47.52 (0.66)	48.94 (0.66)	37.38 (0.41)	46.09 (0.47)	47.68 (0.48)
16	40.44 (0.61)	49.23 (0.67)	50.72 (0.68)	39.50 (0.42)	48.31 (0.47)	50.14 (0.48)
18	40.87 (0.65)	50.09 (0.70)	51.64 (0.71)	41.00 (0.43)	50.63 (0.49)	52.50 (0.50)
20	39.91 (0.72)	48.58 (0.77)	50.16 (0.78)	40.57 (0.47)	50.45 (0.53)	52.37 (0.54)
22	37.05 (0.90)	47.27 (0.96)	48.54 (0.98)	38.99 (0.59)	50.60 (0.68)	52.15 (0.69)

Notes: Standard errors in parentheses. 1% Sample Social Security Administrative Data. Earnings are in 2000 Dollars.

Table 4: Regression Estimates of the Long-Term Costs of Job Separation of Workers in Stable Employment 1974-1979, Leaving Firm 1980-1985, Alternative Specifications

| Years After Before/After Job Separation	Earnings (in $1000) at All Employers Including Zeros			Earnings (in $1000) At Main Employer			Earnings (in $1000) at All Employers		
	Year Effects	Year Effects and Age Controls	Year Effects, Age Controls, and Person Effects	Year Effects	Year Effects and Age Controls	Year Effects, Age Controls, and Person Effects	Year Effects	Year Effects and Age Controls	Year Effects, Age Controls, and Person Effects
-10	-6.73 (0.73)	-4.29 (0.69)	0 0	-6.68 (0.73)	-4.24 (0.70)	0 0	-6.79 (0.73)	-4.34 (0.70)	0 0
-8	-6.53 (0.42)	-4.80 (0.41)	-0.61 (0.81)	-6.48 (0.42)	-4.76 (0.41)	-0.75 (0.78)	-6.58 (0.42)	-4.86 (0.41)	-0.90 (0.80)
-6	-5.41 (0.35)	-4.21 (0.34)	-0.01 (0.88)	-5.42 (0.35)	-4.25 (0.34)	-0.40 (0.85)	-5.47 (0.35)	-4.30 (0.34)	-0.65 (0.87)
-4	-4.94 (0.32)	-4.01 (0.31)	0.19 (0.92)	-5.04 (0.32)	-4.15 (0.31)	-0.35 (0.90)	-5.09 (0.32)	-4.20 (0.31)	-0.69 (0.91)
-2	-4.52 (0.32)	-4.09 (0.31)	-0.40 (0.96)	-4.88 (0.32)	-4.48 (0.31)	-1.13 (0.93)	-4.90 (0.32)	-4.49 (0.31)	-1.49 (0.95)
0	-14.22 (0.40)	-13.25 (0.39)	-8.56 (1.05)	-17.47 (0.38)	-16.48 (0.37)	-12.12 (1.01)	-15.08 (0.40)	-14.08 (0.39)	-10.02 (1.04)
4	-19.93 (0.49)	-19.18 (0.48)	-14.29 (1.06)	-13.74 (0.53)	-12.66 (0.53)	-9.85 (1.04)	-13.00 (0.54)	-11.92 (0.54)	-9.49 (1.06)
6	-18.43 (0.59)	-17.86 (0.59)	-12.93 (1.07)	-11.98 (0.68)	-11.11 (0.68)	-8.19 (1.07)	-11.49 (0.68)	-10.62 (0.68)	-8.08 (1.08)
8	-17.69 (0.59)	-17.36 (0.59)	-12.38 (1.06)	-12.04 (0.66)	-11.44 (0.66)	-8.23 (1.05)	-11.53 (0.67)	-10.94 (0.67)	-8.11 (1.06)
10	-15.64 (0.62)	-15.60 (0.62)	-10.69 (1.08)	-10.33 (0.69)	-10.05 (0.69)	-6.61 (1.06)	-9.89 (0.70)	-9.63 (0.70)	-6.56 (1.09)
12	-13.31 (0.73)	-13.60 (0.73)	-8.94 (1.14)	-8.22 (0.80)	-8.23 (0.80)	-4.93 (1.14)	-7.96 (0.82)	-8.00 (0.82)	-5.08 (1.16)
14	-11.18 (0.86)	-11.64 (0.86)	-7.25 (1.21)	-6.12 (0.94)	-6.43 (0.94)	-3.10 (1.21)	-5.87 (0.97)	-6.20 (0.97)	-3.25 (1.24)
16	-9.10 (1.18)	-9.63 (1.18)	-5.37 (1.46)	-4.00 (1.30)	-4.55 (1.30)	-1.15 (1.51)	-3.78 (1.32)	-4.35 (1.31)	-1.35 (1.53)
18	-8.08 (1.21)	-8.80 (1.21)	-4.75 (1.51)	-2.40 (1.32)	-3.33 (1.31)	0.12 (1.54)	-2.17 (1.34)	-3.15 (1.33)	-0.10 (1.57)
20	-8.03 (1.12)	-8.95 (1.12)	-4.65 (1.35)	-2.80 (1.20)	-4.17 (1.20)	-0.07 (1.35)	-2.54 (1.23)	-3.97 (1.23)	-0.29 (1.39)
22	-7.55 (1.20)	-8.69 (1.20)	-3.01 (1.37)	-1.35 (1.45)	-3.17 (1.46)	1.75 (1.46)	-1.29 (1.47)	-3.18 (1.47)	1.28 (1.48)

Notes: Standard errors in parentheses. 1% Sample Social Security Administrative Data.

Table 5: Regression Estimates of the Long-Term Costs of Job Separation of Workers in Stable Employment 1978-1980, Leaving Firm 1981-1985, Alternative Specifications

| Years After Before/After Job Separation	Earnings (in $1000) at All Employers Including Zeros			Earnings (in $1000) At Main Employer			Earnings (in $1000) at All Employers		
	Year Effects	Year Effects and Age Controls	Year Effects, Age Controls, and Person Effects	Year Effects	Year Effects and Age Controls	Year Effects, Age Controls, and Person Effects	Year Effects	Year Effects and Age Controls	Year Effects, Age Controls, and Person Effects
-6	-2.85 (0.58)	-2.20 (0.54)	0.00 (0.00)	-2.87 (0.58)	-2.24 (0.54)	0.00 (0.00)	-2.94 (0.58)	-2.30 (0.54)	0.00 (0.00)
-4	-4.80 (0.33)	-3.30 (0.31)	1.59 (0.68)	-4.98 (0.33)	-3.44 (0.31)	1.23 (0.66)	-4.95 (0.33)	-3.39 (0.31)	1.36 (0.69)
-2	-8.41 (0.23)	-5.67 (0.23)	1.56 (0.78)	-8.88 (0.23)	-6.06 (0.23)	0.88 (0.76)	-8.75 (0.23)	-5.90 (0.23)	0.99 (0.80)
0	-15.75 (0.26)	-13.06 (0.26)	-5.56 (0.85)	-18.88 (0.25)	-15.98 (0.25)	-8.69 (0.82)	-16.62 (0.26)	-13.70 (0.26)	-6.46 (0.87)
4	-19.27 (0.35)	-17.20 (0.34)	-9.61 (0.90)	-14.64 (0.37)	-11.80 (0.37)	-6.57 (0.88)	-13.83 (0.38)	-10.98 (0.38)	-5.94 (0.92)
6	-17.16 (0.41)	-15.55 (0.41)	-7.92 (0.93)	-12.37 (0.45)	-9.95 (0.45)	-4.66 (0.91)	-11.74 (0.46)	-9.32 (0.46)	-4.22 (0.96)
8	-15.74 (0.45)	-14.65 (0.44)	-6.97 (0.97)	-11.59 (0.49)	-9.68 (0.49)	-4.05 (0.96)	-11.06 (0.50)	-9.17 (0.50)	-3.73 (1.01)
10	-13.66 (0.46)	-13.10 (0.46)	-5.47 (1.01)	-9.81 (0.51)	-8.48 (0.51)	-2.52 (1.01)	-9.39 (0.52)	-8.09 (0.52)	-2.32 (1.06)
12	-12.00 (0.51)	-11.86 (0.51)	-4.46 (1.00)	-8.18 (0.57)	-7.46 (0.56)	-1.50 (0.99)	-7.79 (0.58)	-7.11 (0.58)	-1.35 (1.05)
14	-10.22 (0.55)	-10.46 (0.55)	-3.26 (1.01)	-6.19 (0.61)	-6.10 (0.61)	0.00 (1.01)	-5.89 (0.63)	-5.85 (0.63)	0.06 (1.07)
16	-8.98 (0.69)	-9.48 (0.69)	-2.42 (1.12)	-4.83 (0.77)	-5.31 (0.77)	0.80 (1.16)	-4.46 (0.79)	-5.00 (0.79)	0.91 (1.20)
18	-7.98 (0.82)	-8.77 (0.82)	-1.79 (1.17)	-3.04 (0.92)	-4.15 (0.92)	2.05 (1.24)	-2.67 (0.94)	-3.85 (0.94)	2.14 (1.27)
20	-7.20 (0.96)	-8.29 (0.96)	-0.76 (1.20)	-2.31 (1.09)	-3.96 (1.08)	2.87 (1.26)	-1.81 (1.11)	-3.56 (1.10)	3.05 (1.29)
22	-5.84 (1.17)	-7.32 (1.17)	1.42 (1.31)	0.29 (1.34)	-2.03 (1.33)	5.75 (1.39)	0.61 (1.35)	-1.83 (1.34)	5.67 (1.42)

Notes: Standard errors in parentheses. 1% Sample Social Security Administrative Data.

Figure 1A: Total Separation Rate and Job-Job Transition Rate
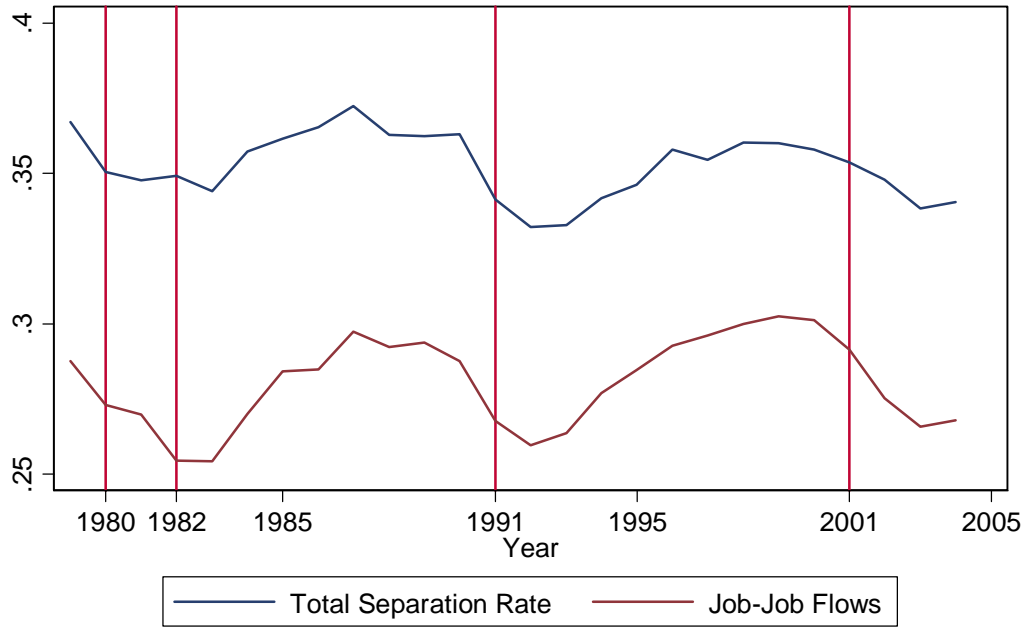
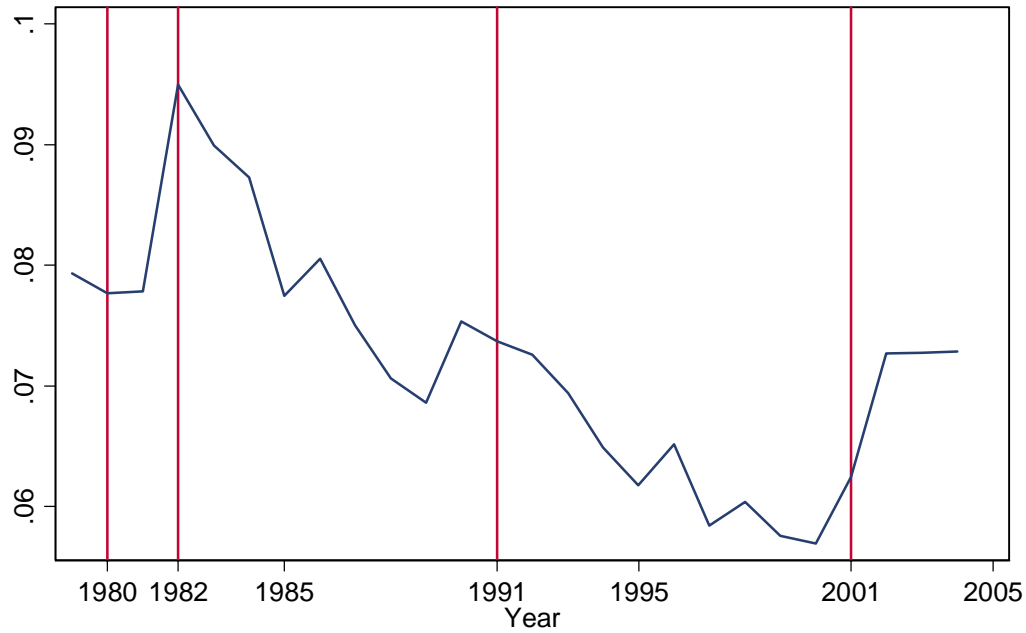Total Separation Rate — Job-Job Flows

Source: 1% Files of Social Security administrative data (see text). Vertical Lines At Business Cycle troughs.

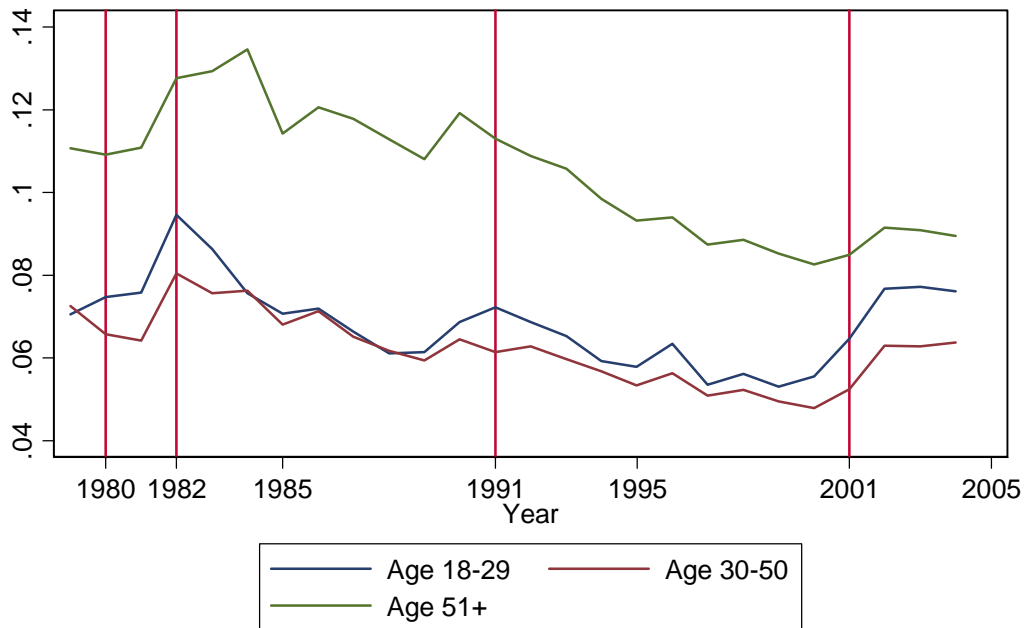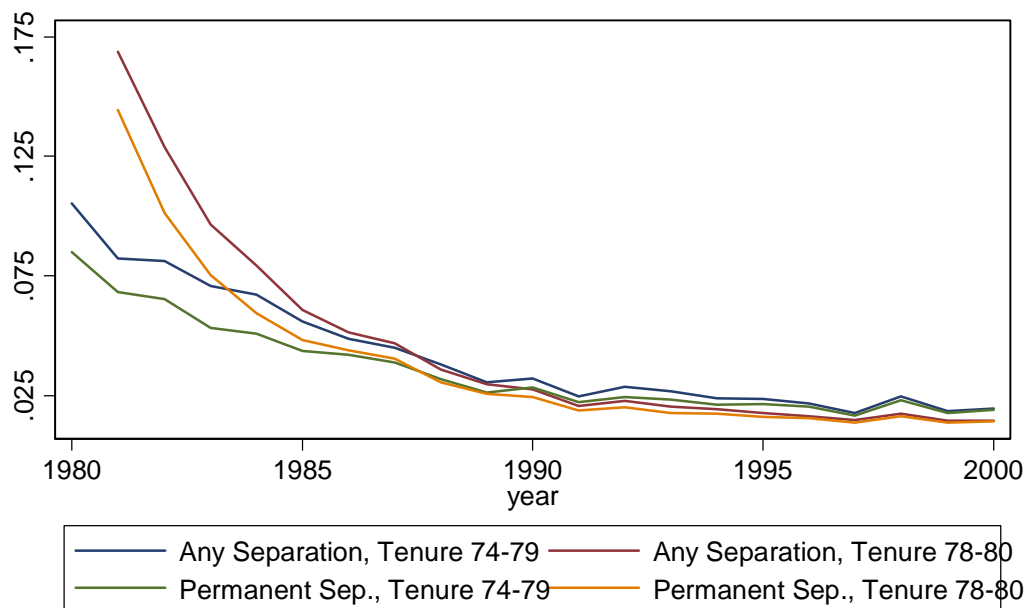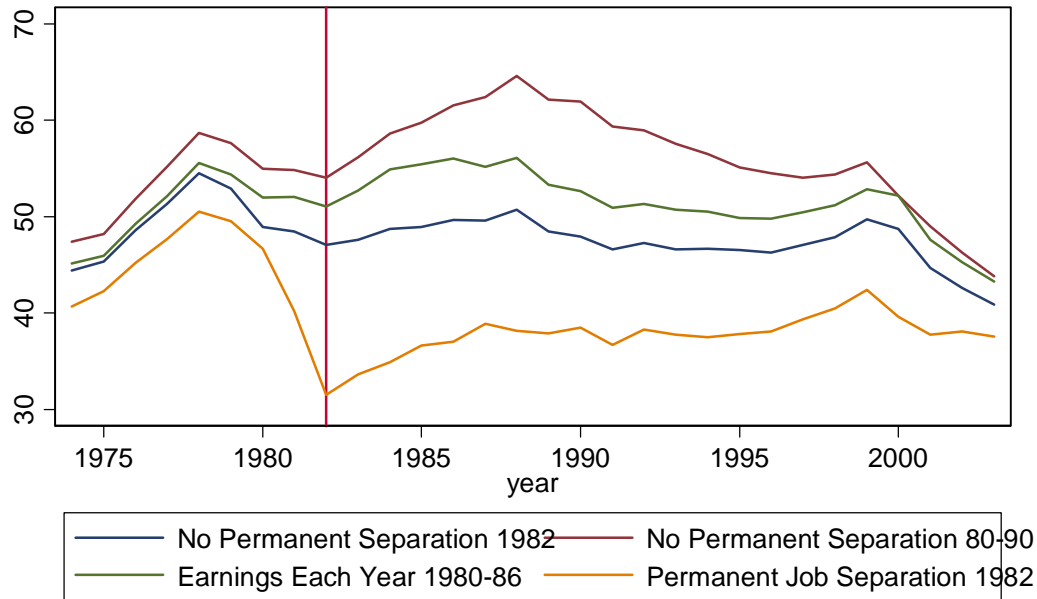## Figure 1B: Total Rate of Transitions from Job to Job By Age
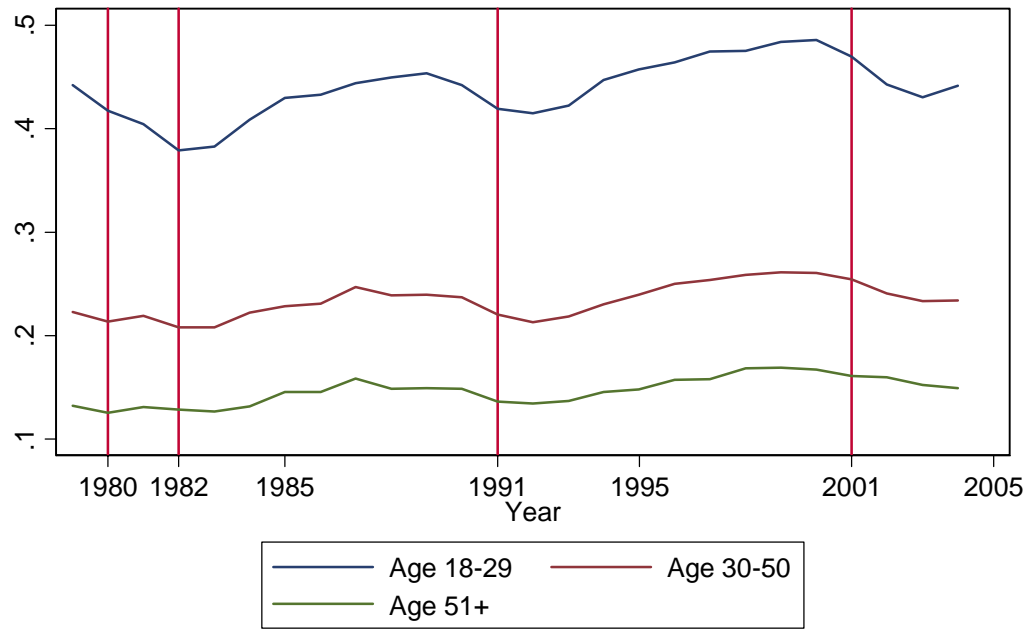
Age 18-29 — Age 30-50
Age 51+

Source: 1% Files of Social Security administrative data (see text). Vertical Lines At Business Cycle troughs.

Figure 2A: Total Rate of Transitions from Job to Non-Employment

Source: 1% Files of Social Security administrative data (see text). Vertical Lines At Business Cycle troughs.

Figure 2B: Total Rate of Transitions from Job to Non-Employment By Age

Source: 1% Files of Social Security administrative data (see text). Vertical Lines At Business Cycle troughs.

Figure 3: Job Separations for High Attachment Workers from Long-Term Job Stable Jobs Held in 1974-1979 or in 1978-1980

Any Separation, Tenure 74-79 — Any Separation, Tenure 78-80
Permanent Sep., Tenure 74-79 — Permanent Sep., Tenure 78-80

Source: 1% Files of Social Security administrative data (see text).
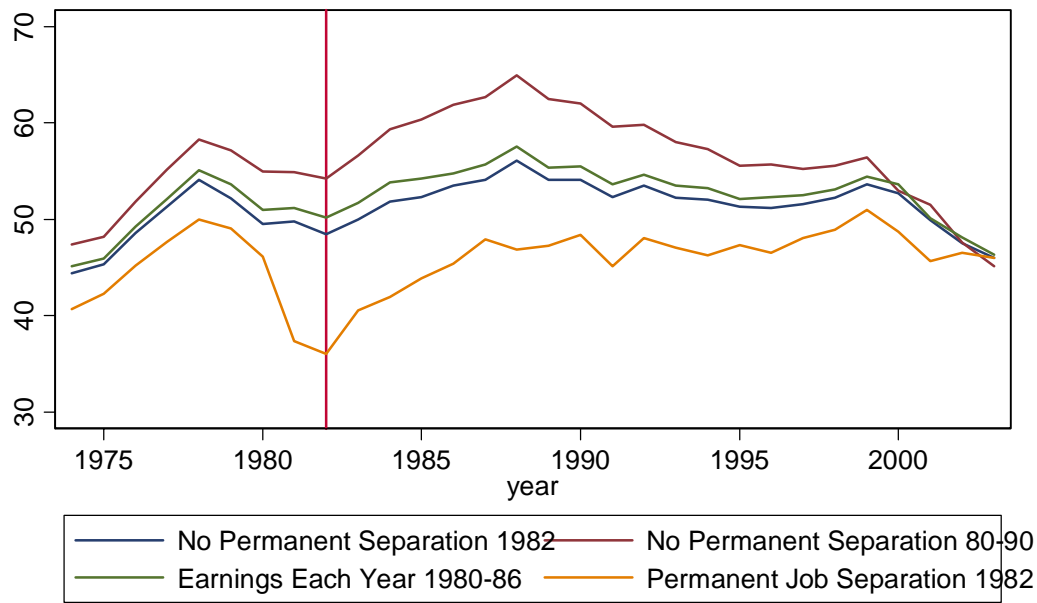
Figure 4A: Annual Earnings at All Jobs for Wokers Separating in 1982 and Alternative Control Groups of Non-Separators (in $1000)

| No Permanent Separation 1982 | No Permanent Separation 80-90 |
| Earnings Each Year 1980-86 | Permanent Job Separation 1982 |

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 4B: Fraction Any Positive Earnings Among Workers Separating in 1982 and Workers Not Separating in 1982
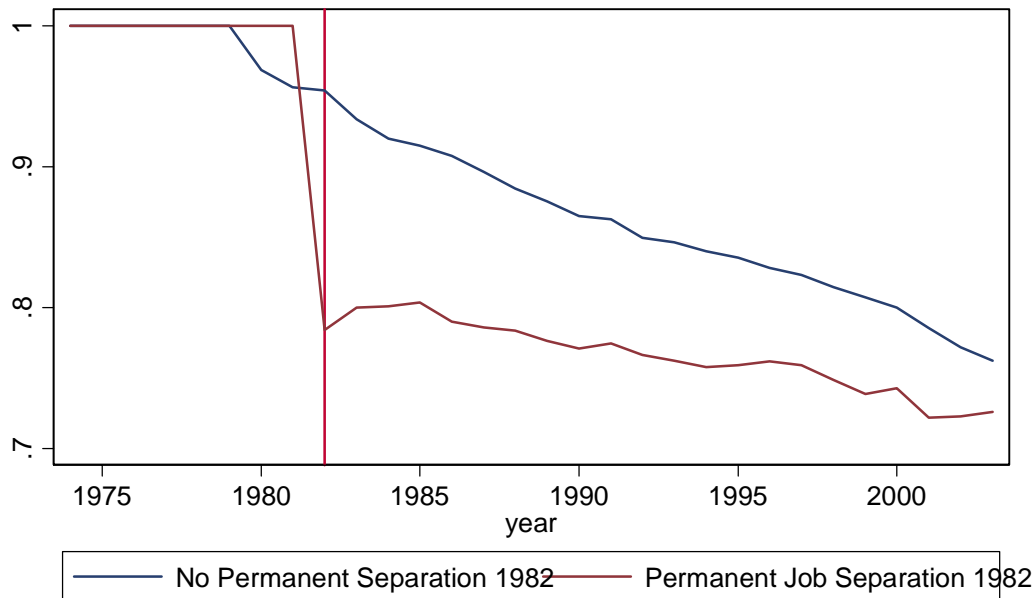
| No Permanent Separation 1982 | Permanent Job Separation 1982 |

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 5A: Positive Annual Earnings at Main Job for Wokers Separating in 1982
and Alternative Control Groups of Non-Separators (in $1000)

No Permanent Separation 1982   No Permanent Separation 80-90
Earnings Each Year 1980-86   Permanent Job Separation 1982

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 5B: Positive Annual Earnings at All Jobs for Wokers Separating in 1982
and Alternative Control Groups of Non-Separators (in $1000)

No Permanent Separation 1982   No Permanent Separation 80-90
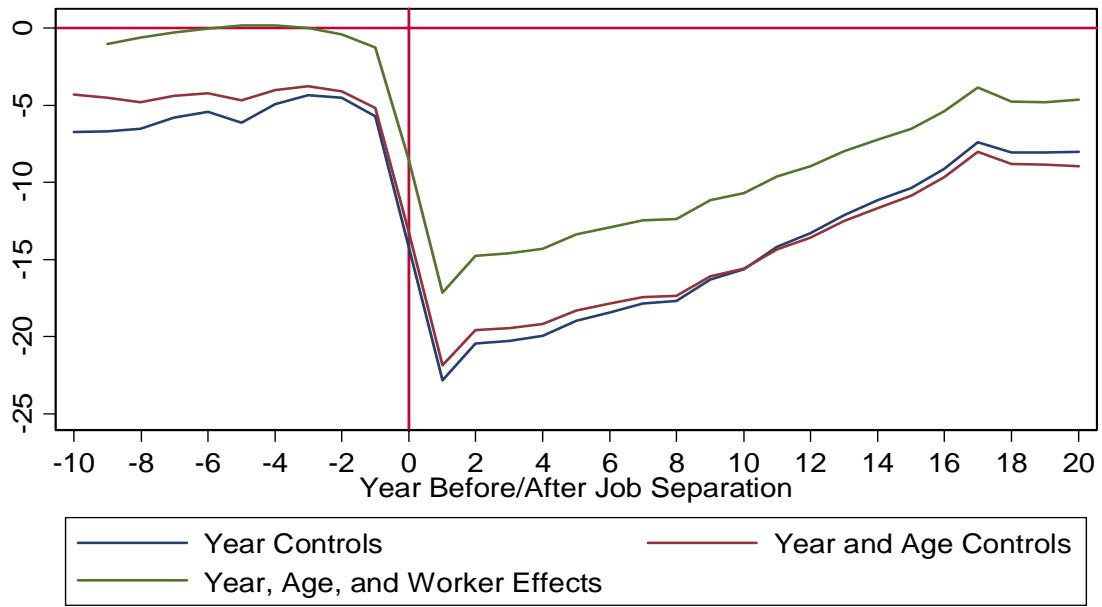Earnings Each Year 1980-86   Permanent Job Separation 1982

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.
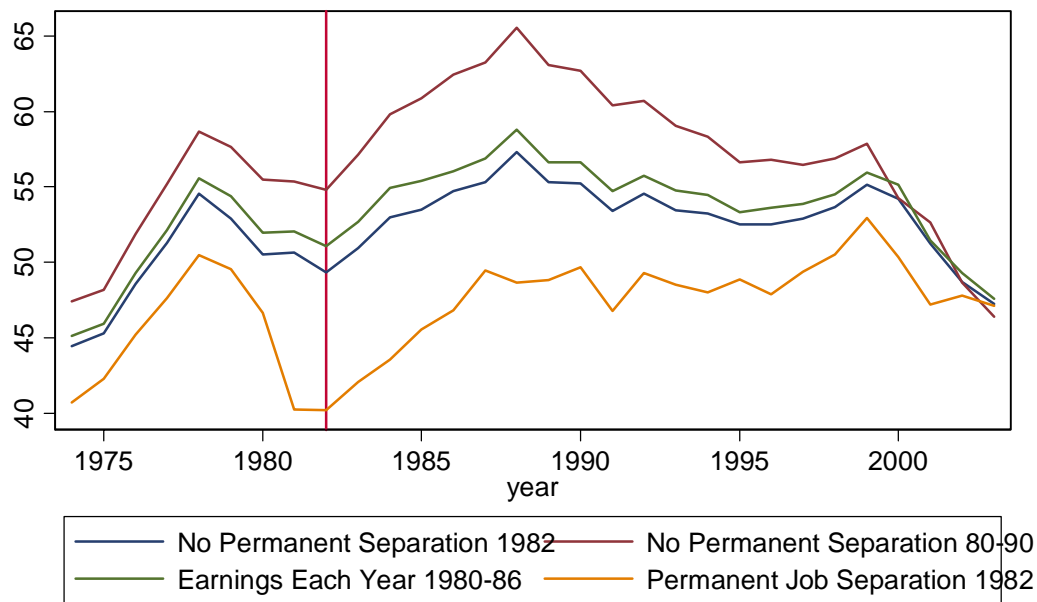
Figure 6A: Average Earnings Pre/Post Separation 1980-1985 For Separators Workers in Stable Job 1974-1979 (in $1000)

Pos. Earnings Main Job
Pos. Earnings All Jobs
Earnings All Jobs Including Zero Earnings
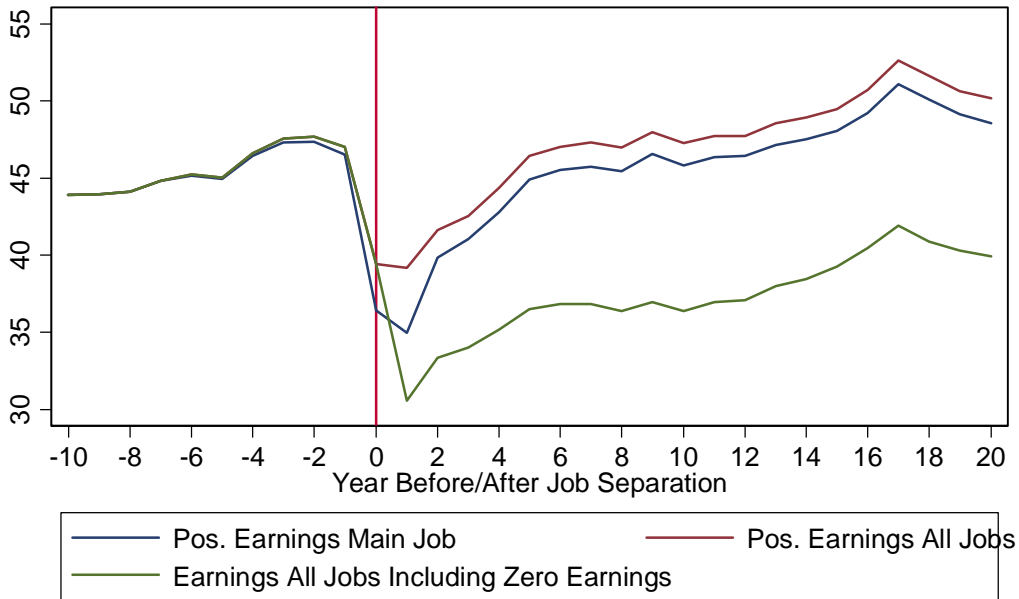
Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 6B: Average Earnings Pre/Post Separation 1980-1985 For Separators Workers in Stable Job 1978-1980 (in $1000)
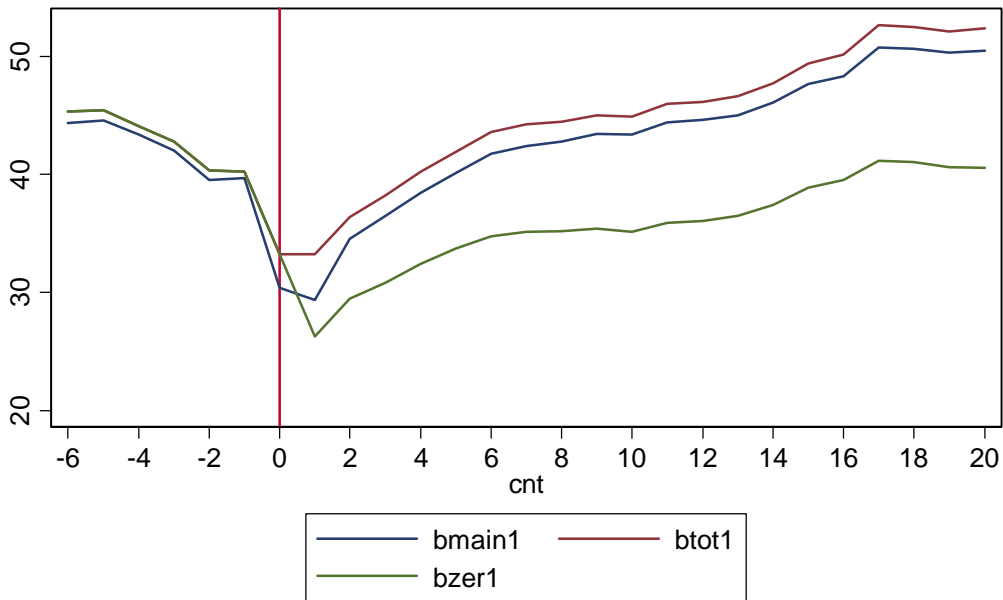
bmain1   btot1
bzer1

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 7: Earnings Losses at Job Separation 1980-1985 Relative to Non-Movers Workers in Stable Job 1974-1979 (in $1000)

Year Controls
Year and Age Controls
Year, Age, and Worker Effects

Source: 1% Files of Social Security administrative data (see text).

Figure 8: Earnings Losses at Job Separation 1980-1985 Relative to Non-Movers Workers in Stable Job 1974-1979 (in $1000)
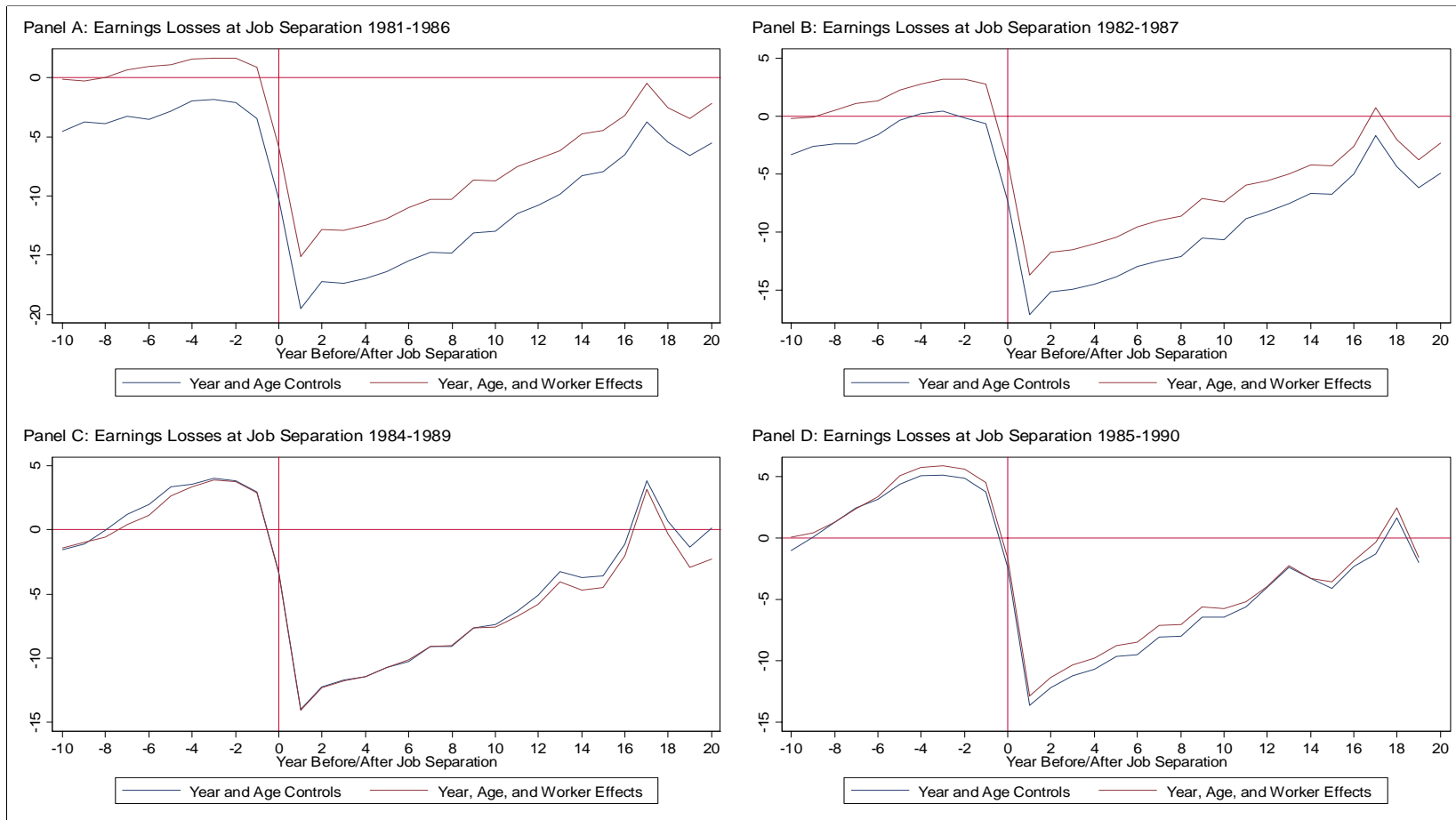
Pos. Earnings Main Job
Pos. Earnings All Jobs
Earnings All Jobs Including Zero Earnings
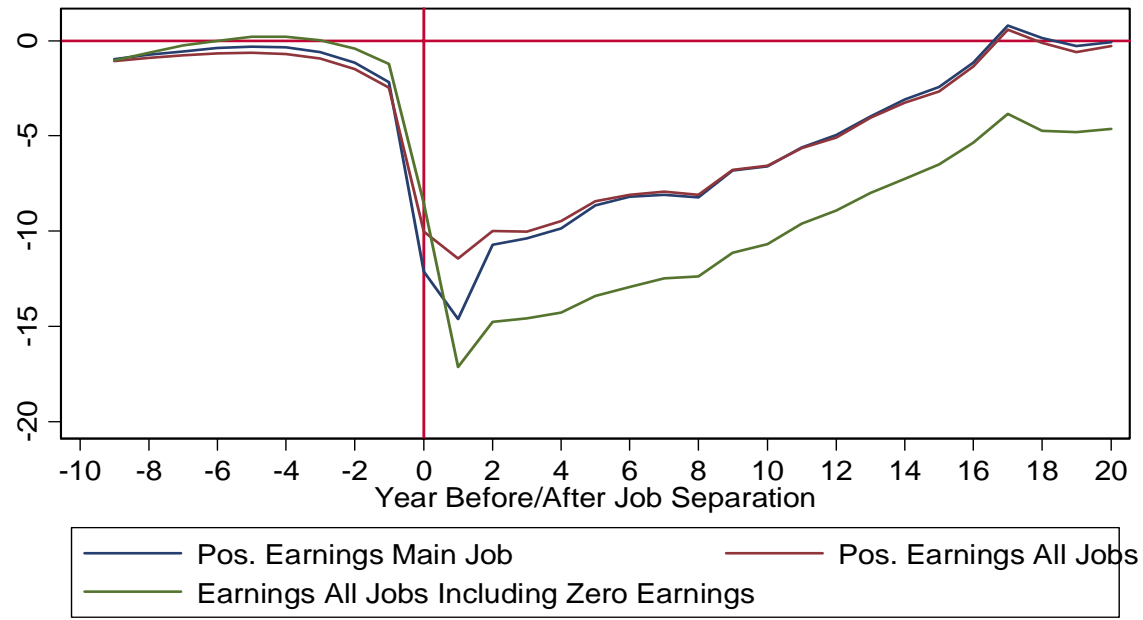
Source: 1% Files of Social Security administ rative data (see text). Earnings in 2000 Dollars.

Figure 9: Earnings Losses at Separation For Different Separation Periods
6 Years of Job Tenure (in $1000)
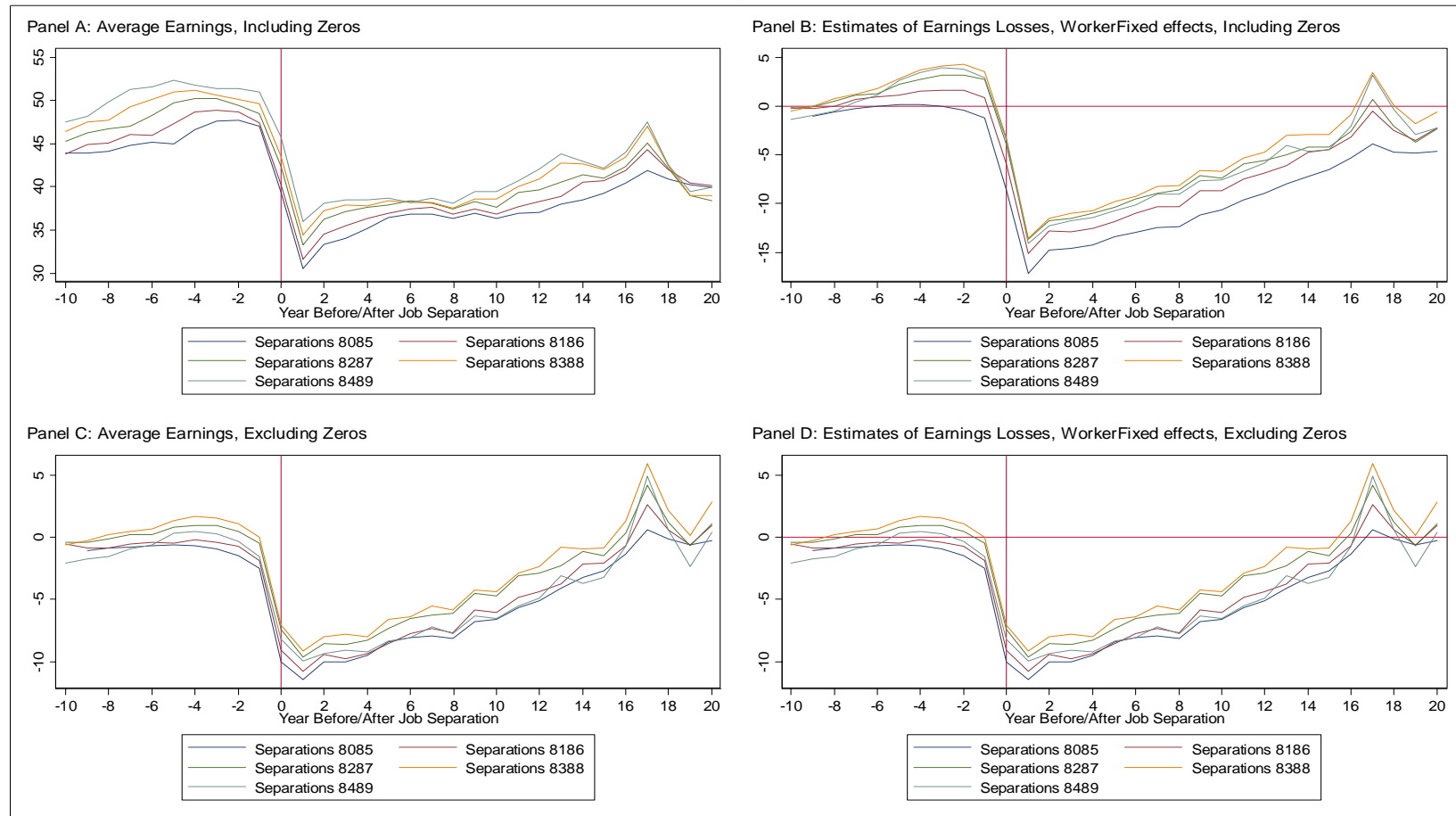
Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 10: Earnings Losses at Separation for Different Separation Periods 6 Year of Job Ten, Alternative Models (in $1000)

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 11A: Estimate of Earnings Loss at Job Separation
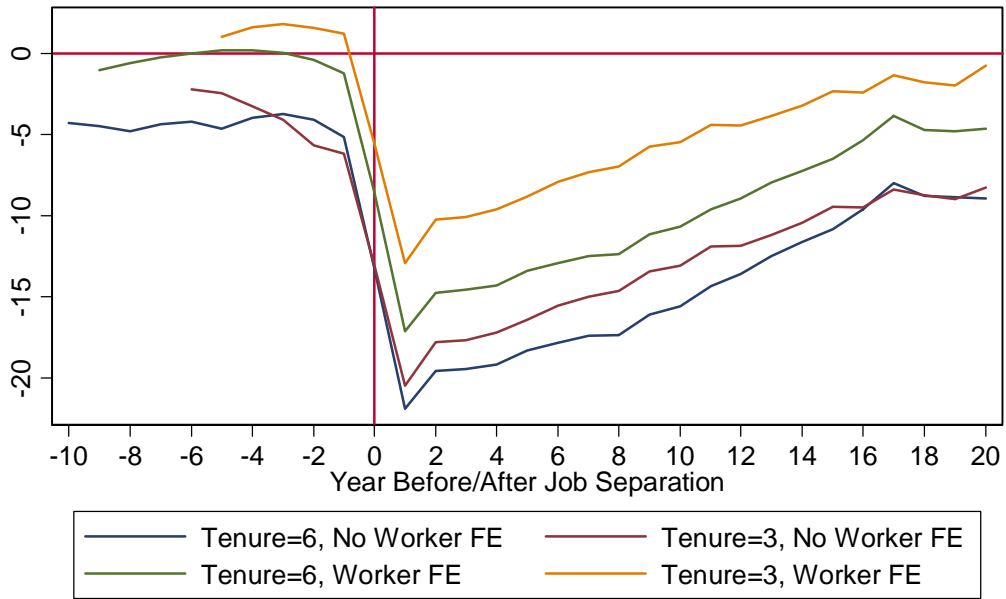Different Years of Job Tenure, Including Zeros (in $1000)

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 11B: Estiamtes of Earnings Loss at Job Separation
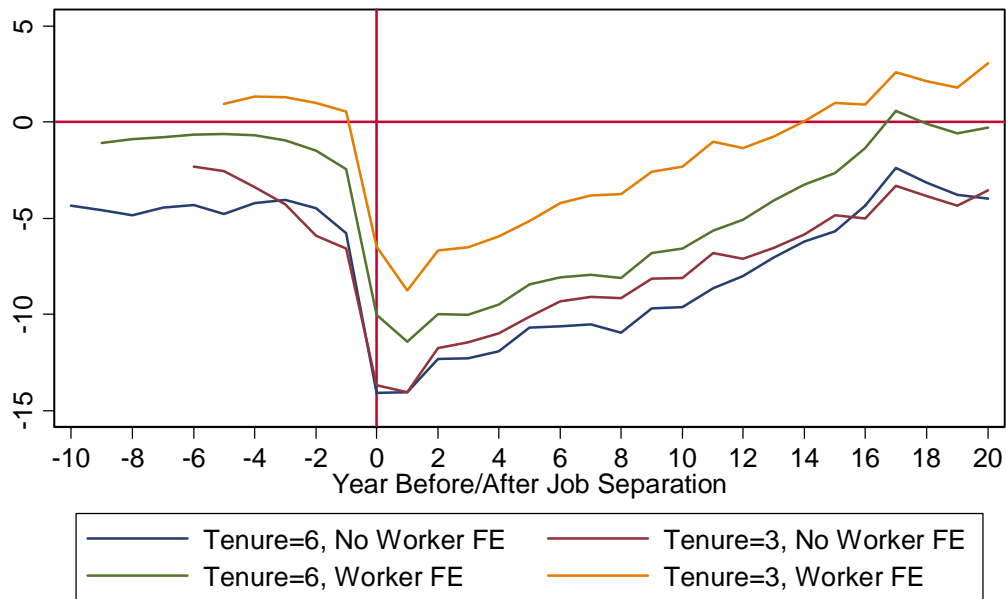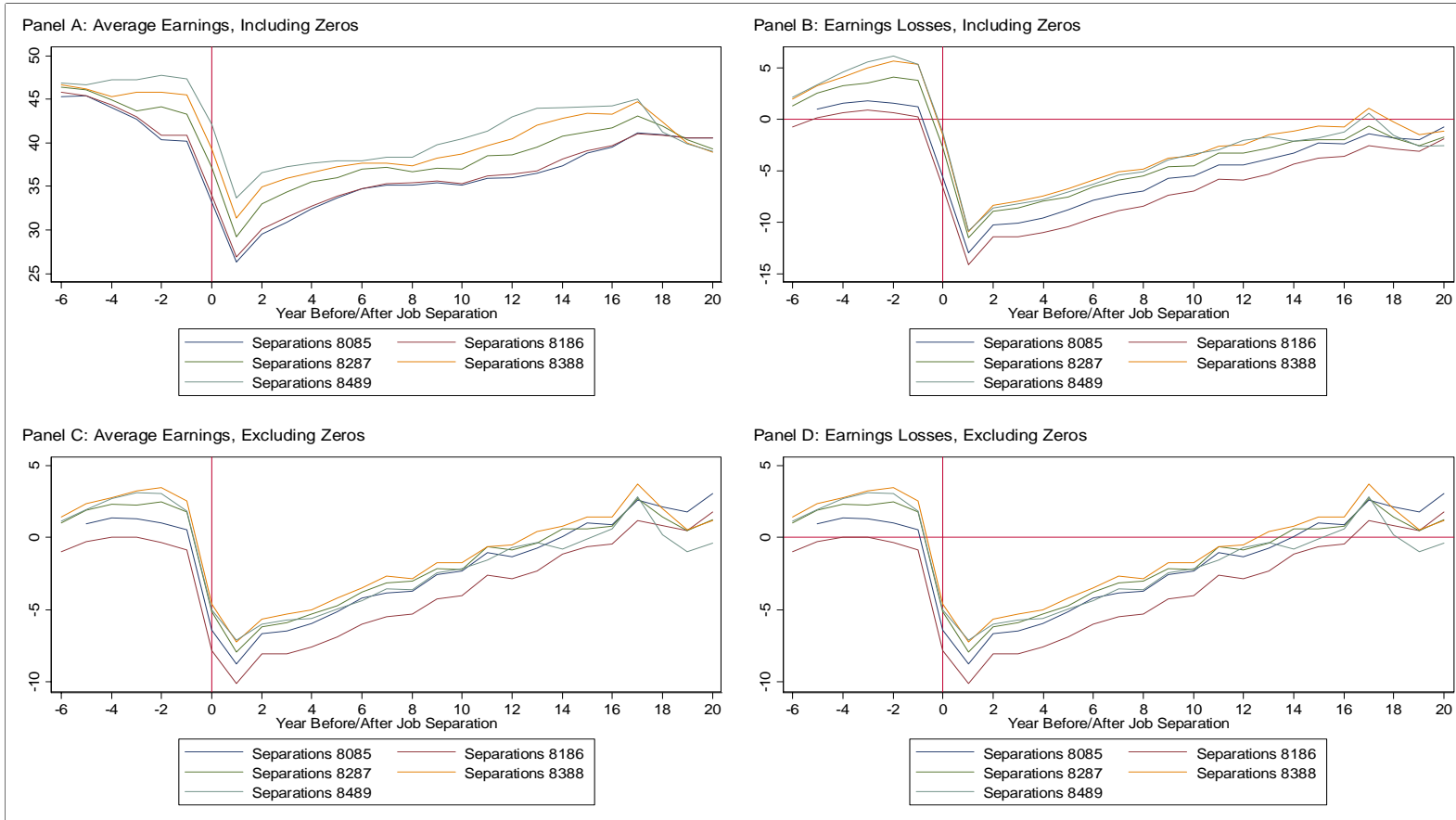Different Years of Job Tenure, Excluding Zeros (in $1000)

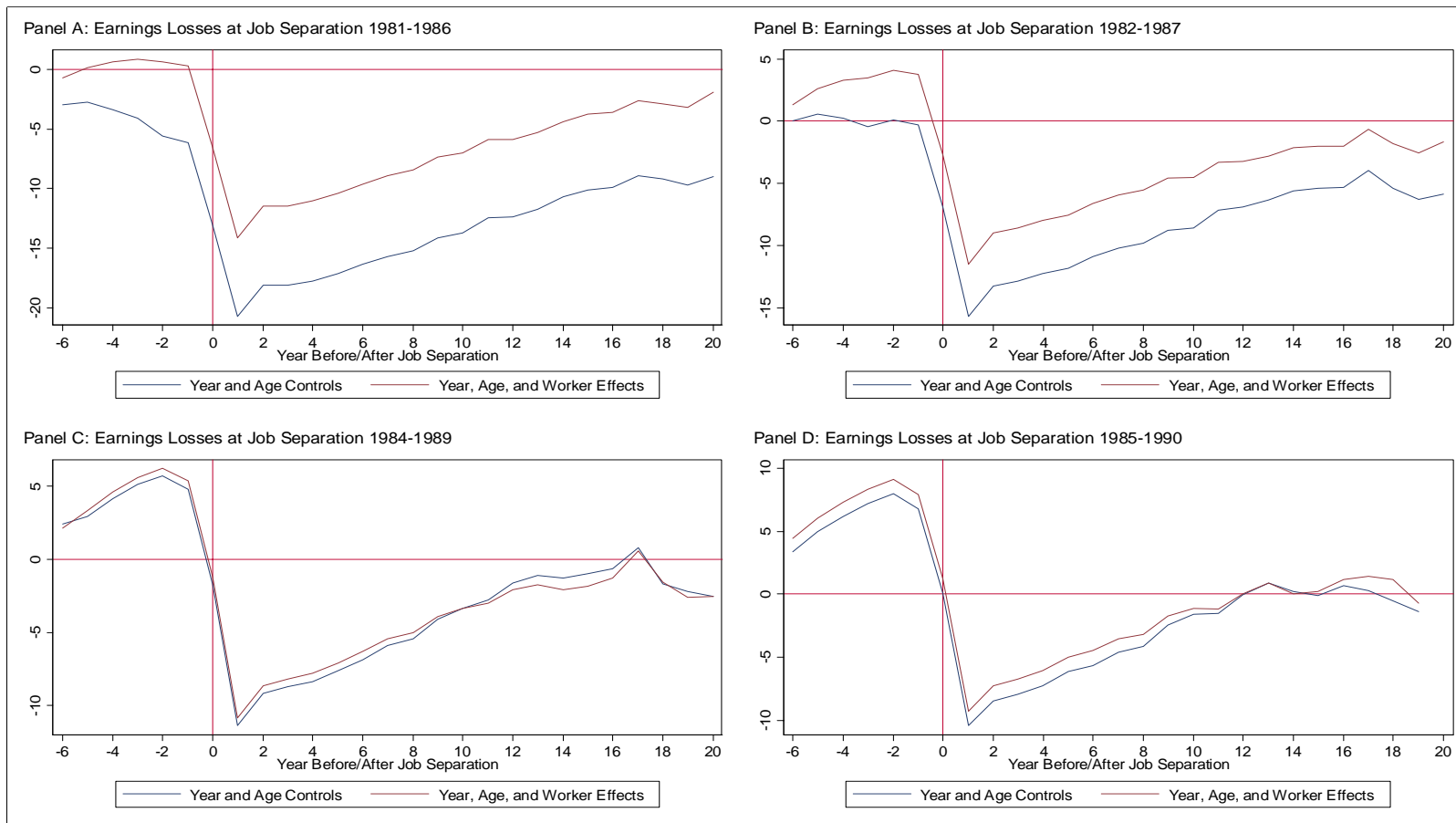Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 12: Earnings Losses at Separation for Different Separation Periods 3 Year of Job Ten, Including Worker Fixzed Effects (in $1000)
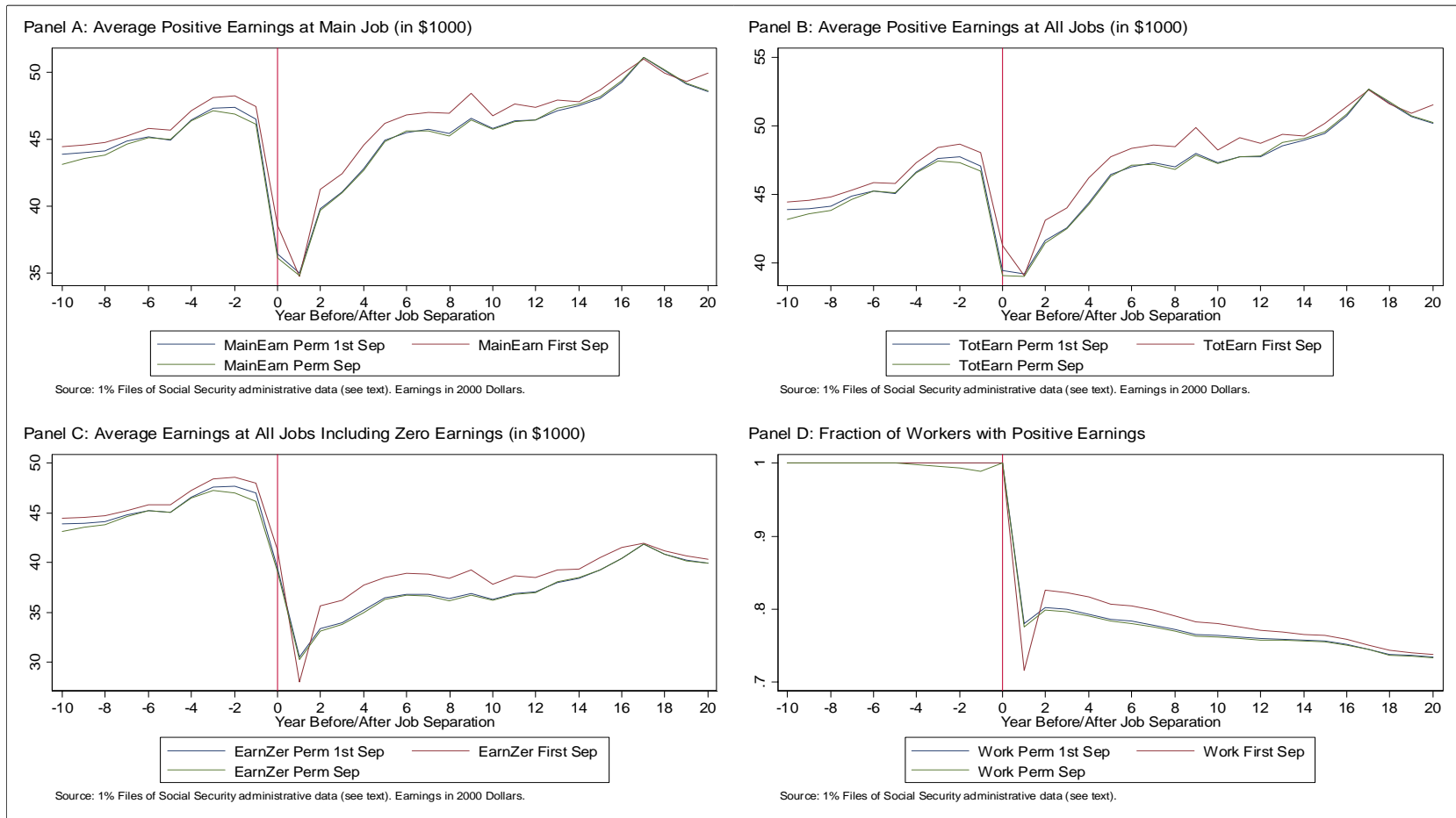

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Figure 13: Earnings Losses at Separation for Different Separation Periods 3 Year of Job Ten, Alternative Models (in $1000)

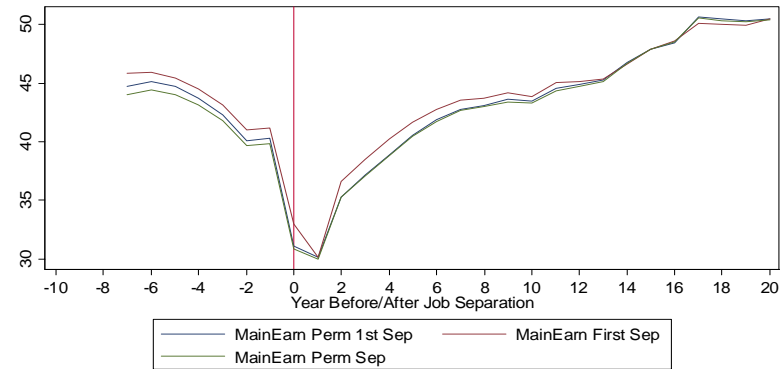Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Appendix Figure 1: Alternative Measures of Job Separation, Six Years of Pre-Separation Job Tenure

Panel A: Average Positive Earnings at Main Job (in $1000)

MainEarn Perm 1st Sep — MainEarn First Sep — MainEarn Perm Sep

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Panel B: Average Positive Earnings at All Jobs (in $1000)

TotEarn Perm 1st Sep — TotEarn First Sep — TotEarn Perm Sep

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Panel C: Average Earnings at All Jobs Including Zero Earnings (in $1000)

EarnZer Perm 1st Sep — EarnZer First Sep — EarnZer Perm Sep

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Panel D: Fraction of Workers with Positive Earnings

Work Perm 1st Sep — Work First Sep — Work Perm Sep

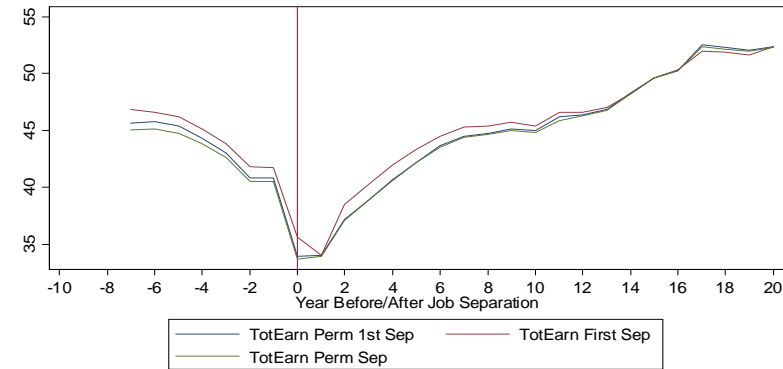Source: 1% Files of Social Security administrative data (see text).

Source: 1% Files of Social Security administrative data (see text).

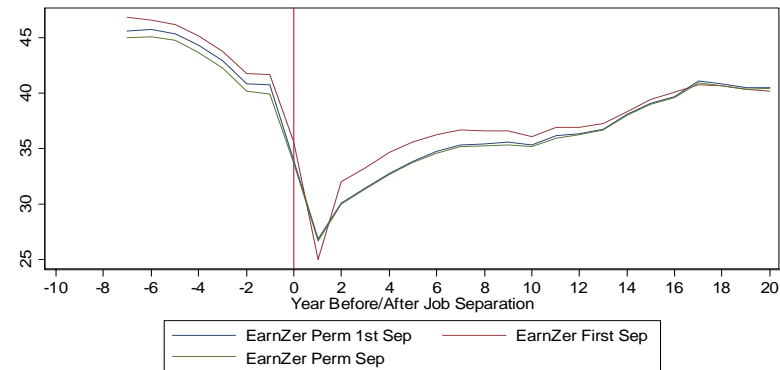# Appendix Figure 2: Alternative Measures of Job Separation, Three Years of Pre-Separation Job Tenure
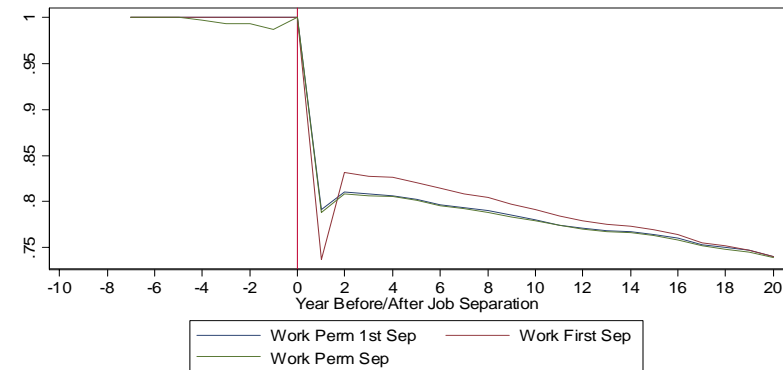
Panel A: Average Positive Earnings at Main Job (in $1000)

Panel B: Average Positive Earnings at All Jobs (in $1000)

Panel C: Average Earnings at All Jobs Including Zero Earnings (in $1000)

Panel D: Fraction of Workers with Positive Earnings

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Source: 1% Files of Social Security administrative data (see text). Earnings in 2000 Dollars.

Source: 1% Files of Social Security administrative data (see text).

Source: 1% Files of Social Security administrative data (see text).