DOCUMENT RESUME

ED 326 679 CE 056 496

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TITLE Job Displacement and Labor Market Mobility. Final Report.
INSTITUTION Massachusetts Univ., Amherst. Dept. of Economics.
SPONS AGENCY Employment and Training Administration (DOL), Washington, D.C.
PUB DATE Feb 90
CONTRACT DOL-998-3481-75-085-01
NOTE 62p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Adults; *Career Change; *Dislocated Workers; *Employment Patterns; Family Mobility; Job Layoff; Labor Force; Labor Market; *Occupational Mobility; *Reentry Workers; *Relocation; Semiskilled Workers; Skilled Workers; Wages

ABSTRACT

A study examined the labor market mobility of displaced workers, using a new data file that matches the January 1984, 1986, and 1988 Displaced Worker Surveys (DWS) to the March Current Population Surveys in the same years. This large database provides information on displaced workers and their families and permits comparison of the geographic migration rates of displaced and nondisplaced workers. Findings are reported in terms of industrial, occupational, and geographic mobility. Major findings included the following: (1) about one-half of displaced workers change industry and occupation following displacement, with most workers who change changing both; (2) reemployment earnings as a percent of predisplacement earnings are substantially lower for workers reemployed in new industries or occupations; (3) skilled craft workers and semiskilled operators have a stronger attachment to industry and occupation than do less skilled laborers; (4) increased job tenure and higher wages on the prior job discourage mobility; (5) male displaced workers have significantly higher rates of geographic mobility than do similar nondisplaced workers; (6) family variables, such as whether a male worker's wife was also displaced, play an important role in family migration decisions; and (7) although the reemployment rate for some displaced workers who move tends to be higher in the short run than for those who do not, there are no significant long-term differences in reemployment rate. (38 references) (KC)

Job Displacement and Labor Market Mobility

Final Report to the U.S. Department of Labor,
Employment and Training Administration

February 1990

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This report was prepared for the Employment and Training Administration of the U.S. Department of Labor under contract # 998-3481-75-085-01. Views or conclusions contained herein should not be interpreted as reflecting the official opinion of the sponsoring agency.

Executive Summary

In this report the authors examine the labor market mobility of displaced workers using a new datafile which matches the January 1984, 1986, and 1988 Displaced Worker Surveys (DWS) to the March Current Population Surveys in the same years. This large database provides information on displaced workers and their families. It also allows the authors to compare the geographic migration rates of displaced and nondisplaced workers.

The first section of the report focuses primarily on industrial and occupational mobility. The major findings are:

-- A large fraction of displaced workers change industry and occupation following displacement. While the DWS data tend to overstate the rate of change, we estimate that approximately one-half of displaced workers ultimately change industry or occupation.

-- There is a strong positive association between industry and occupation change. Workers who change one usually change the other as well. There is a positive but much weaker association between industry and occupation change and geographic mobility. Movers are somewhat more likely to change industry or occupation than stayers.

-- Reemployment earnings as a percent of pre-displacement earnings are substantially lower for workers reemployed in new industries or occupations. Simple correlations between earnings losses and mobility, however, do not provide reliable estimates of the economic returns to mobility since mobility choices are endogenous to the post-displacement adjustment process. It may be the case that workers with the greatest adjustment difficulties, and hence the largest potential private losses, are more likely to change industry and

occupation. In such a case, job change is not a cause of earnings loss but an effect.

-- In order to measure the true effect of mobility on earnings we estimated simultaneous models of mobility, reemployment, and post-displacement earnings for prime-age blue-collar males.

-- Multivariate estimates indicate that skilled craft workers and semi-skilled operatives have a stronger attachment to industry and occupation than do less skilled laborers. Increased job tenure and higher wages on the prior job also discourage mobility. All of these characteristics may reflect greater investments in job skills specific to the prior industry and occupation. Workers displaced by total plant shutdowns are significantly more likely to return to their prior industry and occupation than workers displaced by partial layoffs. By contrast, workers receiving advance notice are significantly more likely to change both industry and occupation. Since neither form of mobility rises with years since displacement. this suggests that some displaced workers accept stop-gap jobs in new industries or occupations, but ultimately return to their prior industry or occupation.

-- Overall, the observable determinants of industrial mobility are very similar to those for occupational mobility. The large and significant positive correlation between their error terms indicates that unobservable determinants are also similar. Thus, these two forms of mobility are typically complements, rather than substitutes, in workers' post-displacement adjustment strategies.

-- Estimates of the labor market returns to mobility were generated from

reemployment wage regressions. Industry and occupation change dummies have large and negative coefficients in simple OLS specifications, indicating negative returns. These estimates may, however, be contaminated by simultaneity bias. Econometric tests for the exogeneity of the mobility variables were performed and the null hypothesis (of exogeneity) was easily rejected.

-- Attempts to treat industry and occupational mobility as endogenous variables yielded perplexing results. The resulting estimators show even larger losses form industry and occupation change as compared to simple OLS estimates. Such findings are difficult to reconcile with econometric models of rational mobility behavior in competitive labor markets.

The third section of the report examines the geographic mobility of displaced workers. The principal findings are:

-- Male displaced workers are have significantly higher rates of geographic mobility than do similar nondisplaced workers. Moreover, the higher mobility is due to job loss and not unmeasured differences between displaced and nondisplaced workers. For female workers the difference in migration rates is not statistically significant.

-- In order to further identify the causes and consequences of migration, an econometric model of migration and reemployment is estimated for prime-age male workers. These multivariate estimates show that family variables, such as whether a male worker's wife was also displaced, play an important role in the family migration decision.

-- While the reemployment rate for some displaced movers tends to be higher than for displaced non-movers in the short run, there are no significant long run differences in reemployment rates.

1. Introduction

In a competitive economy undergoing continual change, worker mobility is an important mechanism for labor market adjustment. Recent research, however, shows that at least some measures of labor mobility have recently declined in the United States. This apparent trend has led several researchers to suggest that low or diminished industrial, occupational, or geographic mobility contributed to the secular rise in the unemployment rate in the 1970s and early 1980s (Murphy and Topel, 1987; Summers, 1986; Zornitsky, et.al., 1986). Concern with declining labor market "flexibility" is, if anything, even more evident in Western Europe (OECD, 1986, Ch.2; Holmlund, 1984).

In this report we examine the relationship between industrial and occupational mobility, reemployment, and earnings for workers displaced from jobs due to plant shutdowns or whose jobs are otherwise eliminated. The issue of job (i.e., industrial or occupational) mobility may be particularly acute for displaced workers, since many of them appear to become structurally unemployed (Podgursky and Swaim, 1987a). If the shifts in labor demand that cause displacement also result in local labor markets with a limited capacity to reabsorb these workers in their accustomed line of work and if many displaced workers are slow to relocate or switch industry or occupation, then chronic underemployment frequently will be the outcome. These concerns provide the rationale for adjustment assistance programs that emphasize reducing the barriers to mobility through relocation assistance and retraining (Bakke, 1963; Rehn, 1985).

Several studies that use the 1984 Displaced Worker Survey (DWS) report that displaced workers who migrate, or change industry or occupation generally do worse than their less mobile counterparts. For example, Podgursky and Swaim

(1987b) report that workers moving, or changing industry or occupation generally experience larger earnings losses once reemployed, while Addison and Portugal (1987) report more unemployment for movers. None of these studies, however, provides reliable measures of the labor market returns to mobility for displaced workers, because none treats mobility as an endogenous variable. For many displaced workers, mobility may be more a response to than a cause of large wage losses or long-duration unemployment.

Thus, a number of important questions regarding displacement and mobility remain unanswered. Most fundamentally, do market incentives result in enough and the right sort of mobility? At the present time this question can not be answered because reliable estimates of the economic return to mobility are lacking. Although displaced workers are frequently perceived as being too immobile, we do not even know if mobility pays off for those who choose to relocate or make a career transition.[1] Since good measures of these returns are not available, the responsiveness of displaced workers to economic incentives for mobility also awaits careful empirical analysis.

This report describes our attempt to use the Displaced Worker Surveys to examine worker mobility following displacement. The analysis which follows is divided into two sections. This introduction constitutes Section 1. Section 2 examines industrial and occupational mobility using the matched database we have constructed from the January 1984, 1986, and 1988 DWS and the March Current Population Surveys (CPS) in the same years. Section 2.1 describes this datafile and presents descriptive tabulations. Section 2.2 presents a simultaneous model of mobility and earnings following displacement and discusses econometric strategies for estimating the parameters of such a model. Section 2.3 provides estimates for simplified models of job mobility,

reemployment, and reemployment earnings for prime age, blue-collar males. A summary section 2.4 provides concluding remarks.

Geographic migration behavior of displaced and nondisplaced workers is taken up in Section 3. Section 3.1 provides a brief literature review. Section 3.2 describes the matched datafile used in the analysis. Section 3.3 lays out a simple econometric model of migration and employment based on job search theory. Section 3.4 discusses estimates of the model and Section 3.5 provides summary comments.

2. Industrial and Occupational Mobility

2.1 Data and Descriptive Analysis

This section uses a database constructed by matching the January 1984, 1986, and 1988 Displaced Worker Surveys (DWS) to special versions of the March 1984, 1986 and 1988 Current Population Survey (CPS). The DWS are retrospective five-year surveys on job displacement that supplement the January CPS in these three years. Respondents aged 20 and older in the CPS sample were asked whether they or a member of their household "lost or left a job since ... [1979 or 1981 or 1983] ... because of a plant closing, an employer going out of business, a layoff from which [the worker] was not recalled or other similar reasons." An affirmative response triggered a series of 19 questions regarding the previous job and post-displacement experience. These datafiles are extensively described in Flaim and Sehgal (1985) and Horvath (1987).

The March 1984, 1986, and 1988 Current Population Surveys include the Annual Demographic and Work Experience Supplements, which provide extensive information on the income and work experience of family and household members over the previous year. This file also includes information on the location of each worker one year and five years earlier.[2] From this datafile we draw a subsample of workers aged 20-61 who were displaced from full-time nonagricultural wage and salary jobs. For purposes of comparison we also extracted a sample of nondisplaced adults who held full-time jobs in the relevant five-year period.

Table 1 shows that post-displacement industrial and occupational mobility rates are very high, ranging between 68 and 82 percent. Since we limit our sample to prime age workers, many of whom have considerable occupational and

industrial tenure, this degree of job mobility is perhaps surprising. At a minimum, it suggests that displaced workers should not viewed as generally unable or unwilling to adapt to shifts in the occupational and industrial composition of labor demand.

(Table 1)

Three caveats are, however, potentially important. First, these rates are for reemployed workers only. Although it would be valuable to know if workers not yet reemployed when surveyed are confining their job search to their prior industry and occupation or searching more broadly, we lack reliable data for this group and confine our descriptive analysis of industrial and occupational mobility to the reemployed subsample. Even though we restricted the sample in Table 1 to prime age workers losing full time jobs just 75 percent of the men and 62 percent of the women were (re)employed at the time of the survey. Industrial and occupational mobility data is thus unavailable for between 25 and 38 percent of our sample of workers displaced between 1979 and 1986.[3]

A second caveat is that some of the changes in industry and occupation indicated in Table 1 may be trivial or spurious, since they rely on changes in the 3-digit Census codes reported in the CPS.[4] As a check, we calculated mobility rates for 11 broad industry sectors and 11 broad occupations (Table 2). Not surprisingly, the resulting industrial and particularly occupational mobility rates are lower. Still, 47 percent of the men and 56 percent of the women had moved between two of the broad occupational categories. The corresponding mobility rates for broad industrial sectors were 62 and 64 percent.

(Table 2)

A third caveat is that unusually high rates of industrial and occupation mobility may have characterized the early 1980s. Many of the workers displaced in the 1981-2 recession lost production jobs in declining sectors of manufacturing hence may have had little choice but to shift to a new type of work. Table 2 provides some support for this hypothesis, since mobility rates for the recovery period 1983-1987 (from the 1988 DWS) tend to be lower than those for the two earlier periods. In particular, occupational change rates for women fell by nearly 10 percentage points.

Table 3 compares the rates of industrial and occupational mobility for displaced workers with those for a comparison group of nondisplaced. The March CPS records industry and occupation for the longest job held in the previous calendar year. Since industry and occupation is also recorded for the current job in both the January and March surveys, it is possible to compare short-term job mobility rates for these two groups. These comparisons also provide some indication of the extent of measurement error.

(Table 3)

The displaced samples exhibit greater job mobility than do the comparison groups. For example, 28 percent of the men displaced more than a year before the January survey, who worked both in the year immediately prior to the survey and when interviewed, reported moving to a new three-digit industry.[5] The corresponding rate for the nondisplaced was a lower, but still high 23 percent. However, much of this --previous year to January-- mobility is spurious.

The previous year to March transitions reported in the lower panel of Table 3 are much less inflated by misreporting. This is because the information on industry and occupation for the previous year job and the March job is gathered in the same survey and respondents are explicitly asked whether

the two jobs are the same. Comparing rates for January and March suggests misreporting rates in the prior year to January comparisons that vary between 13 and 18 percentage points for 3-digit industry and a higher 27-32 percentage points for 3-digit occupations.[6] These previous year to March mobility rates, however, confirm that displaced workers --even once reemployed-- change industry and occupation more than other workers.

In sum, the evidence suggests that the DWS data does overstate job mobility following displacement, but that approximately one-half of displaced workers become reemployed in a new industry or occupation (or frequently both). Further, displacement seems to result in a period of employment instability in the sense that even once reemployed the displaced are more likely to make delayed (or further) changes.[7]

Table 4 presents data on geographic migration and job mobility for our sample of prime-age displaced workers. This tabulation draws upon the DWS data regarding whether the worker made an employment-related move to a new city or county following displacement. Here we find that for both men and women, job mobility and geographic mobility are complements: geographically mobile workers are more likely to change industry and occupation, although the difference is not large. The causes and consequences of geographic mobility will be considered in more detail in Section 3 below.

(Table 4)

Table 5 presents data on earnings loss by mobility status, which show that the private costs of displacement are substantially higher for workers reemployed in new industries or occupations. For example, 36.2 percent of the men reemployed in a new industry experience no earnings loss compared to 43.0 percent of those returning to the same industry. At the other extreme, the

shares suffering earnings losses in excess of 25 percent were 36.7 and 18.6 percent, respectively, and industry changers are more than twice as likely as stayers to report weekly earnings less than half that of the old job. A summary measure of the increase in earnings losses is provided by comparing median losses, which are 12.3 percent for men employed in a new industry versus 3.7 percent for men returning to the same industry. Similar comparisons hold for women and occupational mobility.[8]

(Table 5)

Job mobility is also associated with an increase in the dispersion of wage losses. For example, the variance of the natural log of the ratio of reemployment earnings to (trend adjusted) prior earnings is 44 percent higher for men reemployed in a different industry than for those returning to the same industry. This increase in dispersion is attributable to the greater probability of large earnings losses for industry and occupation changers. It is striking, however, that large earnings gains are approximately as frequent for this group as for workers returning to the same industry and occupation. Selection into job mobility may thus favor both those workers best and those least able to adjust to displacement (i.e., selection may be from "both tails" of the distribution of losses from displacement).

As was stated in the introduction, simple correlations between earnings losses and mobility do not provide reliable estimates of the economic returns to mobility. Since mobility choices are endogenous to the post-displacement adjustment process, they may be symptoms -- as well as causes -- of earnings losses. In order to measure the effect of mobility on earnings we now turn to simultaneous models of mobility, reemployment, and post-displacement earnings.

These multivariate models also provide an indication of the effect of worker characteristics and labor market conditions on mobility and earnings.

2.2 Econometric Framework

In this section a simultaneous model of reemployment earnings and mobility is described that provides the framework for our empirical analysis. One goal in specifying this model is to examine the determinants of industrial and occupational mobility. A second goal is to estimate the returns to this mobility for displaced workers, while accounting for the fact that movers probably do not constitute a random sample of all displaced workers. A final goal is to estimate the responsiveness of mobility behavior to these returns.

The econometric literature on industrial and occupational mobility is quite limited (Shaw, 1987). However, geographic mobility raises similar issues and has been much more extensively studied (Greenwood, 1975 and 1985). In particular, a number of migration studies have estimated the labor market returns to relocating. It is only recently, however, that attempts have been made to jointly model migration decisions and earnings in recognition of the potential problems of self-selection between movers and stayers. The first of these studies (Nakosteen and Zimmer, 1980 and 1982) concluded that the potential for increased wages is an important determinant of migration, but also showed that the returns realized by migrants are not representative of the returns that could be expected for non-movers if they were to move. This self-selection issue may be especially important for displaced workers, since many of those choosing not to change industry or occupation may correctly perceive that their returns would be unusually low.

An important limitation of the binary selection correction procedure utilized in most of these studies is that only two possibilities are

considered, moving or not moving. Frequently, however, mobility takes several interdependent forms, such as industrial and occupational change. Alternatively, a given form of mobility may warrant a multinomial characterization. For example, a number of occupations could be recognized rather than simply prior occupation and all others.

Lee (1983) has recently developed the theoretical foundation for specifying and estimating more general models of the sort required. He shows that it is possible to generalize the binary sample selection model developed by Heckman (1979) and others to accommodate polychotomous choice models such as those surveyed by McFadden (1975) and Maddala (1983, chapters 2 and 3). Such models recently have been employed by Falaris (1987), who examines migration between 23 Venezuelan states.

Unfortunately, our data on mobility and earnings are not complete enough to allow full implementation of this framework. We thus begin by describing an ideal application of the Lee approach to our problem. We then discuss how the incomplete observability of both mobility choices and earnings in the matched CPS data-file complicates estimation. Finally, we describe several ways in which this framework can be simplified to yield tractable estimators for our data set.

2.2.1 Full Information Structural Estimation

We begin by specifying the earnings function for the i-th displaced worker in the j-th labor market, where $j = 1, 2, \ldots, M$ are the possible combinations of mobility choices. Thus, $j = 1$ might correspond to searching for a new job in the same industry and occupation as on the old job, while higher values of j would correspond to decisions to search in other industries

or occupational markets. Denoting the natural logarithm of post-displacement earnings by W_{ij} and linearizing for the purpose of estimation:

$$W_{ij} = \gamma_j Z_{ij} + \epsilon_{ij} \quad (1)$$

where Z is a vector of exogenous determinants of earnings such as productivity related individual characteristics (age, education) and labor market conditions (unemployment rate, industry or occupation specific employment growth). The ϵ_{ij} error terms are assumed i.i.d. mean zero normal. The selectivity bias issue relates to the fact that W_{ij} is only observed in the labor market that has been chosen by worker i and that workers' mobility choices are likely to be correlated with ϵe_{ij}

Workers are assumed to pick the labor market expected to produce the highest level of utility. The linearized stochastic indirect utility function for worker i in labor market j can be represented by:

$$V_{ij} = \alpha_j W_{ij} + \beta_j X_{ij} + \mu_{ij} \quad (2)$$

where α_j measures the responsiveness of mobility decisions to variations in the level of earnings and X_{ij} is a vector of exogenous individual and labor market (e.g., industrial and occupational) characteristics that capture nonpecuniary determinants of the propensity to change industry or occupations. For example education would be included since more educated workers may be less occupationally mobile than less educated workers (Borsch-Supan, 1987). The error term (μ_{ij}) is assumed mean zero i.i.d. and reflects unmeasured differences in individual preferences and labor market characteristics, and worker misperceptions concerning their level of utility in the various labor markets.

Before estimating this model of reemployment earnings and mobility the probability distribution that μ_{ij} follows must be specified. Several

distributions have been used in the discrete choice literature, but the approach can be illustrated by assuming that these error terms are type I extreme value distributed. Since workers' mobility choices are utility maximizing, labor market s is chosen if and only if $V_s = \max (V_j)$ for $j = 1,2,..,M$. It can be shown that this selection process generates a conditional logit model and that the probability that the s-th labor market will be chosen by the i-th worker is:

$$P_{is} = \frac{\exp (\alpha W_{is} + \beta_s X_{is})}{\sum_{j=1}^{M} \exp (\alpha W_{ij} + \beta_j X_{ij})} \qquad (3)$$

Expected earnings in labor market s, given that s was chosen by the worker, is:

$$E (W_{is}) = \gamma_s Z_{is} + \sigma_s \rho_s \left(\frac{-\phi (\Phi^{-1} (P_s))}{P_s} \right) \qquad (4)$$

where Φ^{-1} is the inverse standard normal distribution function, ϕ is the standard normal density function, σ^2_s is the variance of ϵ_{is}, and ρ_s is the correlation coefficient between ϵ_{is} and μ^*_{is}, a transformed residual defined from equation (2) as described by Lee (1983, p. 510).

Maximum likelihood estimators of the model described by equations 1-4 will be computationally intractable if more than two or three labor market choices are considered (i.e., M is even moderately large). Fortunately, Lee shows that equations (3) and (4) can be used to derive consistent two-step estimators of the coefficients in the wage equations (1). We now summarized his estimation approach and its extension to produce consistent estimates of the coefficients of the structural mobility choice equations (2).

The first step in the estimation procedure is to obtain consistent estimates of the mobility choice probabilities, P_s. Maximum likelihood estimators of the

conditional logit model defined by equations 2 and 3 could be calculated but for the fact that W_{ij} is not observed for $j \neq s$. A reduced form of equation 2 can, however, be estimated by maximum likelihood. The results of this step are of direct interest, since they indicate the ultimate determinants of mobility and interrelationships between the different types of mobility.

The second step in the estimation procedure is to use the results of the first step to obtain consistent estimates of the coefficients of the wage equations (γ_j) and the selection term ($\sigma_s \rho_s$). The step 1 conditional logit coefficients can be used to calculate consistent estimates of P_s, hence, the composite selection term in equation 4. OLS regressions of W_{is} on Z_{is} and this selection term then generates consistent estimators for the coefficients of each wage equation. The asymptotic standard errors of the coefficients can also be consistently estimated. These step 2 estimators can then be used to calculate the rate of return for mobility, both for movers and nonmovers.

A third step can be added to Lee's estimation scheme to obtain estimates the coefficients of the structural mobility model described by equations 2 and 3. The step 2 estimators of γ_j are used to calculated consistent estimates of W_{ij}, which are then be used as regressors in the conditional logit model defined by equations 2 and 3. Maximum likelihood estimators of the earnings coefficient in the indirect utility function, a, would be of especial interest in assessing the responsiveness of displaced workers to economic incentives for mobility.

This estimation strategy can be extended to somewhat more general specifications of the mobility choice model. In particular, if the μ_{ij} are allowed to follow the generalized extreme value distribution then the more general nested logit model emerges (Falaris, 1987). This relaxes, somewhat, the "independence of irrelevant alternatives" property of the basic logit

model. Important patterns of interdependence across mobility choices may, however, still be precluded since it is unclear that occupational and industrial mobility choices fit the hierarchical choice structure imposed by the nested logit specification.

2.2.2 Data Limitations and Semi-Reduced Form Estimation

The estimation scheme just summarized requires more complete information on worker mobility choices and consequent earnings levels then are available in our data file for workers not reemployed when surveyed. First, it was assumed that mobility choices are observed for all workers, whereas we do not have information concerning current industry and occupation for workers who are not reemployed. Of course, we also lack information on current earnings for these workers. Since 25.4 percent of the men and 37.6 percent of the women were not reemployed when surveyed, excluding these workers from the analysis might result in large sample selection biases.

Although the random utility framework of equations (1) and (2) still provides a useful interpretive structure for our empirical analysis, it is neither fully appropriate nor computationally feasible for our data. Formally, the random utility framework can accommodate nonemployment by expanding the choice set to include all possibly mobility and reemployment combinations. It may be inappropriate, however, to treat nonemployment as a utility maximizing choice in the same ex ante sense as the choice of labor market in which to search. One promising approach might be to incorporate competing hazards specifications of post-displacement job search into the random utility framework for selecting the labor market segments in which to concentrate search activities.[9]

In light of these complications, we estimate several simplified models of the relationship between job mobility, reemployment, and earnings. One simplification that we explore is switching regressions models that utilize reduced form selection equations. Fishe, Trost, and Lurie (1981) and Tunali (1986) developed early examples of this class of models and showed that Heckman's (1979) two-step consistent estimators can be extended to estimate ... models with multiple, correlated, and endogenous selection processes.[10]

If mobility only affects the intercept term in the equation (1), then this switching regressions framework collapses to an additive shift, "endogenous treatments" model. In that case, the first step multivariate-probit can be used to construct instruments for the various mobility outcomes which are then used in the second step wage regressions (instead of the selection terms). The coefficients on the mobility instruments then provide estimates of the returns to mobility.

We also estimate a second simplified version of the random utility model described above. In this case we impose the assumption that the mobility choice is optimal, but assume that earnings are the sole determinant of utility levels V_{ij} in equation (2). Maddala (1983, chapter 10) surveys this class of models and provides maximum likelihood estimators. In all of these simplified models, we assume that the error terms are iid, jointly normal distributed.

2.3 Estimates

Table 6 provides definitions for the variables used in our econometric analysis of post-displacement mobility. Sample means are also provided for our estimation sample of prime age men displaced from blue-collar, nonconstruction and nonagricultural, jobs. Tables 7-8 then present estimation results for this sample.

(Table 6)

Maximum likelihood estimates for two bivariate probit models of job mobility and reemployment are reported in columns 1-4 of Table 7. The estimates in the first two columns are for a bivariate probit model of industry change and reemployment (NEWIND and EMP), while columns 3 and 4 report estimates for a bivariate model of occupation change and reemployment (NEWOCC and EMP). Since NEWIND and NEWOCC are only observed for workers who are reemployed, these are estimates of a bivariate probit model with selectivity (i.e., where the likelihood function is modified to accommodate the missing data, as explained by Wynamd and Bernard, 1981). Thus, we implicitly assume that NEWIND and NEWOCC are defined for workers not yet reemployed (i.e., that they have chosen to focus their job search either in their prior labor market sector or elsewhere), even though that choice is not observable in the CPS data set.

(Table 7)

In general, demographic variables such as AGE, ED, and BLACK are not significantly related to job mobility, although the latter two have a strong effect on reemployment. By contrast, several labor market variables have a substantial effect on mobility. For example, skilled craft workers and semi-skilled operatives show a stronger attachment to industry and occupation than do less skilled laborers (the excluded group). These differences likely reflect greater investment in industry and occupation specific human capital by more skilled workers. Increased job tenure, which may also reflect specific skills, initially reduces mobility levels but the effect diminishes with increased tenure and is not statistically significant for occupation changes.

Higher wages on the prior job (OLDWAGE) strongly discourage job mobility. This suggests that wage differences on the prior job reflect either specific skills investments not captured by other variables or good matches of worker skills to industry and occupation skill demands. High prior wages may also reflect nonmarket-clearing rents. Two variables meant to capture such rents (UNION and INDRENT), however, have no effect. Any rents accruing to workers in unionized or "high wage" industries thus appear to be dissipated by the longer periods of unemployment associated with "queuing-up" for these jobs.

The nature of the layoff influences the level of job mobility. Workers displaced by total plant shutdowns are significantly more likely to return to their prior industry and occupation than workers displaced by partial layoffs. If partial layoffs are interpreted by prospective employers as discretionary, hence a signal of poor productivity on the prior job, employers demanding similar skills may avoid hiring those workers (Gibbons and Katz, 1989). By contrast, workers receiving advance notice are significantly more likely to change both industry and occupation.

Interestingly, neither form of mobility rises significantly with years since displacement (YEARS). The latter finding suggests that some displaced workers accept stop-gap jobs in new industries or occupations, but ultimately return to their prior industry, occupation, or even employer (Crosslin, et. al., 1986). This "trickle-back" effect seems largely to offset the general tendency for mobility rates to rise with time. Since the year of survey dummies (DWS86 and DWS88) are not significant, the downward trends in job mobility rates between 1979 and 1987 have apparently been absorbed by other variables.[11] Finally, the industrial and occupational change error terms are not significantly correlated with the reemployment error term (RHO).

Unmeasured factors influencing the probability of returning to the same industry or occupation do not seem to affect reemployment.

Since the reemployment process appears to be largely independent of mobility outcomes, we also report a bivariate probit for NEWIND and NEWOCC which was estimated for the subsample of reemployed workers. The resulting coefficients in columns 5 and 6 are very similar to the corresponding coefficients in columns 1 and 3. With only a couple exceptions, the coefficients for NEWIND and NEWOCC are similar. This means that the observable determinants of industrial mobility are very similar to those for occupational mobility. The large and highly significant estimate for the co relation between the two error terms (RHO) also indicates that the unobservable determinants of these two forms of job mobility are similar. It appears that these two forms of mobility are complements rather than substitutes when workers develop adjustment strategies in response to displacement.

Table 8 reports estimated coefficients from several reemployment wage equations for these (male blue-collar) displaced workers. The dependent variable is the natural log of current earnings. Since the natural log of former earnings is included as a regressor, this is also a model of earnings loss following displacement.

(Table 8)

In each section of the table, specifications 1-4 present alternative simple, additive shift models in which the impact of the various mobility choices is limited to shifting the intercept.[12] Section A of the table summarizes four specifications examining the impact of industry change on earnings, while section B examines occupation change, and section C both industry and occupation change. Although an extensive list of regressors was

included in these regressions, only coefficients directly related to the economic returns to job mobility are reported.

For purposes of comparison, the first specification is simple OLS. The industry and occupation change dummies (NEWIND and NEWOCC) have large and negative coefficients. The significant and negative coefficient for NIXRENT, the interaction term between industry change (NEWIND) and the wage rent in the prior industry (INDRENT), indicates larger losses for workers moving away from high-wage industries.[13] These estimates may, however, be contaminated by simultaneity bias. Hausman-Wu tests for the exogeneity of the mobility variables were thus performed and the null hypothesis (of exogeneity) was decisively rejected.

The second specification in Table 8 reports two-stage least squares estimates which use instruments for the mobility variables that were included in the OLS equation. The NEWIND and NEWOCC instruments (NIFIT and NOFIT) were constructed using the bivariate probit coefficients in columns 1 and 3 of Table 7. One possible source of the endogeneity of NEWIND and NEWOCC is that these mobility outcomes are proxy indicators of above average adjustment difficulties, hence negatively correlated with the earnings equation error term. Instrumenting for these variables should produce consistent and presumably (absolutely) higher estimates of the labor market returns to mobility. Surprisingly, the estimated reduction in earnings from changing industry or occupation dramatically increases.

Consistent with the bivariate probit results, NIFIT and NOFIT are highly collinear. When both or these mobility instruments are included in the model, as in section C, their standard errors become very large.

The two-stage least squares coefficients in specification 2 may, however, be subject to sample-selection bias produced by the reemployment process. Specifications 3 and 4 incorporate Heckman's two-step correction for the potential sample-selection bias associated with nonrandom reemployment into specifications 1 and 2. The estimated selection term for reemployment (1-EMP), however, is small and never statistically significant. Although the standard errors on the mobility variables increase, there is no indication that the selectivity corrected returns to mobility are less negative than the naive OLS coefficients indicate.

It may be, however, that the additive shift model is too restrictive to adequately capture the impact of mobility on earnings. Thus, we estimated separate switching regression models for (1) new versus same industry and (2) new versus same occupation. As was discussed above, two separate approaches were used to model the selection into the mobility classes.

First, we used the reduced form bivariate probits in Table 7 to construct selection correction terms for the joint effect of mobility and reemployment. Unfortunately, the two selection correction terms in each equation turned out to be highly multi-collinear with each other and many other regressors. Hence, the resulting coefficients were both implausible and imprecise, and are not reported here.

Second, we attempted to estimate a switching regressions models assuming that industry (occupation) movers and stayers face different earnings equations and that workers choose to be reemployed in the sector offering the highest weekly earnings. Since our reduced form selection correction results provided no support for the hypothesis that mobility choices are earnings maximizing, it

is not surprising that imposing that condition resulted in an ill-conditioned model that could not be solved.

2.4 Conclusion

Our empirical analysis suggests four tentative conclusions. First, displacement is an important inducement to labor market mobility. Even allowing for substantial measurement error, industrial and occupational mobility rates are high following displacement. Second, a number of labor market characteristics significantly affect post-displacement industrial and occupational mobility. Third, mobility is closely related to the earnings losses associated with displacement. The causation, however, appears to run in both directions, with greater adjustment difficulties inducing mobility as well as mobility affecting earnings capacity. Simultaneous models of mobility and earnings are thus clearly indicated. Fourth, our estimates with simple simultaneous models yield implausible results. This suggests that our empirical specifications did not adequately model the causal mechanisms at work. As a result, the coefficients reported in Table 8 (and others not reported) probably do not provide reliable estimates of the labor market returns to post-displacement mobility.

3. Geographic Mobility of Displaced and Nondisplaced Workers

3.1 Introduction

In a competitive economy undergoing continual change, geographic labor mobility is an important mechanism for labor market adjustment. In this section we examine the relationship between geographic migration and displacement. In contrast to the analysis in Section 2, our matched datafile allows us to construct a comparison group of nondisplaced workers and explicitly compare migration rates for the two groups.

3.2 Literature Review

The econometric literature on geographic mobility is very large indeed (Greenwood, 1975 and 1985). More recently, a number of studies have examined the labor market experience of displaced workers (Hamermesh, 1988). The overlap between the two literatures, however, is very small.

Since most displaced workers experience a spell of unemployment or joblessness following displacement, one relevant strand of the migration literature concerns the behavior of unemployed workers. Several studies have shown that, as regards migration, the unemployed are different. DeVanzo (1978) and later Schottman and Herzog (1985) have shown that unemployed workers are more likely to migrate, and are more responsive to local labor market conditions than are employed workers. DeVanzo, in particular, shows that unemployed workers are more sensitive to unemployment rates in both the original and destination labor markets as compared to employed workers. More recently, Goss and Schoening (1984) include unemployment duration as well as an unemployment dummy variable as regressors in a simple logit migration model and find that unemployed workers with long spells are generally less likely to move. They argue that this finding helps explain low rates of out-migration

observed in communities with persistently high rates of unemployment. This research suggests that displacement will serve as a spur to migration for some workers, but may also produce a pool of structurally unemployed who are (or become) highly immobile.

3.3 Geographic Mobility Rates of Displaced and Nondisplaced Workers

In order to examine the migration behavior of displaced workers we constructed a new database by matching the January 1984, 1986 and 1988 Displaced Worker Surveys (DWS) to special versions of the March 1984, 1986 and 1988 Current Population Survey (CPS). The March 1984, 1986 and 1988 CPS include the Annual Demographic and Work Experience Supplements, which provide extensive information on the income and work experience of family and household members over the previous year. This file also includes information on the location of each worker one year and five years earlier.[14] Note that the five-year retrospective mobility information in these March surveys matches the time-frame on the retrospective displacement information in the January surveys. From this datafile we draw a subsample of prime-age workers 25-54 who were displaced from full-time nonagricultural wage and salary jobs. For purposes of comparison we also extracted a comparable random subsample of nondisplaced adults who held full-time nonagricultural jobs in the relevant five-year period.[15]

Table 9 reports one and five-year migration rates for displaced and nondisplaced wage and salary workers from the matched January-March 1984,86 and 88 CPS. The geographic mobility rates for displaced men and women are substantially higher than for non-displaced workers. The association between job displacement and migration shows up for both interstate moves and

intercounty moves (both within and between states) and is similar in magnitude for men and women.

(Table 9)

It is interesting to compare the mobility rates in Table 9 based on the March questionnaire with the information on employment-related moves to a new city or county following for displacement in the January DWS. The first row of Table 10 shows that the migration rates implied by the DWS definition of geographic mobility are on the order of the Table 9 rates for men, but are lower for women.[16] The generally lower rate of (own) employment-related moves for women, as compared to moves for all reasons in Table 10, likely reflects the "tied" nature of much female migration (Mincer, 1978).

(Table 10)

3.4 Econometric Model

Following recent economic research on migration, we assume that migration decisions are undertaken so as to maximize discounted family utility (Sandell, 1977, Mincer, 1978). A family decides to migrate to a new location when expected discounted utility in the destination location exceeds that in the location of origin. Family utility is a function of the leisure time of family members and total family income (net of any relocation costs). We will assume that variation in (net) family income between locations is primarily a function of labor market opportunities and relocation costs. Let m_i denote the difference in expected family utility in the origin and destination locations. Thus a family moves (M=1) when the latent variable $m_i > 0$.

In this study, the unit of observation (i) will not be a family, but a worker. Nonetheless, we assume that the mobility decision of an individual worker is determined by family utility. Hence, net utility (mi) in equation

(5) below will be a function both of family structure and as well as individual demographic variables all of which are included in the vector X_1 (the i subscript is suppressed):

$$m = \alpha_1 X_1 + \alpha_2 D + v \qquad (5)$$

These family and individual demographic variables are meant capture variation in relocation costs and benefits X_1 also includes a measure of the relative unemployment in the origin labor market. Of particular interest are a set of dummy variables indicating whether the worker and his or her spouse experienced displacement (D). Our expectation is that $\alpha_2 > 0$ since since for many workers expected earnings (and hence utility) in the origin labor market will fall relative to destination labor markets when displacement occurs. Presumably, this effect will be strongest for displaced workers in local labor markets with limited employment opportunities.

Having made the decision to migrate or stay, the worker now engages in job search. The worker's reservation wage (w^*) is determined as

$$w^* = \beta_1 Y_1 + \beta_2 D + \beta_3 M + e_1 \qquad (6)$$

with $V(e_1) = \sigma_1^2$ and offered wages (w)

$$w = \Gamma_1 Y_2 + \Gamma_2 D + \Gamma_3 M + e_2 \qquad (7)$$

with $V(e_2) = \sigma_1^2$

Workers are employed when

$$I = w - w^* = \delta_1 Z + \delta_2 D + \delta_3 M + u > 0 \qquad (8)$$

where Z includes all of the variables in Y_1 and Y_2, and $V(u) = \sigma_1^2 + \sigma_2^2 - 2\sigma_{12}$. We expect $\delta_2 < 0$ since recently displaced workers are more likely to be unemployed and engaged in job search than similar nondisplaced workers. We also expect the effect of displacement to diminish over time. While the coefficient on D in equations (5) and (8) can be signed relatively

unambiguously, this is not the case for the mobility dummy M in equation (8), since $\delta_3 = \Gamma_3 - \beta_3$. Presumably workers move to secure better wage offers, hence $\Gamma_3 > 0$. If workers with high reservation wages tend to be more mobile (or if mobility leads workers to raise their reservation wage), $\beta_3 > 0$. This makes the sign of δ_3 a priori indeterminate.

3.5 Estimates

The normalized versions of the coefficients in equations (5) and (8) can be estimated by a two-step procedure (Maddala, 1973, pp. 247-247). Equation (5) is estimated as standard univariate probit model. Estimates of the mobility equation (5) for our sample of prime-age males are presented in Table 12. The dependent variable MOVE1 takes the value one if the worker resided in a new state one year prior to the survey. The variable MOVE5 takes the value one if the worker resided in a different location five years earlier. We focus first on the one-year mobility estimates in columns (1) and (2). The estimates in column (1) include an individual displacement dummy (DISPLACED), while those in (2) interact the displacement dummy with several individual covariates in X_1.

(Tables 11 and 12)

We begin our discussion with the additive estimates in column (1) of Table 12. The demographic variables take their expected signs and are generally consistent with the empirical migration literature. Mobility declines sharply with age (a quadratic age variable was insignificant) and rises with years of completed schooling.

Of more interest for us are the displacement variables at the bottom of the table. There are two displacement variables for individual workers: a dummy (DISPLACED) taking the value one if the worker was displaced from one or

more full-time jobs over the previous five years, and an interaction between the displacement dummy and years since displacement (DISPLACEDxYEARS). If displacement causes mobility, one would expect the mobility-inducement effect of displacement to diminish over time. On the other hand, if displaced workers are simply more mobile workers, we would not expect to find a significant coefficient on DISPLACEDxYEARS. The significant negative sign on this interaction term clearly favors the former interpretation. The point estimate in (1), for example, suggests that by the third year of displacement, the mobility rate for displaced and nondisplaced workers converge.

The mobility equation estimates in column (1) limit the effect of displacement on net utility to a simple additive effect. Column (2) reports the interactions between the displacement dummy and several independent variables (omitted interactions were not statistically significant). The positive age interaction suggests that age is less of an impediment to mobility among displaced workers. The significant negative education coefficient indicates that the association between mobility and education is much weaker among displaced as compared to nondisplaced workers. This may reflect the fact that the higher mobility of more educated workers in the nondisplaced population is accounted for in part by intercompany transfers (Bartel, 1979). Better-educated workers whose employment with a company is permanently terminated revert to more localized search much like their less-educated counterparts.

The labor market experience of a male worker's wife also plays an important role in the migration decision. For the combined sample of displaced and non-displaced, 6.0% reported that their wife was displaced from one or more jobs during the previous five years (6.3 % for displaced and 4.9% for

nondisplaced). Displacement of one's wife significantly increases mobility, however, the effect is primarily limited to displaced workers. Not surprisingly, the most mobile families have a displaced husband and wife.

The estimates in columns (4) and (5) are for a five-year mobility model. Before examining these coefficients it is important to bear in mind an important caveat. What we are comparing is the mobility rates of workers displaced at some point over a five year interval, with workers who were not displaced over the same interval. Some of the displaced workers, however, may have moved prior to displacement. This leads to a different expectation regarding the sign of years since displacement. If displacement leads to instantaneous migration, then we would expect the coefficient of DYEARS to be zero. If displacement leads to migration, but with a short lag, we would expect a weak positive effect. In general, then, we now expect a non-negative sign on DYEARS, which is what we do in fact observe.

The estimated probit coefficients show a positive and statistically significant effect of displacement on one-year mobility. Unfortunately, raw probit coefficients do not provide much insight into the magnitude of the displacement effect. To better gauge the size of this effect, Table 13 reports fitted one-year migration rates using the estimated probit coefficients from column (2) of Table 12 for an average worker in the sample. Comparing rows 1 and 2 we see that the migration rate of displaced workers is twice that of nondisplaced workers in the first year following displacement, but the gap narrows rapidly with the passage of time. The importance of the labor market experience of the wife is seen in the last row of the table: the migration rate for a displaced husband with a displaced wife is five times that of a nondisplaced worker.

(Table 13)

The estimates of the migration equation (5) above may be used to construct an instrument for migration ($\hat{M}$) which, when entered in a univariate probit for the employment equation (8), yields consistent estimates of δ_1/σ_u - δ_3/σ_u.[17] The first two columns of Table 14 report these estimates for one-year migration. Not surprisingly, the displacement dummy shows a very strong negative effect of displacement on employment, but an effect which tends to dissipate over time. The coefficient on MOVEFIT in column (1) shows no significant effect of mobility on employment for the combined sample of displaced and nondisplaced workers. The estimates in column (2) allow the effect of MOVEFIT to differ for displaced and nondisplaced workers. These estimates show an interesting but puzzling pattern: the first workers to move following displacement have lower reemployment rates than later cohorts. A behavioral interpretation might be that later cohorts learn from the mistakes of earlier ones. A sorting explanation would be that more employable workers are slower to move following displacement.

(Table 14)

The estimates in the last column of Table 14 explore longer-run returns to mobility using five-year mobility data. The displacement dummy remains significant, but not surprisingly, the interaction with years since displacement drops to insignificance. The coefficient on MOVEFIT is also statistically insignificant. When interactions with the displacement variables are added to the model, these too are insignificant. Thus, after a year or more, movers and stayers have the same employment rates, whether or not they are displaced.[18]

3.8 Conclusion

In this section we have examined the geographic mobility of displaced and nondisplaced male workers. Displaced male workers are more mobile, typically in ways predicted by economic theory. Moreover, their higher mobility is clearly related to displacement and is not simply due to unmeasured worker heterogeniety. Displaced workers who move, do in fact tend to have higher reemployment rates in the first year following migration, particulary displaced workers whose job loss was not recent but occured more than a year earlier. These short-term gains dissipate, however, and after a year or more, the employment rates of movers and stayers become statistically indistinguishable. An important factor in the family mobility decision is the employment experience of the wife: male workers with a displaced wife have much higher migration rates.

Table 1

Job Mobility Rates for Prime Age Workers Displaced from Full-Time Jobs, 1979-1987[a]

	Reemployed (%)	Percent of Reemployed Moving to a New: 3 - Digit Industry	3 - Digit Occupation
Men:			
All	74.6	77.2	71.6
White-Collar and Service	80.2	75.9	67.7
Blue-Collar	70.6	78.0	75.2
Women:			
All	62.4	81.3	78.3
White-Collar and Service	68.1	81.7	76.7
Blue-Collar	52.5	81.1	81.5

[a] Data Source: Matched January-March 1984, 1986, and 1988 Current Population Survey data files. Displaced workers are individuals aged 25-54 who were displaced from full-time nonagricultural and nonconstruction jobs in the years 1979-1987.

Table 2.

Alternative Measures and Recent Trends in Post-Displacement Job Mobility[a]

	Percent of Reemployed Moving to a New:			
	3 - Digit Industry	Broad[b] Industry	3 - Digit Occupation	Broad[c] Occupation
Men				
All Three Surveys	77.2	61.5	71.6	47.1
1979-1983	78.3	63.6	73.6	46.6
1981-1985	79.5	64.4	72.2	45.7
1983-1987	73.4	56.4	69.0	49.0
Women				
All Three Surveys	81.3	64.1	78.3	56.2
1979-1983	83.5	69.7	82.3	57.7
1981-1985	83.8	61.4	80.4	63.3
1983-1987	77.1	61.8	72.9	48.4

[a] Workers aged 25-54 displaced from full-time, non-construction, non-agricultural jobs in the years 1979-1987 and reemployed at the date of the surveys.

[b] The eleven broad industry sectors are mining; nondurable manufacturing; durable manufacturing; transportation, communications and utilities; wholesale; retail; finance, insurance and real estate; business services; personal services; professional services; and public administration.

[c] The eleven broad occupations are manager; professional; technical; sales; clerical; service; farmers, foresters, and fishers; craft; operatives; transport operatives; and laborers.

Table 3

Job Mobility of Displaced and Non-displaced Workers in Year Prior to CPS Survey[a]

	Industry Mobility		Occupation Mobility	
	3 - Digit (%)	Broad[b] (%)	3 - Digit (%)	Broad[c] (%)
Previous Year to January Survey				
Men				
Displaced	28.2	17.7	41.5	27.1
Not Displaced	23.1	13.7	37.8	22.2
Women				
Displaced	29.1	20.5	40.3	22.5
Not Displaced	20.3	12.3	35.6	19.4
Previous Year to March Survey				
Men				
Displaced	11.7	9.4	11.6	8.9
Not Displaced	4.9	4.0	5.8	4.0
Women				
Displaced	14.2	11.0	13.6	8.7
Not Displaced	7.4	5.6	7.9	5.6

Table 3 (continued)

[a] Data Source: Matched January-March 1984, 1986, and 1988 Current Population Survey data files. Displaced workers are individuals aged 25-54 who were displaced from full-time jobs between one and five years prior to the survey. Non-displaced workers are individuals aged 25-54 who held full-time jobs during the five years prior to the survey but were not permanently displaced from any of those jobs.

[b] The thirteen broad industry sectors are agriculture, forestry, and fisheries; mining; construction; nondurable manufacturing; durable manufacturing; transportation, communications and utilities; wholesale; retail; finance, insurance and real estate; business services; personal services; professional services; and public administration.

[c] The eleven broad occupations are manager; professional; technical; sales; clerical; service; farmers, foresters, and fishers; craft; operatives; transport operatives; and laborers.

Table 4

Migration and Job Mobility:
Reemployed Displaced Workers[a]

	Move (%)	New Ind. (%)	New Occ. (%)	Move (%)	New Ind. (%)	New Occ. (%)
All	22.5	77.1	71.8	14.5	81.6	78.2
Movers	100.0	80.2	74.0	100.0	84.3	82.1
Stayers	0.0	76.1	71.2	0.0	81.1	77.5
New Industry	23.4	100.0	81.4	15.0	100.0	85.8
Same Industry	19.4	0.0	39.7	12.4	0.0	44.5
New Occupation	23.2	87.3	100.0	15.2	89.5	100.0
Same Occupation	20.7	50.9	0.0	11.9	53.1	0.0

a. Workers aged 25-54 displaced from full-time nonagricultural and nonconstruction jobs between 1979 and 1987. Move indicates an employment-related move to a new city or county following displacement and New Industry (Occupation) indicates reemployment in three-digit Census industry (occupation) different from that of the former job.

Table 5

Job Mobility and Earnings Loss for Reemployed Displaced Workers[a]

	All	Same 3-Digit Industry	New 3-Digit Industry	Same 3-Digit Occupation	New 3-Digit Occupation
Men		(percent distribution)			
More Than 25% Gain	16.8	18.4	16.3	16.3	16.8
0-25% Gain	21.0	24.6	19.9	24.6	19.5
0-25% Loss	29.8	38.4	27.2	38.8	26.1
25-50% Loss	19.3	13.4	21.1	15.7	20.8
More Than 50%	13.2	5.2	15.6	4.3	16.8
Median Loss (%)	8.9	3.7	12.3	4.5	12.1
Dispersion[b]	53.5	39.2	56.6	36.8	58.4
Women		(percent distribution)			
More Than 25% Gain	16.3	16.9	16.7	16.8	16.2
0-25% Gain	20.7	23.6	20.0	25.7	19.3
0-25% Loss	31.1	37.1	29.7	36.3	29.6
25-50% Loss	16.4	15.7	16.6	14.4	17.0
More Than 50% Loss	15.5	6.7	17.6	6.8	18.0
Median Loss (%)	9.2	4.8	9.9	4.7	10.2
Dispersion[b]	54.2	44.4	56.0	40.1	57.1

[a] Workers aged 25-54 displaced from full-time, non-construction, non-agricultural jobs in the years 1979-1987 and reemployed at the date of the surveys. Earnings loss based on a comparison of usual weekly earnings at the date of the survey with usual weekly earnings on the prior job. Prior earnings are adjusted for the trend growth in occupational earnings between the year of displacement and the survey.

[b] Standard deviation of 100 times the natural log of the ratio of current earnings to adjusted former earnings.

Table 6

Variable Definitions and Sample Means

Dependent Variables

WAGE - natural log of weekly earnings at the survey date (5.68)

EMP - reemployed when surveyed (i.e., in January 1984, 1986, or 1988) (.715)

NEWIND - reemployed in a different 3-digit industry (.779)

NEWOCC - reemployed in a different 3-digit occupation (.745)

Independent Variables

AGE - worker age at time of displacement (35.3)

ED - years of schooling completed (11.8)

BLACK - race dummy (1=black) (.010)

MARRIED - (1=married) (.788)

FN18 - number of children under 18 (1.24)

OTHFINC - other family income in year prior to survey (10.1)

OLDWAGE - natural log of full-time weekly earnings on old job (5.93)

EXP - estimated labor market experience (AGE-ED-6) (17.8)

EXPSQ - (EXP squared) / 100 (3.91)

TENURE - years of employment with former employer (5.60)

TENSQ - (TENURE squared) / 100 (.680)

INDRENT - Katz-Summers (1988, Table 1) estimate of wage rents in prior industry (.102)

NIXRENT - Interaction of INDRENT and NEWIND (.079)

UNION - percent of workers in prior 3-digit industry belonging to a union (Kokkelenberg and Sockell, 1985, Table 3) (36.4)

CRAFT, OPER - blue-collar occupational dummies (.409 and .480)

SHUTDWN - displaced due to total plant shutdown (.456)

Table 6. (continued)

ADVNOT - worker received advance notice or expected layoff (.533)

UIELIG - eligible for unemployment insurance (imputed) (.839)

URATED - unemployment rate in prior state in year of displacement (8.44)

URATE - unemployment rate in current state and year (8.30)

METROD - dummy for lived in metropolitan area when displaced (.634)

METRO - dummy for currently live in a metropolitan area (.611)

YEARS - years since displacement (2.33)

DWS86 - dummy for 1986 Displaced Worker Survey (.340)

DWS88 - dummy for 1988 Displaced Worker Survey (.260)

Instrumental Variables

NIFIT - fitted probability for NEWIND=1

NIFXRENT - interaction of NIFIT with INDRENT

NOFIT - fitted probability for NEWOCC=1

λ-EMP - selection term for reemployment

λ-NEWIND - selection term for NEWIND

λ-NEWocc - selection term for NEWOCC

Table 7

Determinants of Job Mobility and Reemployment for Blue-Collar Males: Maximum Likelihood Bivariate Probit Coefficients[a]

(asymptotic standard errors in parenthesis)

	Model 1		Model 2		Model 3	
Variable	NEWIND	EMP	NEWOCC	EMP	NEWIND	NEWOCC
AGE	-.005 (.007)	--	-.012 (.007)	--	-.005 (.007)	-.012* (.007)
ED	.008 (.035)	.082*** (.020)	.014 (.032)	.083*** (.020)	.010 (.025)	.012 (.023)
BLACK	-.159 (.201)	-.396*** (.117)	.140 (.208)	-.396*** (.117)	-.172 (.162)	.145 (.166)
MARRIED	-.282* (.160)	.322*** (.097)	-.171 (.149)	.321*** (.097)	-.271** (.131)	-.171 (.128)
FN18	.063 (.044)	.047 (.033)	-.009 (.042)	-.047 (.033)	.064 (.131)	-.011 (.128)
OTHFINC	.003 (.005)	-.009*** (.003)	.005 (.005)	-.009*** (.003)	.003 (.004)	.006 (.004)
OLDWAGE	-.189* (.108)	.110 (.082)	-.202*** (.073)	.105 (.088)	-.171 (.106)	-.192*** (.062)
EXP	--	-.023 (.020)	--	-.022 (.020)	--	--
EXPSQ	--	.032 (.046)	--	.028 (.046)	--	--
TENURE	-.036* (.021)	.018 (.017)	-.019 (.021)	.018 (.017)	-.037* (.021)	-.020 (.021)
TENSQ	.100 (.091)	-.073 (.074)	.045 (.090)	-.072 (.073)	.100 (.094)	.051 (.093)
INDRENT	.135 (.502)	-.199 (.402)	--	-.200 (.402)	.061 (.460)	--
UNION	.004 (.002)	-.006*** (.002)	.006** (.003)	-.006*** (.002)	.004** (.003)	.006*** (.002)

Table 7 (continued)

	Model 1		Model 2		Model 3	
Variable	NEWIND	EMP	NEWOCC	EMP	NEWIND	NEWOCC
CRAFT	-.419**	.122	-.376**	.121	-.428**	-.377***
	(.181)	(.126)	(.164)	(.126)	(.177)	(.164)
OPER	-.397**	.098	-.318**	.097	-.384**	-.298*
	(.177)	(.122)	(.162)	(.122)	(.176)	(.162)
SHUTDWN	-.200**	.064	-.235***	.065	-.204**	-.242***
	(.090)	(.074)	(.086)	(.074)	(.089)	(.085)
ADVNOT	.410***	.258***	.259**	.259***	.403**	.238***
	(.112)	(.072)	(.105)	(.072)	(.090)	(.084)
UIELIG	.092	.212**	.064	.211**	.070	.041
	(.143)	(.100)	(.134)	(.100)	(.133)	(.124)
URATE	--	-.075***	--	-.075***	--	--
		(.017)		(.017)		
URATEP	-.022	--	.008	--	-.022	.007
	(.022)		(.022)		(.018)	(.017)
METRO	--	-.024	--	-.025	--	--
		(.076)		(.076)		
METROD	.067	--	-.161*	--	.048	-.166*
	(.090)		(.089)		(.091)	(.090)
YEARS	.031	.256***	.095	.256***	.031	.090***
	(.073)	(.026)	(.067)	(.072)	(.032)	(.031)
DWS86	.021	-.087	-.029	-.085	.009	-.035
	(.110)	(.093)	(.105)	(.093)	(.107)	(.103)
DWS88	-.147	.044	-.080	.045	-.145	-.086
	(.126)	(.107)	(.118)	(.107)	(.108)	(.102)
RHO	--	-.003	--	.059	--	.614***
		(.608)		(.569)		(.040)
N	1637	1637	1637	1637	1170	1170

a. Models 1 and 2 are bivariate probits with selectivity (see text). Model 3 is estimated for the reemployed subsample.

*,**,*** Significant at 10%, 5% and 1%, respectively.

Table 8

Alternative Specifications of the Effect of Job Mobility on Post-Displacement Earnings[a]

A. Industrial Mobility:

Specification	Selected Coefficients[b] NEWIND	NIXRENT	NIFIT	NIFXRENT	λ-EMP
1. OLS	-.136***	-1.17***	--	--	--
	(.034)	(.289)			
2. 2SLS	--	--	-.464	-4.30**	--
			(.388)	(1.87)	
3. EMP Selectivity	-.136***	-1.17***	--	--	.026
	(.045)	(.286)			(.208)
4. 2SLS + EMP Selectivity	--	--	-.848	-2.30	.114
			(.606)	(1.46)	(.273)

B. Occupational Mobility:

Specification	Selected Coefficients[b] NEWOCC	NOFIT	λ-EMP
1. OLS	-.254***	--	--
	(.034)		
2. 2SLS	--	-1.02***	--
3. EMP Selectivity	-.254***	--	.014
	(.033)		(.639)
4. 2SLS + EMP Selectivity	--	-1.73***	.018
		(.688)	(.639)

C. Industry and Occupational Mobility:

Specification	Selected Coefficients[b] NEWIND	NEWOCC	NIFIT	NOFIT	λ-EMP
1. OLS	-.183***	-.186***	--	--	--
	(.038)	(.037)			
2. 2SLS	--	--	-1.12	1.69	--
			(1.48)	3.58)	
3. EMP Selectivity	-.183***	-.186***	--	--	.035
	(.037)	(.036)			(.207)
4. 2SLS + EMP Selectivity	--	--	-.877	-1.72**	.140
			(1.55)	(.703)	(.707)

[a] Blue-collar men displaced from full-time, nonconstruction, nonagricultural jobs between 1979 and 1987.

[b] Additional regressors were ED, BLACK, MARRIED, OLDWAGE, EXP, EXPSQ, TENURE, TENSQ, INDRENT, UNION, CRAFT, OPER, SHUTDWN, ADVNOT, UIELIG, URATE, METRO, YEARS, DWS86, DWS88.

*,**,*** Significant at 10%, 5% and 1%, respectively.

Table 9

Geographic Mobility of Displaced and Non-displaced Workers[a]

	One-Year Mobility			Five-Year Mobility		
	(1) Same State New County (%)	(2) New State (%)	(1)+(2)	(1) Same State New County (%)	(2) New State (%)	(1)+(2)
Jan.-March 198 DWS						
Men						
Displaced	4.4	4.2	8.6	12.6	12.2	24.8
Not Displaced	4.0	1.9	5.9	10.4	11.1	21.5
Women						
Displaced	2.4	3.5	5.9	12.5	10.7	23.2
Not Displaced	2.6	2.0	4.6	9.5	9.3	18.8
Jan.-March 1986 DWS						
Men						
Displaced	5.1	2.8	7.9	11.5	11.2	22.7
Not Displaced	4.5	2.3	6.8	10.4	9.1	19.5
Women						
Displaced	3.8	1.4	5.2	13.7	8.3	22.0
Not Displaced	3.4	3.1	6.5	9.5	9.8	19.3
Jan.-March 1988 CPS						
Men						
Displaced	4.8	3.1	7.9	--	--	--
Not Displaced	3.4	2.6	7.0	--	--	--
Women						
Displaced	5.7	2.8	8.5	--	--	--
Not Displaced	3.4	2.5	5.9	--	--	--

Table 9 (cont.)

* Data Source: Matched January-March 1984 and January-March 1986 Current Population Survey data files. Displaced workers are individuals aged 20-61 who were displaced from full-time nonagricultural jobs in the five years prior to the survey. Non-displaced workers are individuals aged 25-54 who held full-time jobs during the five years prior to the survey but were not permanently displaced from any of those jobs. Five year mobility data was not available in the March 1988 CPS.

Table 10

Trends in Mobility for Displaced Workers[a]
(Percentage Rates)

	1979-82	1981-84	1983-86
Total	21.0	21.9	24.4
Male	23.3	25.3	27.0
Female	16.0	15.1	19.7

[a] Workers aged 25-54 displaced from full-time nonagricultural jobs who made a job-related move to a new city or county as a percent of total.

Table 11

Variable Definitions

MOVE1	1-moved to a new state in the last year
MOVE5	1-worker's state of residence five years ago differed from his or her current residence.
EMP	Employed on survey date
AGE	Age on survey date
EDUCATION	Years of schooling completed
BLACK	1-black
MARRIED	1-married
#CHILD<18	Number of own children under 18
RUNEMPLYMT T-1	Unemployment rate in origin state one year ago/US unemployment rate
RUNEMPLYMT T-5	Unemployment rate in origin state five years ago/US unemployment rate
UNEMPLYMT T-1	Unemployment rate in current state at time of survey
OTHFAMINC (/10000)	Family income other than that of the worker
MOVEFIT	Mobility Instrument (see text)
DISPWIFE	1-spouse displaced from one or more jobs in last five years
DISPLACED	1-worker displaced from one or more jobs in the last five years
DISPLACED x YEARS	Years since displaced (not displaced-0)

Table 12

Estimated Mobility Coefficients:
Prime-Age Males (25-54)

dependent variable =	(1) MOVE1	(2) MOVE1	(4) X	(5) MOVE5	MOVE5	X
CONSTANT	-2.047**	-2.192**	--	-1.528**	-1.318**	--
	(7.88)	(-6.06)		(-7.09)	(-4.53)	
AGE	-.019**	-.028**	36.6	-.015**	-.026**	36.3
	(4.46)	(-4.27)		(-4.15)	(-5.22)	
EDUCATION	.062**	.096**	12.9	.074**	.087**	12.8
	(4.95)	(5.08)		(7.48)	(6.05)	
BLACK	-.175	-.173	.090	-.120	-.114	.090
	(-1.41)	(-1.39)		(-1.27)	(-1.20)	
MARRIED	-.096	-.100	.741	.004	.007	.750
	(-1.22)	(-1.26)		(.06)	(.11)	
#CHILD<18	-.026	-.023	1.10	-.013	-.014	1.13
	(-.86)	(-.77)		(-.67)	(-.65)	
RUNEMPLYMT T-1	.104	.092	1.01	--	--	--
	(.91)	(.80)				
RUNEMPLYMT T-5	--	--	--	-.120	-.127	.996
				(-1.10)	(-1.17)	
DISPWIFE	.257*	-.271	.060	.137	.195	.060
	(2.18)	(-.89)		(1.35)	(1.11)	

Table 12 (Cont.)

dependent variable =	(1) MOVE1	(2) MOVE1	(3) X	(4) MOVE5	(5) MOVE5	(6) X
DISPLACED	.384**	.715	.540	.141*	-.196	.558
	(4.47)	(1.57)		(1.93)	(-.54)	
DISPLACED x YEARS	-.125**	-.124**	1.21	.023	.005	1.23
	(-4.14)	(-4.13)		(.10)	(.22)	
DISPLACED x AGE	--	.015	19.4	--	.020**	19.9
		(1.76)			(3.01)	
DISPLACED x ED	--	-.064*	6.8	--	-.026	7.0
		(-2.53)			(-1.33)	
DISPLACED x DISPWIFE		.671**	.040	--	-.107	--
		(2.04)			(-.50)	
Sample Size	6400	6400	6400	3670	3670	3670

Table 13

One-Year Mobility Rates:
Prime-Age Males[a]

	Years Since Displacement		
	.5	1.5	2.5
Nondisplaced	2.3 %	2.3 %	2.3 %
Displaced Husband	5.2	4.0	3.1
Displaced Husband and Wife	11.1	8.9	7.1

a. Probability that a worker moves to a new state. Computed for an average worker in the sample using the estimated coefficients in Col. (2) Table 11.

Table 14

Estimated Reemployment Coefficients:
Displaced and Nondisplaced Prime-Age Males

	(1)	(2)	(3)
DISPLACED	-1.062**	-1.047**	-.483**
	(-13.37)	(-9.68)	(2.85)
DISPLACED x YEARS	.247**	.158**	.055
	(9.63)	(4.77)	(- 1.38)
MOVEFIT	.192	.061	-.930
	(.09)	(.02)	(- .70)
DISPLACED x MOVEFIT	--	-2.449	--
		(-.88)	
DISPLACED x YEARS x MOVEFIT	--	4.350**	--
		(4.16)	
Sample Size	6400	6400	3670

a. Dependent variable= employed at survey date. Independent variables not shown: AGE, EDUCATION, BLACK, MARRIED, #CHILD<18, UNEMPLYMT T-1, OTHFINC. The migration instrument MOVEFIT refers to one-year migration in columns (1) and (2). In column (3) MOVEFIT is an instrument for migration 2-5 years prior to the survey date. Hence, the column (1) and (2) estimates measure short-run differences in employment, while those in column (3) measure long-run differences.

Notes

1. A recent study of the contraction of manufacturing employment in Pittsburgh (Jacobson, 1987) calls into question the notion that mobility should be viewed as the necessary cure for displacement. Many of the blue-collar workers displaced from manufacturing jobs in recent years have been successfully reemployed in manufacturing, which --despite the rapid decrease in total sectoral employment-- generated 16 percent of the job vacancies in Pittsburgh between 1977 and 1982. Similarly, Crosslin, et. al. (1986) show that many workers displaced from declining industrial sectors in three states ultimately returned to their former employers. Finally, Podgursky and Swaim (1986) present national data that reveal a strong tendency for blue-collar workers displaced from manufacturing to become reemployed in manufacturing.

2. The five-year retrospective data on residence is not available in the March 1988 CPS, since the question was dropped from the survey questionnaire.

3. Restricting the sample to workers displaced at least one year prior to the survey increases reemployment rates by 7-8 percentage points, but has very little effect on job mobility rates for the reemployed.

4. Validation studies have shown that the coding of industry and occupation in the CPS is rather inaccurate and often varies from month to month for individuals who have not changed jobs (Mellow and Sider, 1983).

5. Note that this mobility rate does not measure industry changes between the predisplacement job and a postdisplacement job; both the "previous year" job and the "current" job are post-displacement jobs. Although the impact of displacement on job mobility is likely greatest in the first postdisplacement job, it appears that a rapid sequence of industrial and occupational changes sometimes results.

6. The degree of measurement error in the mobility rates emphasized in this study (i.e., from comparisons of the pre-displacement job with the job held at the time of the January survey) is probably intermediate between those shown in Table 3. The previous year to January rates probably contain the most spurious moves since the information was solicited in two separate interviews. By contrast the pre-displacement to January rates are based on answers given by the same respondent to separate but identical questions during the same (January) interview. Unlike the (most accurate) previous year to March comparisons, however, industry and occupation always have to be reported twice since the January job is never the same as the predisplacement job.

7. Another indication that the occupational mobility of displaced workers far exceeds that of other workers is provided by BLS tabulations from the January 1987 CPS, which contained a special supplement on occupational change. Just 5.3 percent of all workers had voluntarily changed occupations in the previous 12 months (Markey and Parks, 1989, Table 3).

8. Industry and occupation changers are also more prone to long spells of joblessness.

9. Fallick (1989) and Carrington (1989) use DWS data to estimate competing risks models of jobless duration following displacement. They examine the choice between searching in the prior industry versus searching in all other industries, but do not model reemployment earnings along with reemployment and industry mobility.

10. This could be termed a semi-reduced-form approach because the selection model does not impose a utility maximization condition comparable to equation (4). The possible loss of efficiency from not imposing expected utility maximization may be compensated for by computational tractability and the added

flexibility allowed for correlations across the various mobility choices and between mobility and reemployment.

11. We expected that unemployment rates, which trended downward after their peak in 1981-1982, might account for the declining level of industrial and occupational mobility observed in Table 2. However, the state unemployment rate at the time of displacement was never a significant determinant of either industrial or occupational change.

12. In section A, an interaction between industry change and the estimated wage rent in the prior industry is also included (i.e., NIXRENT and NIFXRENT).

13. This pattern is consistent with the hypothesis that INDRENT reflects efficiency wage premiums and not unmeasured differences in individual productivities. However, a compensating wage differentials interpretation would also predict that the premiums would be lost with industry shifts.

14. The five-year retrospective data on residence is not available in the March 1988 CPS, since the question was dropped from the survey.

15. The random subsample of nondisplaced workers was designed to yield approximately the sample number of observations as the (100%) subsample of displaced workers.

16. Since the DWS rates only reflect employment-related moves and refer to the time since displacement (two and one-half years on average), this is something of a surprise. Two factors probably account for these relatively high rates of migration. First, the DWS definition includes intra-county moves to a new city while the migration rates in Table 8 reflect only intercounty moves. Second, many moves to a new area are followed by a return to the prior area (DaVanzo, 1983). Comparisons of residence at two points in time, such as those provided in the March CPS, will not detect intervening moves that are reversed during the

period (i.e., sufficiently prompt return migrants). By contrast, the DWS measure in Table 2 should reflect these temporary moves.

17. The coefficients of equations (5) and (8) will only be identified up a scalar parameter σ_v and σ_u, respectively.

18. Unfortunately, data limitations prevented us from developing reliable estimates of wage equation (7). The matched CPS datafile only provides current and time-of-displacement weekly earnings for displaced workers, but no comparable measure of prior earnings is available for nondisplaced workers. Thus we cannot control for pre-mobility earnings (or estimate a wage-change version of equation (7)) for a comparison group of nondisplaced workers. We experimented with a various migration instruments in an earnings model for displaced workers only. The coefficient of the migration instrument usually took a negative sign, but was generally not statistically significant.

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