THE INDUSTRIAL MOBILITY OF DISPLACED WORKERS

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ABSTRACT

This paper uses a two-industry model of unemployment duration and job search to estimate the rates of transition of displaced workers from unemployment to employment in their previous industry and in another industry. The competing risks structure allows inferences about search strategies to be drawn from data about employment outcomes.

Improvements in their prospects for employment in one industry and at their current jobs induce displaced workers to reduce their search intensity or increase their reservation wages in other industries. The determinants of the rate of reemployment differ between a worker's previous industry and other industries.

I. Introduction

Approximately eleven million workers permanently lost their jobs between 1981 and 1985 in the United States (See Horvath(1987)). Many lost their jobs due to structural changes in the demand for labor, often as part of a general contraction of employment in their industries, which affect their ability to return to jobs similar to those they lost. The ability and willingness of these workers to regain employment following displacement and to move between industries in response to the economic incentives engendered by structural change is a large part of the economy's ability to adjust smoothly to new circumstances. As changes in the market create differences in employment opportunities across industries, we expect displaced workers to adapt by concentrating their efforts to find jobs in industries offering better prospects, even if that means switching industries.

Macroeconomic incentives to change industries are, however, tempered by the long-term attachments which many displaced workers have to their jobs. They may have acquired skills specific to the industry, for example, whose value at their next job is crucial to their economic well-being. They may have established credentials in an industry, or have information which facilitates productive and efficient search for a job there. In sum, a worker's previous industry may offer very different prospects for finding new jobs than other industries. Together with more aggregate economic conditions, a displaced worker may find, for example, that his old industry offers high wages but few jobs, while other industries offer many jobs at lower rates of pay. Taking account of all of these factors, a displaced worker can allocate his search efforts among industries and so affect both the duration of his or her unemployment and the likelihood of changing

industries.

A model of job search with multiple labor markets can incorporate both the macroeconomic incentives which may favor changing industries and the more person-specific incentives which make re-employment in the same industry attractive. Nevertheless, the basic prediction stands that, all else constant, an unemployed worker's search strategy should adjust to favor finding and taking a job in those industries in which more promising aggregate conditions prevail. (See Section II.) While the prediction comes as no surprise, it has not before been tested. Furthermore, this is largely a generalization of the implication of single-sector search theory that an improvement in labor market conditions should induce a worker to search more intensively while becoming more particular about which job to take. This is a fundamental prediction of the theory, but it has not been seriously tested. The present study uses a two-industry model which facilitates both testing this aspect of search theory and understanding the unemployment experience of displaced workers, especially questions about where they search for new jobs.[1]

This paper uses a competing risks model of unemployment duration to investigate these issues empirically. It analyzes the speed of reemployment and the inter-industry mobility of displaced workers in the United States by estimating the determinants of the rates of transition of displaced workers from unemployment to employment in the industry from which they were displaced, on the one hand, and to reemployment in another industry, on the other. In this way I can examine a basic implication of search theory -- that conditions in the labor market, most notably the distribution of wage offers and the rate at which job offers are forthcoming, are crucial determinants of a job-seeker's search strategy as well as of the outcomes of

the search process -- in a context where these conditions vary across markets as well as across individuals, and where the mobility as well as the employability of workers is an important issue. By taking advantage of the competing risks structure, inferences about search strategies can be drawn from data about employment outcomes without data on search behavior itself.

I find that displaced workers do adjust their search behavior in response to their prospects for employment in each industry and at their current jobs. Workers who were displaced from industries which experienced smaller growth in employment or lower average wage rates choose search strategies which contribute to greater mobility between industries.

In addition, the determinants of the rate of reemployment in a worker's previous industry differ from those for reemployment in other industries. The reason that one's job ended and regional economic conditions are more important for entering a new job in the worker's previous industry, while education, job tenure, gender, advance notice, and wage premia are more important for other industries. Furthermore, personal characteristics such as the level of family income and heading a household can have large effects on both reemployment rates.

II. Theoretical Framework

Consider an individual with characteristics X_i who has been displaced from a job and is unemployed at the beginning of period t. The worker has available an amount of search "intensity" which he may devote to seeking a job during this period or to other activities. "Intensity" may refer to time, resources, or effort. I find it most convenient to think of it as the available time. The worker may allocate the time he devotes to search between search in two sectors of the economy: the industry from which he

was displaced, which I shall call the old industry, and the set of all other industries, which I shall call the new industry.

Let the proportion of available time during period t which the worker devotes to search in industry j be denoted by $s_j(t,X_i)$, where j=old,new. Assume that the length of the period is sufficiently small that the probability of receiving more than one job offer in a single period is negligible. If the worker were to devote all of his available time in period t to searching in industry j, then the probability that he would obtain a job offer in period t from industry j is $\alpha_j(t,X_i)$, which may loosely be called the offer-arrival rate. Assume further that in general the probability that the worker will receive an offer in period t from industry j is $\alpha_j(t,X_i)\sigma(s_j(t,X_i))$, where σ is an increasing concave function with $\sigma(0) = 0$ and $\sigma(1) = 1$. The rate of current compensation associated with a job offer, which I will denote w and refer to simply as the wage, is randomly drawn from a distribution $F_j(w;X_i)$.

Assume that for each industry in each period, there is a reservation wage $w_j^r(t,X_i)$ such that the worker will accept a job offer in industry j with wage w if and only if $w \geq w_j^r(t,X_i)$. In this structure, the probability that a worker who was unemployed at the beginning of period t will make a transition from unemployment to employment in industry j during period t, i.e., the hazard function, is

$$(1) \qquad h_{i,j}(t) = \alpha_j(t,X_i)\ \sigma(s_j(t,X_i))\ [1-F_j(w_j^r(t,X_i);X_i)]$$

Equation (1) makes clear how changes in the α's and F's would affect the hazard rates, holding search strategies constant, and how changes in the elements of the search strategies would affect the hazard rates, holding the a's and F's constant. If the search strategies were not to

change, i.e., if s_j and w_j^r were held constant, an increase in α_j or an improvement in the distribution F_j would increase the hazard rate $h_{i,j}$ and reduce the duration of unemployment. An increase in α_j or an improvement in F^j can also be expected to increase s_j and w_j^r, but such reactions are not necessary in order to induce a relationship between, say, α_j and $h_{i,j}$.

In contrast, changes in α_k or F_k, where k is the other industry from j would not affect $h_{i,j}$ at all if the search strategies did not change. Any relationship between, say, α_k and $h_{i,j}$ must be due to the way in which search in industry j reacts. I exploit this consideration in order to make inferences about search behavior from data on re-employment outcomes.

Fallick (1988b) developed a model of job search in two sectors which fits this description. The optimal search strategy is a function of the offer-arrival rates, wage-offer distributions, layoff rates, and costs of searching. Each of these factors and its effects may depend upon the individual's characteristics and the length of time he has been unemployed but will also have elements which are common to all individuals and specific to the industry.

In particular, any improvement in the prospects for employment in industry k should lead to a reduction in search intensity devoted to search in industry j and a rise in the reservation wage for jobs in that industry. The unambiguous prediction, then, is that $h_{i,j}$ should fall in response to an improvement in conditions in industry k, due to the induced changes in search behavior. On the other hand, while an increase in α_j or an improvement in F_j would probably lead to an increase in $h_{i,j}$, the increase in w_j^r which they induce prevents a definitive prediction.[2]

A reduced form of the hazard function (1) may be written

(2) $h_{ij}(t) = g(t, X_i,$ common components of labor market conditions in the old and in the new industries)

where t is the number of periods of unemployment thus far, and by "common components" I mean that part of the labor market conditions in each industry (such as α and F) which are common to all individuals. Which specific industries comprise the "old" and "new" industries depends upon the individual's history. I estimate a version of the reduced form hazard function (2) for each industry.

III. Data

My sample is drawn from the BLS Displaced Worker Surveys attached to the Current Population Surveys of January 1984 and 1986. (See Flaim and Sehgal (1985) and Horvath (1987) for descriptions.) Each individual surveyed is at least 20 years old and lost a job in the five years previous to the survey due to a plant closing, layoff from which he was not recalled or a similar reason.[3] Call that job the worker's old job. I include in the sample only workers who were employed full-time at their old jobs, were in the labor force at the time of the survey or reported that they wanted a job, and last worked at their old jobs (i.e., lost their old jobs) in the year prior to the survey. In addition, only workers who reported that their old jobs ended due to a plant closing or relocation, slack work, or the abolition of the position or shift were included.[4] The characteristics of the members of the sample are summarized in Table 1.

For this study, I have defined industries according to the twenty-two major industry groups defined in the January CPS. They are listed in Table 1. The worker's "old" industry is the industry group of his old job. The

"new" industry is defined as the other industry groups taken together. Thus, the identity of the old and new industries depends upon the individual's history.

In addition to the data provided in the Displaced Worker Survey, I constructed several variables meant to reflect the labor market conditions in each industry. They are the rate of employment growth, median weekly earnings, and rate of growth of median weekly earnings in each industry. They were constructed using the full CPS for March 1983 through 1986, each of which was comprised of approximately 60,000 households. These variables are described in more detail below.

For the worker's old industry, constructing these variables was straightforward. A worker's new industry, however, comprises several industry groups, each of which is more or less relevant to his search for a job. In particular, the conditions prevailing in those industries which are "close" to his old industry, in the sense that he is likely to find attractive work there or can transfer to a job there much of the skill and knowledge which he has acquired in his old industry, are likely to be more influential to his search behavior and to the outcome of his efforts than conditions in more "distant" industries will be. Therefore, each of the variables reflecting the market conditions in the new industry is a weighted average of the conditions in each of the major industry groups of which it is composed.

The weights were constructed from data on workers' transitions between industries from the March CPS' Work History data from 1983 to 1988, using the procedure outlined in Shaw (1984, 1987). Essentially, two industries are deemed to be close to each other if workers leaving jobs in those two industries tend to move to the same other industries.[5]

One difficulty with the industry conditions variables arises immediately. The new industry is defined as the complement of the old industry. By construction, then, there is a one-to-one mapping within each year between each of the variables for the old industry and its counterpart for the new industry. In particular, there is a strong inverse relation between the members of each pair of variables for each year. In order to avoid seeing their effects confounded, I regressed each of these variables on its counterpart and a dummy for the year. The residuals from these equations are used in the estimation.

IV. Estimation Procedure

I assume that transitions from unemployment to employment occur as part of a search process in continuous time. The hazard functions in (1) and (2) should be reinterpreted accordingly. I further assume that the rates of transition follow the proportional hazards model. The hazard rate of individual i for transitions from unemployment to employment in industry j at duration t is

$$h_{i,j}(t) = h_{0,j}(t)\exp(X_i'\beta_j) \tag{3}$$

where $h_{0,j}$ is a baseline hazard rate which may vary with time, X_i is a vector of individual characteristics and conditions in the old and new industries, and β_j is a vector of coefficients on the X_i for transitions into industry j.

Since the baseline hazard function is not of interest in the present study, a specification which does not require assumptions about the shape or character of the baseline hazard is best. This avoids the biases which such assumptions can impart to the estimates of the rest of the function, at the

cost of discarding some of the information in the data. Therefore I estimated the coefficients β_{old} and β_{new} using a competing risks version of Cox's Partial Likelihood model (See Cox(1984)), which uses information on the order of events only, not the times at which they occur.

The data report the duration of unemployment in weeks, rather than more specific actual durations. Consequently there are numerous ties in the data, which were handled using the approximation suggested by Breslow (1974). The estimation was performed using BMDP software.

V. Results

In this section I describe the explanatory variables and present their estimated effects. The data are summarized in Table 1. Table 2 briefly defines the explanatory variables. Table 3 presents the estimates for the full sample. Table 4 presents estimates for a subsample of workers with at least three years of tenure at their old jobs.

A. Information and Market Conditions

One of the major themes of the theory of job search is that workers should adjust their search behavior in response to information about their prospects for employment in the relevant labor markets. The conditions in the labor markets or their individual circumstances will affect the outcomes of the search process by affecting workers' search strategies as well as by affecting the distribution of outcomes which results from any given search strategy. For example, a change in α_j will affect $h_{i,j}(t)$ both by changing α_j and by inducing the worker to change s_j and w_j^r. Within a single labor market, these two effects are confounded. If we observe that an increase in α_j is associated with a decrease in h_j (an unlikely event), we can infer that workers decreased s_j or increased w_j^r, but if

it is associated with an increase in h_j, no inference about search strategies is possible.

When two labor markets are examined, changes in the conditions in one market may affect a worker's search behavior in the other market, and this will be reflected in the outcomes in the other market. Since $h_j(t)$ is the instantaneous probability of employment in sector j at time t conditional on having remained unemployed until time t, it is unaffected by the conditions in the other labor market except through their effect on search strategies. Therefore, if an increase in α_j is associated with <u>any</u> change in h_k, where $k \neq j$, we can infer that workers change their search strategies in response.

One of the interesting issues concerning displaced workers is the rate at which those displaced from "declining" industries move into employment in other industries, as compared to workers displaced from industries which are doing better. More generally, we would like to know whether workers adjust their search behavior according to the labor market conditions in the industries from which they were displaced, and how these conditions affect outcomes. In order to investigate this issue I constructed several variables meant to describe the general prospects for employment in the two industries for each individual. The variables for the new industry were constructed using the weighting scheme described in Section III. For workers displaced during 1983, data from the March '83 and '84 CPS were used; for workers displaced during 1985, the March '85 and '86.

The rates of growth of full-time employment in each of the two industries are measured by EMPOLD and EMPNEW. The median weekly earnings of full-time employees in each industry, averaged between the two surveys, are EARNOLD and EARNNEW.[6] RATEOLD and RATENEW measure the rate of increase

of median full-time earnings in the two industries over the year. As discussed in Section III, these variables are actually the residuals from regressions of each old industry variable on each new industry variable, and vice-versa. Thus EMPOLD is, for example, orthogonal to EMPNEW.

EMPOLD is meant to serve as a proxy for that part of α_{old} which is specific to the old industry rather than to the individual. It is intended to answer questions like: Holding the wage-offer distribution constant, do workers respond to increasing difficulty of obtaining a job offer in their old industry by adjusting their search behavior so as to increase h_{new} ? According to the analysis in Section II, the answer should be yes.

The estimates in Table 3 imply that EMPOLD is significantly and positively related to h_{old} (t=3.3), while it is significantly and negatively related to h_{new} (t=-2.0). There is little question that the rate of growth of employment in the worker's old industry should increase the rate at which he goes to work there, but this need not be due to any change in search behavior on his part. On the other hand a larger rate of employment growth in his old industry also decreases the rate at which he becomes employed in another (the new) industry, and this does imply something about behavior. It appears that workers do respond to lower offer-arrival rates in the old industry by increasing their search intensity or decreasing their reservation wages in the new industry. As a ballpark figure, the point estimate indicates that a one percentage-point increase in EMPOLD would decrease h_{new} by roughly 5% . Similarly, the coefficient on EMPNEW in the equation for h_{old} is significantly negative (t=-3.5), implying that greater rates of employment growth in other industries draws the worker away from successful search in his old industry.

EARNOLD is meant to capture that part of the expected value of w

which is common to all workers from an industry while EARNNEW reflects the value of w that workers from that industry can expect elsewhere.[7] A better wage-offer distribution in one industry ought to reduce the hazard rate for re-employment in the other industry by making jobs there, and therefore search as well as acceptance of an offer, less attractive.[8] The coefficient on EARNOLD is significantly negative in h_{new} (t=-1.8) and the coefficient on EARNNEW in h_{old} is close (t=-1.6).[9]

RATEOLD and RATENEW were meant to serve as a proxy for the "tightness" of the labor market in the industry, and thereby for the prospects for advancement or future job loss. The coefficients on these variables are insignificantly different from zero for both hazard rates.

The results presented thus far support the claim that workers adjust their job-search behavior in response to conditions in the labor markets in which they may search because these conditions affect their prospects for employment. Closer to home, the prospects for continuing at the old job may affect search behavior before the job ends. One would expect that a person who has been informed or expects that his or her job is going to end in the near future would react to this information by increasing the intensity of on-the-job search or by taking actions, such as gathering information, which would facilitate search once the job had ended. The sooner this information became available the sooner the search process would begin. These actions should decrease the duration of the ensuing unemployment, perhaps eliminating it altogether.[10]

The variable YESNOTIF in Table 3 indicates that workers who knew or expected in advance that their jobs would end had significantly a higher hazard rates for reemployment in the new industry than those who did not know, all else equal. The point estimates holds that prior knowledge

increases h_{new} by 19%. However, we cannot reject the hypothesis that advance notice has no effect on h_{old}.

The reason that a person lost his or her job may also influence his beliefs about his prospects for future employment at that job, and so influence his search behavior. The dummy variables SLACK and ABOLISH control for the reason for the loss. In particular, a worker whose job was lost due to a plant closing or moving (the omitted category) will have little or no hope of being recalled or rehired to his old job. A person whose job was lost due to the abolition of his position or shift (ABOLISH = 1) may have some hopes, while a person's whose reason was "slack work" (SLACK = 1) probably has some reason for optimism (although no one in this sample had in fact been recalled) and his prospective employers may fear the same possibility. If so, then this last group may be less vigorous or less successful in finding a new job than the other two.[11]

Alternatively, workers may be more likely to know in advance that the plant is scheduled to close than that a position is scheduled to be abolished, and more likely to expect either of those events than a layoff due to slack work. The coefficients on SLACK and ABOLISH are consistent with either of these views. h_{old} is significantly lower for those laid off due to slack work than for those whose position or shift was abolished, which in turn is lower than h_{old} for those whose plant closed or moved. h_{new} is similar, but there is no significant difference indicated between plant closing and abolition of shift.

A last variable reflecting labor market conditions not peculiar to the individual is the unemployment rate in the state in which he lives. Not surprisingly, the coefficient on STUNEMP is significantly negative in h_{old}, but the estimates do not indicate any significant effect on h_{new}.

B. Human Capital

Education is one likely indicator of human capital which may improve the wage-offer distributions and the offer-arrival rates facing individuals. One would expect education to provide mainly general human capital with respect to industries. If so, or if education increases the productivity of an individual's investments in human capital, then we would expect more educated workers to face higher offer-arrival rates and better wage-offer distributions overall, which should serve to increase the hazard rates. In addition, greater productivity of investments in human capital may mean better prospects for advancement, which should raise the hazard rates by lowering reservation wages. Mincer & Ofek (1982), among others, have also argued that at higher levels of education human capital depreciates more rapidly, so that individuals with more education have more incentive to keep the duration of unemployment short.[12]

EDUC measures the number of grades of schooling completed. It is significantly positive for h_{new} and insignificantly different from zero for h_{old}.[13] This difference in signs makes sense if education does much more to improve α_{new} and $f_{new}(w)$ than it does to improve α_{old} and $f_{old}(w)$ (see Section II). There are two appealing hypotheses about why this may be the case: 1) Education may be a less informative indicator of a prospective worker's productivity in a particular industry than the worker's work history, recommendations, etc. from that industry. Therefore, an increase in an applicant's education influences an employer's offers in a new industry, where superior indicators are not available, more than it does in the old industry.[14] 2) Education may be general human capital in the sense that it increases the productivity of the worker's future investments

in specific human capital, e.g., it increases or signals the worker's ability to learn. Since the worker already has industry-specific human capital in the old industry, such productivity is more important to both the employer and the worker in the new industry than in the old.[15]

Since educational credentials are awarded at discrete intervals, it is reasonable to think that the category of educational attainment is more relevant that the number of years of schooling completed. In a separate run, education was entered into the hazard function as a series of dummy variables. HSGRAD = 1 iff the worker reported completing at least 4 grades of high school, SOMECOLL = 1 iff he completed at least 1 to 3 grades of college, and COLLGRAD = 1 iff he completed 4 or more grades of college. The coefficient on each of these variables is thus an estimate of the effect of the indicated increment in education. The results are summarized at the end of Table 3. Again, the coefficients are not significantly different from zero for the rate of re-employment into the old industry. The addition of a fourth grade of high school significantly raises h_{new}. (The point estimate is that completing high school raises h_{new} by 38% .) Obtaining some college appears to increase h_{new}, although the coefficient is not significantly different from zero, and there is some indication that completing college actually reduces this hazard rate.

PREMOLD represents where the worker stood in his old industry's earnings distribution. It is the percentage by which the worker's earnings in his or her old job exceeded the industry average. In short, PREMOLD is intended to capture that part of $f^{i}_{old}(w)$ which is specific to the individual rather than to everyone in his old industry. The coefficient on PREMOLD is significantly negative for h_{new} while insignificantly positive for h_{old}. This suggests that the effect of the wage premium, possibly the

premium itself, will not carry over into a new industry although it may carry over into a new job in the old industry, so that the existence of the premium indicates a better $f_{old}(w)$ relative to $f_{new}(w)$. Workers respond by searching less intensively in the new industry or raising their reservation wages there relative to the wage-offer distribution.

Job-tenure is often used as a proxy for firm-specific human capital. If tenure at the old job is also indicative of industry-specific human capital at the level of aggregation being considered here, then it should be associated with a better $f_{old}(w)$ and α_{old} relative to $f_{new}(w)$ and α_{new}. We would then expect tenure to increase h_{old} and decrease h_{new}.[16] The variable OJTEN is significantly negative in the equation for h_{new}, while insignificantly different from zero in the equation for h_{old}. The coefficient for h_{new} says that one additional year of tenure reduces this hazard rate by 2% .

D. Occupations

Occupation-specific human capital will affect a worker's labor market opportunities, his α's and F's. To the extent that particular occupations tend to be employed in particular industries, a worker's occupation may affect h_{old} and h_{new} differently. A set of dummy variables controlled for the occupation of the worker. The definitions of the variables can be found in Table 2. They refer to the worker's occupation at his old job by Census major occupation code.

The results indicate that, all else equal, managerial and professional occupations have lower h_{old} than other occupations (excepting service occupations), and higher h_{new} than production occupations. More detailed analysis (not shown in the tables) indicated that within that group it is the executive, administrative and managerial occupations, as opposed to

professional specialties, which differ when it comes to re-employment in the old industry. For the new industry, salespeople and production occupations appear to have lower hazard rates than other occupations. These occupations probably involve a significant amount of industry-specific human capital. Managers and executives, on the other hand, appear to have less industry-specific or more general skills and knowledge.

E. Demographic Characteristics

AGE reduces both hazard rates. This coefficient must be interpreted with caution, however, since the data include no measures of labor force experience, which is closely related to age. FEMALE is a dummy variable which equals 1 if the worker is a woman. The estimates indicate that women have significantly higher hazard rates for reemployment in the new industry than do men, but there is no significant difference for the old industry.[17]

"Usual" family income has a highly significant positive effect on both hazard rates. Considering that the worker's earnings on the old job are controlled for by EARNOLD and PREMOLD (The result remains if the worker's earnings are entered directly.), I interpret the coefficient on FAMINC as follows: FAMINC may represent income from other family members or assets. If there are direct costs of search, this should increase reservation wages and possibly decrease search intensity by reducing the direct costs of search in utility terms. If search intensity refers to time spent in search activities, then the normality of leisure pulls in the other direction.[18] FAMINC may also represent the household's social status, and so higher FAMINC implies more contacts with people likely to be of assistance in finding a new job, and a greater stigma on remaining unemployed.

Finally, as we would expect, heads of households have higher hazard rates of re-employment than do other members of a household.

F. A Higher-Tenured Subsample

The definition of a displaced worker has varied in the literature. The present study focuses on the distinction between old and new industries because of an interest in displaced workers who are likely to have formed some attachment to the industries of their old jobs. Therefore, the sample was restricted to those whose tenure at that job was at least one year. To pursue the same goal further, I tried restricting a subsample to those whose tenure at their old jobs was at least three years.

The cost of this restriction was reducing the size of the sample from 2090 to 1266, and the number of uncensored observations from 954 (54% of the sample) to 573 (45% of the subsample).[19] Despite than the consequent increase in the standard errors of estimates, the results, reported in Table 4, remain consistent with the above discussion. The largest differences are found in the estimates for h_{new}, where the coefficients on EDUC, EARNOLD, FEMALE, and YESNOTIF are substantially smaller (in absolute value) than above, and lose statistical significance.

VII. Conclusion

Search-theoretic models and empirical studies of the duration of unemployment generally treat all jobs as belonging to a single homogeneous labor market. Recognizing that a worker may search simultaneously in more than one market allows one to test a fundamental class of implications of job-search models and investigate their importance to the mobility of labor across sectors of the economy. In particular, judging from the results presented here, it is useful to distinguish between industries when

analyzing the reemployment of displaced workers because labor market conditions vary across industries. Improvements in the prospects for employment, both of the probability of receiving a job offer and in the distribution of wages, in one industry induce workers to reduce their search intensity and increase their reservation wages in other industries.

The distinction between the industry in which a person used to work and all other industries is useful also in that education, job tenure, intra-industrial wage premia, the state's unemployment rate, and other factors affect the hazard rates associated with these two sectors differently. For example, at least through graduating from high school, education increases the rate of reemployment into jobs in a new industry, but not the rate into jobs in the old industry. Studies of displaced workers should take account of the distinctions between the different industries in which a worker may find a job.

Advance knowledge of the loss of one's job speeds up the process of finding a new job, as does an unambiguous end to the job: a clear message that there is no prospect of recall. Clearly, the information available to a worker about his own situation is an important factor determining his search behavior.

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[1]Both theoretical search models and empirical studies of the duration of unemployment have tended to model search in a single market. Several studies of the wage losses of displaced workers (Jacobson (1978), Madden (1987), Madden (1988), Podgursky and Swaim (1986), and Kletzer (1986)) recognize that changing industries or occupations matters, but do not examine the implications of this fact for search behavior.

[2]In brief, in each period the unemployed worker chooses the elements of his search strategy. Each of the reservation wages is set so as to equate the expected value of remaining unemployed next period with the value of becoming employed in that industry at that wage next period. Search intensity is allocated so that the marginal value of additional search in each industry is equal to the marginal cost of searching. Any change which raises the value of being unemployed more than it raises the value of being employed in industry j at the reservation wage will induce the worker to raise his reservation wage for jobs in that industry. Any change which increases the marginal "productivity" of search in either industry relative to the marginal cost of searching will induce a worker to increase his search intensity over-all, and any change which increases the marginal value of search in industry j relative to that of search in industry k will induce the worker to search more intensively in industry j relative to industry k. Therefore, an improvement in the wage-offer distribution or offer-arrival rate in the old industry should cause reservation wages to rise and search intensity to be reallocated away from the new industry and towards the old industry.

[3]The involuntary nature of the separations rules out the problems of selectivity that concern much of the literature on voluntary turnover.

[4]I also included only those workers who were not missing relevant data, did not report impossible values for important variables, and were not in the Armed Forces at their old jobs. For a further discussion of the sample and problems with the data, see Fallick (1988a).

[5]Details are available from the author.

[6]Using mean weekly earnings rather than the median does not appreciably alter the results.

[7]Variables meant to reflect the spread of the wage-offer distributions, the variance of weekly earnings and the quartile range, were too highly correlated with mean or median earnings to separate their effects. Only the median was included in the reported results. Since a worker's search strategy truncates $f(w)$ from below at w^r so that only the upper part of the distribution matters, an increase in the standard deviation of $f(w)$ holding the mean constant is in most cases an improvement from the point of view of the worker. Therefore, the median earnings can still be interpreted as a measure of the "goodness" of the distribution.

8 Warner et al. (1980) found that the predicted expected wage for a worker (based upon an estimated earnings function) was positively related to the reservation wage, and negatively related to the duration of unemployment spell given the reservation wage.

9 The coefficient on EARNOLD in h_{old} is not significantly different from zero. It has been suggested that EARNOLD may reflect the degree of unionization in the industry and therefore be correlated with the worker's union status, for which I cannot control directly. Union status may matter because, in the words of one unemployed worker, "nonunion employers ... were reluctant to hire a union man, believing he would be unhappy with the lower wage they offer." (New York Times, May 2, 1986, p. A20). Controlling for the rate of unionization in the old industry did not change much, but controlling for the rate of unionization in the worker's old 2-digit SIC industry yielded a positive, although insignificant, coefficient. I suspect that it is due to the prevalence of wage rates well above a worker's reservation wage in his old industry.

10 See, for example, Ehrenberg and Jacubson (1989).

11 Barron and Mellow (1984) found that better prospects for recall reduced the amount of time devoted to search. They used data on time and expense spent in search from a supplement to the May 1976 Current Population Survey.

12 Kiefer and Neumann found that more education increases the reservation wage while Barron and Mellow found that it increases the amount of available time devoted to search, and Feldstein and Poterba found education to be insignificant in determining the reservation wage/previous wage ratio.

13 The coefficients on the education variables were sensitive to specification of the hazard function, especially to the inclusion or exclusion of an AGE. I report what I consider to be the most reliable estimates.

14 This could be true whether education contributes to that productivity or merely acts as a signal of ability. My thanks to Eric Smith for pointing this out.

15 Robert Whaples suggests that education improves one's search skills, which are more important in the "unfamiliar turf" of a new industry.

16 Also, permanent job loss may come as more of a surprise to workers with more seniority at a firm, and they may be more optimistic about the possibility of being recalled. Therefore they may begin to search later and with lesser intensity than their less tenured co-workers. See Leighton and Mincer (1982). Tenure and age are highly correlated, so one may wish to interpret the coefficients cautiously.

[17] The coefficient on FEMALE loses significance as better controls for occupation are added, suggesting that it is really the occupational distribution of women that matters.

[18] Barron and Mellow found that higher nonwage income leads to less time devoted to search but for some individuals leads to larger financial expenditures on search.

[19] Studies which use the same data sources but concentrate on wage changes often achieve larger sample sizes by including workers displaced up to five years prior to the survey. I have restricted the sample to those displaced no more than a year prior to the survey in order to reduce inaccuracies in the measured durations of unemployment spells. The survey asks only for the number of weeks that an individual has been without a job since becoming displaced from the old job, defined as the longest-held job from which one was displaced within the past five years. The more time there has been since that job for other jobs to intervene, the less accurate the comparisons of peoples' inferred unemployment experiences will be.

TABLE 1
Summary Characteristics of the Sample

Sample size = 2090

Variable	mean	s.d.	Variable	mean	s.d.
Weekly earnings (old job)	360	213	Age	36.4	11.4
			Tenure (old job)	5.7	6.1
Weeks unemployed	12.9	12.8	Education	12.2	2.6

Variable	frequency	Variable	frequency
Current Industry:		UI:	
unemp	46%	recipients	61%
old	23	nonrecipients	38
new	32	don't know	1
Sex:		Notified of impending job loss:	
male	69%	yes	53%
female	31	no	47
Race:		Hh position:	
white	87%	head	68%
nonwhite	13	other	32

Why left?

(1)	Plant or co. closed or moved	39%
(2)	Slack work	47
(3)	Position of shift abolished	15
(4)	Seasonal job ended	0
(5)	Self-operated business failed	0
(6)	Other reason	0

Major Occupation At Old Job

Occupation	#Workers	Percent
(1) Executive, administrative, managerial	214	10.2%
(2) Professional Specialty	125	6.0
(3) Technicians and related support	75	3.6
(4) Sales	185	8.9

TABLE 1 (continued)

Occupation	#Workers	Percent
(5) Administrative support	196	9.4
(6) Private household services	0	0.0
(7) Protective services	20	1.0
(8) Other services	119	5.7
(9) Precision production, craft, repair	416	19.9
(10) Machine operation, assembly, inspection	400	19.1
(11) Transportation, material moving	150	7.2
(12) Handlers, equipment cleaners, etc.	159	7.6
(13) Farming, forestry, fishing	31	1.5

Major Industry At Old Job

Industry	#Workers	Percent
(1) Agriculture	50	2.4
(2) Mining	91	4.4
(3) Construction	218	10.4
(4) Durable Manufacturing	585	28.0
(5) Nondurable Manufacturing	310	14.8
(6) Transportation	126	6.0
(7) Communications	29	1.4
(8) Utilities & Sanitary Services	16	0.8
(9) Wholesale Trade	125	6.0
(10) Retail Trade	185	8.9
(11) Finance, Insurance, Real Estate	56	2.7
(12) Private Household Services	0	0.0
(13) Business & Repair Services	122	5.8
(14) Personal Services	32	1.5
(15) Entertainment & Recreation	19	0.9
(16) Hospitals	4	0.2
(17) Medical	28	1.3
(18) Education	5	0.2
(19) Social Services	21	1.0
(20) Other Professional Services	45	2.2
(21) Forestry & Fishing	2	0.1
(22) Public Administration	21	1.0

Geography:	frequency
New England	6.8%
Middle Atlantic	13.0
East North Central	14.8
West North Central	9.7
South Atlantic	13.0
East South Central	6.0
West South Central	12.7
Mountain	9.7
Pacific	14.3

Education Level:	frequency
< 4 grades high school	21.9%
4 grades high school	46.8
1-3 grades college	18.9
>= 4 grades college	12.4

Year:	frequency
1984	51.9
1986	48.1

TABLE 2

Definitions of Explanatory Variables

WHITE	= 1 if white, = 0 if nonwhite
HEAD	= 1 if head of household, = 0 otherwise
HSGRAD	= 1 if completed at least 4 grades of high school, = 0 otherwise
SOMECOLL	= 1 if completed at least 1 grade of college, = 0 otherwise
COLLGRAD	= 1 if completed at least 4 grades of college, = 0 otherwise
FAMINC	= an increasing index of usual family annual income
OJTEN	= number of years working at the old job
EMPOLD	= regression residual corresponding to the fraction increase in the number of full time employees in the old major industry in the January Current Population Survey between 1983 and 1984
EARNOLD	= regression residual corresponding to the median weekly earnings of full-time employees in the old major industry in the January 1984 CPS
RATEOLD	= regression residual corresponding to the fraction increase between the 1983 and 1984 median earnings.
PREMOLD	= the proportional difference between weekly earnings on the old job and median weekly earnings for the industry.
FEMALE	= 1 if female, = 0 if male
YESNOTIF	= 1 if expected in advance of the loss of one's job, = 0 if did not expect
SLACK	= 1 if left job due to slack work = 0 otherwise
ABOLISH	= 1 if left job due to the elimination of shift or position, = 0 otherwise
SUPPORT	= 1 if occupation at the old job was technical, sales or administrative support, = 0 otherwise
SERVICE	= 1 if occupation at the old job was services, = 0 otherwise

TABLE 2 (continued)

PRECPROD = 1 if occupation at the old job was precision production, craft and repair,
= 0 otherwise

OPFABLAB = 1 if occupation at the old job was operator, fabricator, or laborer,
= 0 otherwise

FAFOFI = 1 if occupation at the old job was farming, forestry, or fisheries,
= 0 otherwise

If SUPPORT = SERVICE = PRECPROD = OPFABLAB = FAFOFI = 0, then the occupation at the old job was managerial or professional.

EDUC is the number of grades of schooling completed.

STUNEMP is the state unemployment rate for 1983 or 1985.

EMPNEW is the analog of EMPOLD for the weighted aggregate of all major industries except the old industry.

EARNNEW is the analog of EARNOLD for the weighted aggregate of all major industries except the old industry.

RATENEW is the analog of RATEOLD for the weighted aggregate of all major industries except the old industry.

UI = 1 if unemployment insurance benefits were received,
= 0 otherwise.

YEAR86 = 1 if the observation came from the 1986 survey,
= 0 otherwise.

Dummy variables for geographic divisions are also used.

TABLE 3

Full Sample (2090 observations)

Variable	h_{old}	h_{new}	Variable	h_{old}	h_{new}
EMPOLD	9.8***	-4.9**	OPFABLAB	0.34**	-0.24**
	(3.3)	(-2.0)		(2.0)	(-1.8)
EARNOLD	-0.0005	-0.0025*	FAFOFI	0.71	-0.012
	(-0.3)	(-1.8)		(1.6)	(-0.03)
RATEOLD	-0.46	-1.1	AGE	-0.016***	-0.013***
	(-0.1)	(-0.3)		(-3.1)	(-2.8)
EMPNEW	-169***	65**	FEMALE	0.10	0.27***
	(-3.5)	(1.8)		(0.8)	(2.6)
EARNNEW	-0.10*	0.19***	FAMINC	0.11***	0.067***
	(-1.6)	(4.2)		(6.6)	(4.6)
RATENEW	-41.	48.	HEAD	0.62***	0.40***
	(-0.5)	(0.7)		(4.8)	(3.8)
YESNOTIF	0.04	0.18**	WHITE	0.55**	0.68***
	(0.4)	(2.2)		(3.2)	(4.6)
SLACK	-0.44***	-0.27***	UI	-1.1***	-1.2***
	(-4.2)	(-3.0)		(-10.8)	(-13.6)
ABOLISH	-0.27**	0.062	YEAR86	-0.11	-0.0076
	(-1.8)	(0.5)		(-0.8)	(-0.1)
STUNEMP	-0.092***	-0.021	MID ATLANTIC	-0.43**	-0.57***
	(-2.8)	(-0.9)		(-1.9)	(-2.7)
EDUC	0.012	0.053***	E N CENTRAL	-0.22	-0.49**
	(0.6)	(2.8)		(-0.9)	(-2.3)
PREMOLD	0.055	-0.12**	W N CENTRAL	-0.43**	-0.041
	(0.8)	(-1.7)		(-1.9)	(-0.2)
OJTEN	-0.0020	-0.023***	S ATLANTIC	-0.0832	-0.044
	(-0.2)	(-2.5)		(-0.4)	(-0.2)
SUPPORT	0.37***	-0.12	E S CENTRAL	0.055	-0.11
	(2.4)	(-1.0)		(0.2)	(-0.4)
SERVICE	0.098	0.12	W S CENTRAL	-0.33*	-0.21
	(0.4)	(0.7)		(-1.5)	(-1.1)
PRECPROD	0.51***	-0.28**	MOUNTAIN	-0.25	-0.034
	(3.0)	(-1.9)		(-1.1)	(-0.2)

TABLE 3 (continued)

Variable	h_{old}	h_{new}
PACIFIC	-0.025	-0.27
	(-0.1)	(-1.4)
#HSGRAD	0.10	0.32***
	(0.8)	(2.7)
#SOMECOLL	-0.070	0.15*
	(-0.5)	(1.4)
#COLLGRAD	0.0081	-0.17
	(0.05)	(-1.2)

Legend: t-statistics for the coefficients appear in parentheses.

*significantly different from 1 at the 10% level

**significantly different from 1 at the 5% level

***significantly different from 1 at the 1% level

#These variables were included in a separate specification which did not include EDUC.

TABLE 4

High Tenure Sample (1266 Observations)

Variable	h_{old}	h_{new}	Variable	h_{old}	h_{new}
EMPOLD	7.5**	-5.9**	OPFABLAB	0.45**	-0.37**
	(1.8)	(-1.8)		(2.1)	(-2.1)
EARNOLD	-0.0021	-0.0012	FAFOFI	0.74*	0.37
	(-0.9)	(-0.7)		(1.3)	(1.0)
RATEOLD	-1.5	-4.4	AGE	-0.018***	-0.016***
	(-0.3)	(-1.0)		(-2.8)	(-2.9)
EMPNEW	-129**	81*	FEMALE	-0.16	0.18*
	(-2.0)	(1.6)		(-0.9)	(1.3)
EARNNEW	-0.10	0.16***	FAMINC	0.11***	0.063***
	(-1.2)	(2.8)		(4.9)	(3.2)
RATENEW	-11.	114.	HEAD	0.56***	0.22*
	(-0.1)	(1.2)		(3.1)	(1.6)
YESNOTIF	-0.062	0.083	WHITE	0.39**	0.48***
	(-0.5)	(0.8)		(1.8)	(2.5)
SLACK	-0.50***	-0.28**	UI	-1.1***	-1.2***
	(-3.6)	(-2.3)		(-8.3)	(-9.9)
ABOLISH	-0.27*	-0.073	YEAR86	-0.13	0.13
	(-1.5)	(-0.5)		(-0.7)	(0.9)
STUNEMP	-0.11***	0.0037	MID ATLANTIC	-0.59**	-0.61**
	(-2.6)	(0.1)		(-1.9)	(-2.3)
EDUC	0.0000	0.026	E N CENTRAL	-0.25	-0.78***
	(0.0)	(1.1)		(-0.7)	(-2.7)
PREMOLD	0.050	-0.15*	W N CENTRAL	-0.40*	-0.24
	(0.5)	(-1.6)		(-1.4)	(-0.9)
OJTEN	-0.0036	-0.031***	S ATLANTIC	-0.041	-0.16
	(-0.3)	(-2.7)		(-0.1)	(-0.6)
SUPPORT	0.41**	-0.0030	E S CENTRAL	0.079	-0.45
	(2.0)	(-0.02)		(0.2)	(-1.3)
SERVICE	0.31	0.13	W S CENTRAL	-0.40*	-0.41
	(0.8)	(0.5)		(-1.3)	(-1.5)
PRECPROD	0.54***	-0.32**	MOUNTAIN	-0.36	-0.079
	(2.5)	(-1.7)		(-1.1)	(-0.3)
			PACIFIC	-0.015	-0.46**
				(-0.05)	(-1.7)

TABLE 4 (continued)

t-statistics for the coefficients appear in parentheses.

*significantly different from 1 at the 10% level

**significantly different from 1 at the 5% level

***significantly different from 1 at the 1% level

#These variables were included in a separate specification which did not include EDUC.