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Abstract: This paper uses a unique personnel data set to explore job separation behavior among welfare hires. Our results indicate that welfare hires are no less stable than similar nonwelfare hires; however, time until separation does differ across welfare status by reason for separation. We also found that the presence of a mentoring program will increase time until separation for both welfare and nonwelfare hires.

JEL classification: I38, J24, J64

Key words: TANF, welfare, job search, job separation

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I. Introduction and Background

In 1996 the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) became law, eliminating the Aid to Families with Dependent Children (AFDC) program.[1] In place of AFDC, states receive a block grant to establish a Temporary Assistance for Needy Families (TANF) program. New rules under the TANF program impose stricter time limits and work requirements. Once a TANF recipient is determined to be 'job ready' or she has received assistance for 24 months, she is required to work.[2] Under AFDC, relatively few recipients were required to work. For example, the Job Opportunity and Basic Skills (JOBS) program, which TANF also replaced, required only about 10% of the AFDC caseload to participate. But under TANF, there is pressure on the states to increase their work participation rates in order to receive their full block grant amount. By 1999, states must have had at least 35% of their mandatory TANF caseload participating in work activities for at least 25 hours (for all families) and 90% of their two-parent TANF families working 35 hours or more.

Due to the changes brought about by the PRWORA, an increasing number of individuals are required to find a job, some entering the labor force for the first time. Many of these job seekers have a low skill level, little work experience, and other barriers to employment, such as transportation and child-care needs.[3] Most of the literature examining questions related to the transition from welfare to work focuses on employment barriers of former welfare recipients and the availability of jobs for former welfare recipients. Few studies have examined the turnover

[1] H.R. 3734, signed by President Clinton on August 22, 1996.
[2] The definition of work is left up to the states to define, and can include employment subsidized by the state. Since most recipients are women, the pronoun she is used.
[3] See Zedlewski (1999), Deavers and Hattiangadi (1998) and Ong (1996) for a discussion of employment barriers facing welfare recipients.

behavior of former welfare recipients.[4] The fear of many employers is that welfare recipients are less stable (higher turnover) workers than non-welfare recipients. And, high turnover is, of course, costly because of personnel processing, orientation, training, etc.

This paper utilizes unique, firm-level post-PRWORA data to examine the separation behavior of welfare and non-welfare hires and the effectiveness of a firm's work programs on reducing turnover. The following questions are addressed: (1) Is the separation behavior of former welfare recipients, in fact, different from other workers? If so, how and why does it differ? (2) What characteristics of a firm's work program contribute to higher retention rates? (3) Does the time to separation vary by welfare status for different *reasons* for separating? In other words, do welfare hires separate from their employer sooner than non-welfare hires for personal versus professional reasons?[5] The answers to these questions have implications for firms' hiring policies and the potential effectiveness of work programs. By identifying factors contributing to higher retention rates, especially factors related to the type of work programs in place, more effective work programs can be designed. After all, the determination of a successful welfare-to-work transition does not conclude merely when the individual finds employment.

Most likely due to the relatively new public policy interest in hiring welfare recipients, there are few studies which empirically examine the separation behavior of welfare hires. Whenever examined, turnover among welfare hires has uniformly been found to be high. For example, Berg et al. (1992) find that 46 percent of recent welfare recipients lost or quit their job

[4] Although the word welfare applies to many different public assistance programs that aid individuals or families based on need and means, welfare as used in this study means individuals or families receiving AFDC (or a successor program). AFDC was the only means-tested program for families in which benefits were received in cash, not goods or services. For recent studies, see Gittleman (2000), Hofferth et al. (2000), Loprest (2000), and Ribar (2000).
[5] Workers who were laid off are not included in the study.

in the first three months of employment and 73 percent have lost or quit their job within one year.[6] Among factors that affect turnover rates among welfare hires, studies have found that turnover is reduced among welfare hires receiving higher wages and those employed in higher-skilled jobs (for example, see Berg et al. 1990, Leete 1996, and Lane and Stevens 1995). In addition, one study (Berg et al. 1992) has found that job loss among welfare hires was more likely for absenteeism, tardiness, and poor social skills, and not for poor physical skills or personal reasons. None of the studies compares the turnover rates among welfare hires with comparable non-welfare hires. The analysis in this paper makes use of data which allows for comparisons of turnover to be made between fairly homogenous welfare and non-welfare hires. The data also allow a comparison of the reason for job separation. A number of key factors have been identified in the broader turnover literature that have proven to be important determinants of separation behavior. This literature will help guide the structure of the empirical analysis that follows.[7]

The results of the analyses indicate that the separation behavior of welfare hires is not remarkably different from non-welfare hires. Welfare hires are found to be less likely to separate, staying on the job for approximately one week longer than non-welfare hires (evaluated at the median tenure). Welfare hires are found to separate sooner for being fired for cause, and to separate later for personal or professional reasons. To improve the retention of both welfare and non-welfare hires, mentoring programs were found to be the most effective type of work program.

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[6] Others finding high turnover rates among former welfare recipients include Berg et al (1990), Leete (1996), Eberts (1997), Lane and Stevens (1998), and Her et al (1995).

[7] Blau and Kahn (1981), Berg et al. (1992), Meitzen (1986), Sicherman (1996), Bartel (1982), and Weiss (1984) all provide good sources of factors that have found to be important in the determination of quit behavior.

II. Unique Data

The data used in this study are from the personnel records of a large, unionized firm in the transportation industry with numerous domestic and international locations. Since this firm mainly employs domestic workers and the welfare-to-work concept being studied applies only to the United States, the study is restricted to domestic workers. Due to the numerous different job types this firm employs, the focus will be on one particular type: part-time package sorters. This part-time position typically involves working four to five hours a day, five days a week.[8] By focusing on one job type, this study provides for homogeneity in working conditions. This type of work often involves heavy lifting, repetitiveness, and working conditions with extreme temperatures depending on the weather. Since this job requires a relatively low level of skill, this is a typical job that a welfare recipient would be able to obtain. As Wolman (1996, 2) reports, "AFDC recipients have below average education levels and cognitive skills," making them more likely to find jobs in the low-skill service sector and in light factory work.[9]

The data set was constructed by querying the firm's personnel records for all employees (of this job type) hired from January 1, 1998 to December 31, 1999. These employees were then matched with other personnel tables to obtain data on demographic characteristics, such as education and age, and job-related characteristics such as shift worked. The sample size is 80,834, of which 5,026 are welfare hires.[10] Summary statistics (of selected variables), by type of

[8] For information on hours worked by welfare recipients, see Brauner and Loprest (1999), Parrott (1998) and Loprest (2000).
[9] See Zill et al. (1991) also for types of jobs obtained by welfare recipients.
[10] To be classified as a welfare hire, the individual must meet the welfare criteria applicable to the Work Opportunity Tax Credit (WOTC). Qualified AFDC recipients are any individuals who are members of a family receiving AFDC (or a successor program) for any nine months during

hire and censoring status, are presented in Table 2.[11] For a description of the variables, see Table 1. The separation percentage is four percentage points *higher* for non-welfare hires (61% vs. 57%). A form of the dependent variable in the duration model, tenure, indicates that the average tenure is longer for *welfare* hires by a few days (116 vs. 114 days). (Note that 66% of welfare hires and 68% of non-welfare hires have tenure below the mean tenure reported for their welfare status category.) The average age of the welfare hires, 24, is one year younger than the average age of the non-welfare hires. The average education level is similar for the two groups, differing by less than one year. The average hourly pay rate is almost identical for the two groups, which is expected since the job is a union job and both groups have similar tenure. A larger percentage of the welfare hires are female and black.

[Tables 1 and 2 here]

For welfare hires, 42% of the observations are censored (i.e., they did not separate prior to December 31, 1999) and 39% of the non-welfare hires are censored. Welfare and non-welfare hires which are not censored have relatively the same tenure, 47 days for non-welfare hires and 46 days for welfare hires. For censored observations, non-welfare hires have a slightly longer tenure, 218 days compared to 213 days. The other variables remain relatively stable across censoring status within a given welfare status category.

When an employee voluntarily or involuntarily separates from her job, the company recorded the individual's main reason for separating. From the 53 different categories for no longer being employed, three main categories were created: professional reasons, personal reasons, and fired for cause. Employees who were labeled as separating for professional reasons

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the last 18 months, ending on the hiring date. An outside agency hired by the firm identified which employees were welfare hires.

[11] Performing a t-test on the variables in Table 2 indicates that the means for the two groups are statistically different at a 5% significance level.

identified themselves, for example, as quitting to accept another job or because they were dissatisfied with a particular aspect of the job, such as pay, type of work, or hours.[12] Employees who were identified as separating for personal reasons cited reasons such as health, returning to school, or transportation problems. Included in this category are individuals who did not show up voluntarily for work. Separation due to being fired for cause includes employees who were terminated because they violated company policies. The main reason for being fired for cause was due to having excessive absenteeism (68% of all reasons within this group were for excessive absenteeism). Table 3 reports reasons for separation, by welfare status. The primary reason for non-welfare and welfare hires separating is due to personal reasons, with the percentage being relatively the same for both groups, about 58 percent. Professional reasons follow as being the next reason for no longer being employed. A larger percentage of non-welfare hires cited this reason, 33 percent of non-welfare hires versus 24 percent of welfare hires. Looking at the fired for cause category, a larger percentage of welfare hires were included in this category compared to non-welfare hires, 18 percent versus 10 percent.

[Table 3 here]

Table 3 also lists the average tenure for each of the three reasons for separating, by welfare status. Examining the average tenure of non-welfare hires by reason for separating, non-welfare hires who separate for professional or personal reasons have the highest tenure at 48 days, while non-welfare hires who separate for being fired for cause have an average tenure of 42 days. For welfare hires, average tenure is longest for employees separating for personal

[12] Employees who were dissatisfied with a particular job aspect were grouped with individuals who quit to take another job since it is believed that the latter group quit in hopes of obtaining a better job. Approximately 26% of non-welfare hires and 35% of welfare hires in the professional quit reason category were dissatisfied with an aspect of the job; the remaining 74% and 65%, respectively, quit to take a different job.

reasons (49 days), followed by professional reasons (45 days), and then fired for cause (38 days).

III. Theory of Quit Behavior

This section applies a standard search model framework in which to examine the decision of a worker to quit his/her present job. While the empirical section will model separations more generally, quitting is the predominant form of separation among these workers, and the theoretical model will identify how some key determinants of quit behavior can be expected to influence the individual level decision to separate from one's job.

The decision to stay at one's present job, return to welfare, or to obtain another job can be viewed as maximizing the net present value of one's expected utility over an infinite horizon. Utility, U(.), is assumed to be a function of money received in the form of income from working (I) or in the form of a public assistance subsidy (S), and leisure. An individual is assumed to be currently working at job J_1 and receiving income I_1 and leisure equal to zero.[13] The decision facing the individual is whether to remain at her current job or to quit this job. If she quits her job, she faces a probability p of obtaining a better job (job J_2 with income I_2 where $E(I_2) > E(I_1)$) and probability (1-p) of returning to welfare. The utility received from returning to welfare is dependent upon how long the individual has received welfare relative to the state-specific time limit for receiving welfare. If her time on welfare, t_w, is less than the maximum welfare receipt time period in that state, she will receive the public assistance subsidy, S. However, if she has already exceeded the maximum time allowable on welfare, t_{max}, she receives no subsidy. Leisure is assumed to equal one if the individual returns to welfare.[14]

Thus, the expected utilities are:

[13] Available time has been normalized to equal one.
[14] For simplicity, the current analysis abstracts from the possibility of working while on welfare.

$$EU_t(\text{don' t quit}) = U_t(I_1, 0) \tag{1}$$

$$EU_t(\text{quit}) = p_t U_t(I_2, 0) + (1 - p_t) U_t(S,1) \text{ if } t_w < t_{\max} \tag{2}$$

$$EU_t(\text{quit}) = p_t U_t(I_2, 0) + (1 - p_t) U_t(0,1) \text{ if } t_w \geq t_{\max} \tag{3}$$

where p_t = probability of obtaining a better job, p_t is contained in the interval [0,1]

t = time
t_w = total time on welfare
$t_{\max}$ = state-specific time limit for receiving welfare
I_1 = income received from first job, job J_1
I_2 = income received from second job, job J_2
S = public assistance subsidy

The basic decision facing the worker is: At what time is it optimal to quit her current job? A simple search model can highlight some important potential determinants of this decision.[15] The assumptions of the model are:

- A worker maximizes the expected value of utility, discounted to the present, over an infinite horizon.
- The quality of a job is summarized by the wage rate.
- Income while employed is constant (either I_1 or I_2).
- S is constant as long as $t_w < t_{\max}$.
- Value function, $V(p_t)$, is constant through time.
- The possible outcome of a lower-paying job is not allowed for. (Presumably returning to welfare is preferable to a job paying less than I_1 or the person would not have quit.)

Thus, the problem is (for $t_w < t_{\max}$):[16]

[15] The model that follows is the standard job search framework applied to the decision to quit one's job. Blau (1991) is a good reference for another application of this model.
[16] The assumption will be that $t < t_{\max}$ since individuals who have received welfare continuously since the reform was enacted will reach their lifetime limit in January 2001 (a date which is later than the last separation date in the data set).

$$\max_{q_t \in \{0.1\}} E_0 \left\{ \sum_{t=0}^{\infty} \beta^t U_t \right\} \tag{4}$$

where $U_t = q_t\left[p_t U(I_2,0) + (1-p_t)U(S,1)\right] + (1-q_t)U(I_1,0)$, and $q_t = \begin{cases} 1 \text{ if the worker quits} \\ 0 \text{ if worker doesn' t quit} \end{cases}$ and p_t, I_1, I_2, and S are defined above. ε_t is the disturbance term with a probability distribution, $P(\varepsilon_t | p_t, q_t)$, defined as:

$$q_t = 0 \Rightarrow U_t = U(I_1,0);\ \varepsilon_t \sim F(.)$$
$$q_t = 1 \Rightarrow p_t = p$$

The transition equation is:

$$p_{t+1} = \varepsilon_t . \tag{5}$$

The probability of finding a better job is equal to p with probability one if $q_t = 1$, and it is a random draw from the distribution function F(.) if $q_t = 0$.

The equation to be maximized is (see Bellman 1957):

$$V(p_t) = \max_{q_t \in \{0,1\}} E\{q_t[p_t U(I_2,0) + (1-p_t)U(S,1)] + (1-q_t)U(I_1,0) + \beta V(\varepsilon_t | p_t, q_t)\} \tag{6}$$

which can be written as choosing the maximum between two options, to quit or not to quit one's current job:

$$V(p_t) = \max\left[\left\{p_t U(I_2,0) + (1-p_t)U(S,1) + \beta E\left[V(\varepsilon_t | p_t, 1)\right]\right\}, \left\{U(I_1,0) + \beta EV\left[(\varepsilon_t | p_t, 0)\right]\right\}\right] \tag{7}$$

This equation can also be written as:

$$V(p_t) = \max\left[\left\{p_t U(I_2,0) + (1-p_t)U(S,1) + \beta V(p_t)\right\}, \left\{U(I_1,0) + \beta EV\right\}\right] \tag{8}$$

where:

$$\beta EV = \int V(\varepsilon) dF(\varepsilon) \text{ and } V(p_t) = E\left[V(\varepsilon_t | p_t, 1)\right]. \tag{9}$$

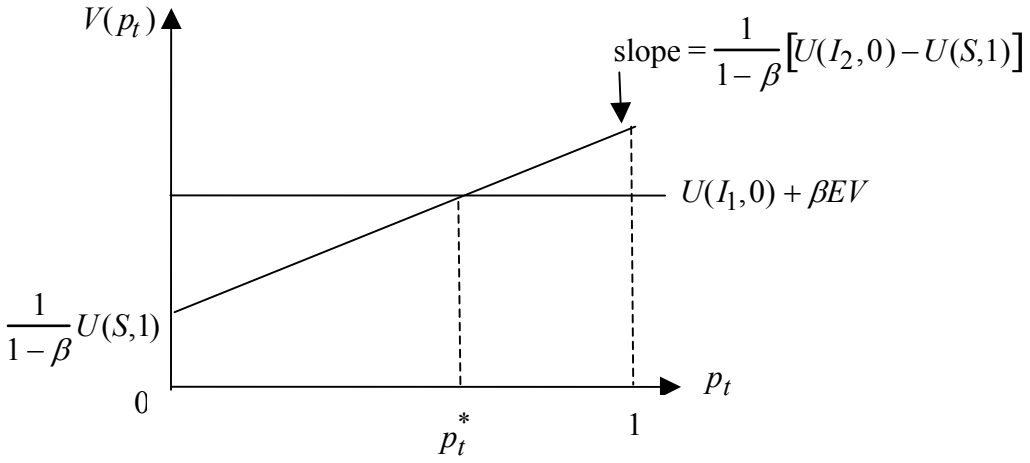
If $V(p_t) = p_t U(I_2,0) + (1-p_t)U(S,1) + \beta V(p_t)$, then:

$$V(p_t) = \frac{1}{1-\beta}\left\{p_t\left[U(I_2,0) - U(S,1)\right] + U(S,1)\right\} \tag{10}$$

so,

$$V(p_t) = \max\left\{U(I_1,0) + \beta EV,\ \left\{\frac{1}{1-\beta}p_t\left[U(I_2,0) - U(S,1)\right] + \frac{1}{1-\beta}U(S,1)\right\}\right\} \tag{11}$$

which can be illustrated graphically as a function of p_t (the probability of getting a better job):



Thus, the optimal quitting rule is given by:

If $p_t < p_t^* \Rightarrow$ do not quit

If $p_t \geq p_t^* \Rightarrow$ quit

We also know:

$$U(I_2,0) > U(I_1,0) > U(S,1) > U(0,1)$$

since utility is increasing in both income and leisure and $I_2 > I_1 > S > 0$.

Thus, when the value of quitting exceeds the value of not quitting ($p_t \geq p_t^*$), the individual should quit her job. Similarly, if the value of not quitting exceeds the value of quitting ($p_t < p_t^*$), she should not quit her current job. An individual's probability of obtaining a better job, p, relative to the probability that makes the value of not quitting equal to the value of quitting, p^*, is one of the key factors in determining whether to quit or not to quit. The values of

S, I_1, and I_2 also will be key determinants in this decision.

To derive the impact changes in S, I_1, I_2, or β have on p*, equation (11) can be written as:[17]

$$V(p_t) = \frac{1}{1-\beta}\left[p^* \left[U(I_2,0) - U(S,1)\right] + U(S,1)\right] \text{ for } p < p^* \tag{12}$$

and

$$V(p_t) = \frac{1}{1-\beta}\left[p\left[U(I_2,0) - U(S,1)\right] + U(S,1)\right] \text{ for } p \geq p^* \tag{13}$$

Integrating over p, simplifying, and solving for p^*, we have:

$$p^* = \frac{U(I_1,0)[1-\beta] + \beta[U(I_2,0) - U(S,1)]p^* F(p^*) + \beta[U(I_2,0) - U(S,1)]\int_{p^*}^{\infty} p dF(p)}{[U(I_2,0) - U(S,1)]} \tag{14}$$

Assuming that $p \sim$ uniform(0,1) implies that $F(p^*) = p^*$ so that $\int_{p^*}^{\infty}$ becomes $\int_{p^*}^{1}$ and

$\int_{p^*}^{1} p\, dp = \frac{1}{2}(1 - p^{*2})$. Therefore, an implicit function for p^* can be defined as:

$$H \equiv p^* - \frac{U(I_1,0)[1-\beta] - \beta[U(I_2,0) - U(S,1)]p^{*2} - (1/2)\beta[U(I_2,0) - U(S,1)][1-p^{*2}]}{[U(I_2,0) - U(S,1)]} = 0 \tag{15}$$

which can be simplified to:

$$H \equiv p^* + (1/2)\beta[1-p^{*2}] - \frac{U(I_1,0)[1-\beta]}{[U(I_2,0) - U(S,1)]} = 0 \tag{16}$$

Appealing to the implicit function rule, the following partial derivatives are obtained:[18]

$$\frac{\partial p^*}{\partial \beta} < 0 \tag{17}$$

[17] Details can be found in Appendix A.
[18] Details can be found in Appendix A.

$$\frac{\partial p^*}{\partial I_1} > 0 \tag{18}$$

$$\frac{\partial p^*}{\partial I_2} < 0 \tag{19}$$

$$\frac{\partial p^*}{\partial S} > 0 \tag{20}$$

A higher discount rate(β) applied to future earnings implies one will be more likely to quit because the (probability) point at which the value of quitting equals the value of not quitting has decreased. Individuals who previously did not quit because $p_t < p^*$, now may find $p_t > p^*$ as they seek to "cash in" on the immediately higher income from job J_2 (again, since both I_1 and I_2 are now more heavily discounted in the future).

A higher income in one's current job (I_1) will increase the reservation probability because now the current job is relatively more attractive. Holding all other variables constant, the probability level at which the value of quitting and not quitting is equal is now higher. Individuals now should be less likely to quit.

Higher earnings in the better job (if one quits) (I_2) leads to a decrease in the reservation probability. Thus, the difference between p and p^* will decrease: individuals will be more likely to quit as expected earnings from obtaining a better job increase.

A higher subsidy (S) will increase the reservation probability. A higher subsidy increases the y-intercept of the graph of $V(p_t)$ and also makes the slope flatter. Thus, if p_t equals zero (or is relatively small) and an individual quits, she can expect to earn S; however, if p_t is relatively high, expected earnings in the future (taking into account there is probability p_t of obtaining the better job and probability $(1-p_t)$ of receiving the subsidy) do not increase as quickly (due to the flatter slope). At p^*, she is indifferent between being at the current job and trying her luck by quitting (in which case she gets S or I_2). Since S has gone up, to have the expected value of

what an individual gets when she quits equal to the same constant number (I_1 and its discounted income in the future), p^* must go up so that $(1-p^*)$ goes down. I_2 now receives a greater probability weight and S receives a lower probability weight.)

This operationalization of quit behavior indicates that welfare subsidies and earnings on the job will be important determinants of observed job separations. Firm-specific human capital theory suggest that job tenure will also be important in determining job separations. The longer an employee remains at her present place of employment, the more specific human capital she is likely to acquire, which increases productivity on the current job. Since her present employer is compensating her for her increased (specific) human capital, and other potential employers will not, it is in her interest to not quit her current job.

The job-matching theory also predicts that tenure on the job will be related to separation behavior, but for different reasons (Jovanovic 1979a,b). Initially, when the worker begins the job, neither the firm nor the worker knows the quality of the job match. Hence, the probability of quitting in the initial stages of employment is low. As time on the job increases and the worker collects more information about the job match, such as information on working conditions, the worker evaluates her job match.[19] Poor matches are resolved by the worker quitting, while good matches result in the worker staying. Thus, this theory predicts that the hazard of a job ending will initially be quite low, then increase as jobs deemed to be bad matches end, followed by a decrease in the hazard as the matches that continue are primarily good ones.[20]

While the amount of specific human capital is not expected to differ across welfare and

[19] Job match theory predicts good matches will receive higher wages and poor matches lower wages. However, information about job match quality cannot come through wages as this job is covered by a union contract.

[20] For studies that examine the role matching has in the tenure-turnover relationship, see Lane and Parkin (1998) and Chapman and Southwick (1991).

non-welfare hires (since jobs held by both in this analysis are entry-level jobs), differential job-matching may provide some explanation if separation behavior differs across welfare status. Welfare hires may have inferior job matches compared to non-welfare hires due to their (possibly) limited past employment experiences and the pressure to obtain a job quickly in order to comply with the new welfare requirements. On the other hand, welfare hires may have better job matches (or bad matches but not act on them by ending the job) compared to non-welfare hires as they may face limited alternative job offers due to, perhaps, less experience and education.[21]

The simple quit model, the theory of firm-specific human capital, and the job-matching theory suggest that a worker's wage, the size of the alternative welfare subsidy, and the length of time with the employer will be important determinants of job separations.

IV. Empirical Analysis

While much attention has been focused on the ability of welfare recipients to find a job, little attention has been given to their turnover behavior. The empirical analysis here is designed to answer three questions: (1) Is the separation behavior of former welfare recipients, in fact, different from other similar workers? If so, how and why does it differ? (2) What types of a work program contributes to higher retention rates? (3) Does the time to separation vary by welfare status for different *reasons* for separating?

A. Time to Job Separation: A Survival Analysis

To explicitly address the issue of job duration or tenure, a survival model is estimated

[21] This is an application of the theory of matching with job search developed by Jovanovic (1979a).

using the entire sample and also estimated separately by welfare status.[22] As presented in Cox and Oakes (1984) and Collett (1994), a proportional hazards model is commonly thought of as being comprised of two pieces, a baseline hazard in which all explanatory variables are zero, $h_0(t)$, and a function that takes on the values of the vector of explanatory variables, $\Omega(X_i,\beta)$:

$$h(t_i,X) = h_0(t_i)\Omega(X_i,\beta), \tag{21}$$

where $\Omega(X_i,\beta)$ is typically specified as $\exp(\beta_{1i}X_{1i} + \beta_{2i}X_{2i} + ... + \beta_{ki}X_{ki})$.[23]

Assuming that the hazard $h(t_i,X)$ is continuous and constant over each interval $[t_j,t_{j+1}]$, and that a specific regression model with a known distribution up to a vector parameter θ has been specified, the likelihood function can be considered to be made up of two pieces, depending on whether the observation is censored or not:[24]

$$\ln L(\theta|X,t) = \sum_{i=1}^{N} \left\{ \tau_i \ln f(t_i|X_i,\theta) + (1-\tau_i) \ln\left[1 - F(t_i|X_i,\theta)\right] \right\} \tag{22}$$

where $\tau_i = 1$ if the observation is not censored (i.e., separates at time t or before) and $\tau_i = 0$ if the observation is censored (i.e., stays beyond time *t*), $f(t_i|X_i,\theta)$ is the probability density function of the random search duration, *T*, and $F(t_i|X_i,\theta)$ is the cumulative distribution function of *T*.

Following Kiefer (1988), the proportional hazard model (equation 21) can be translated into a linear accelerated failure time (AFT) model:

$$\ln(tenure_i) = \alpha_0 + \alpha_1' X_i + \alpha_2' Y_i + \alpha_3' Z_i + \alpha_4' Welfare_i + u_{1i} \tag{23}$$

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[22] For other examples of the use of hazard functions to explore quit behavior, see Light and Ureta (1992), Meitzen (1986), and Sicherman (1996).

[23] See Cox and Oakes (1984), page 70. The use of the exponential function imposes no restrictions on β due to the function's non-negativity.

[24] See Burdett and Cunningham (1998), Kiefer (1988), and Stata Corporation (1999, 2000). The assumption is that censoring times are independent or fixed. If no observations were censored, the likelihood function would simply be the joint probability distribution of the sample as a function of θ.

where α is the vector of coefficients to be estimated and u_{1i} is the error term. The variables included in the model are based on data availability and the theoretical model: The vector X_i consists of a set of personal characteristics, the vector Y_i consists of a set of job-related characteristics, the vector Z_i contains geographic-specific variables, and the dummy variable indicating welfare status is represented by the variable *Welfare*. $Welfare_i$ equals one if the individual is a current or former welfare recipient and zero otherwise. All variables contained in X, Y, and Z are described in Table 1.

Equation (23) can be estimated via MLE by assuming a distribution for u_{1i}. The preferred AFT model estimated is where u_{1i} follows the generalized gamma distribution.[25] The hazard function for the generalized gamma distribution is very flexible; nested within it are the log-normal model (K=0), Weibull model (K=1), and exponential model (K=1 and s=1).

The coefficients estimated for the full sample and by welfare status are reported in Table 4.[26] The first point of interest is that being a welfare hire reduces turnover (see column 1). Being a welfare hire increases median tenure by about seven days. A higher wage rate and being a student also have the effect of increasing median tenure, by 61 days and 25 days, respectively.[27] A higher state benefit also increases median tenure, but by a very small amount (a $10 increase in the state benefit increases median tenure by about one day). The positive impacts of the wage and sate benefit are consistent with the predictions of the theoretical model of quit behavior presented in the previous section. All racial marginal effects are significant at

[25] The model was estimated assuming a log-normal, log-logistic, weibull, and exponential distributions. The generalized gamma was selected as the preferred model based on the Akaike Information Criterion (AIC). The AIC for the gamma model is -243,904; -247,696 for the log-normal; -248,424 for the log-logistic; -256,787 for the Weibull; -271,624 for the exponential. The conclusions did not change when different distributional assumptions were made.
[26] Note that a positive coefficient implies predicted tenure is extended.
[27] This positive impact of a higher wage on retention is consistent with other studies. For example, see Berg et al. 1990, Leete 1996, and Lane and Stevens 1995.

the 90% level. Being a Hispanic increases median tenure by 8 days, while being Asian reduces median tenure by 25 days, being Native American reduces it by 10 days, and being white reduces it by five days (relative to blacks). Females, older workers, and better-educated workers have the effect of reducing median tenure, as do individuals working the day shift. Working the sunrise shift increases median tenure by 6 days.

[Table 4 here]

Based on the estimated coefficients, and using the *average* characteristics by welfare status, the predicted tenure of welfare hires is 128 days, and for non-welfare hires it is 114 days. Thus, the *average* welfare hire stays 14 days longer than the average non-welfare hire.

Looking at the estimated marginal effects for welfare and non-welfare hires, a number of results stand out. Welfare hires appear to be more sensitive to changes in the wage rate.[28] This result suggests that firms have a powerful tool to lower quits among welfare hires (raise the wage). If the wage is too low, welfare hires may see returning to welfare as a viable alternative, whereas non-welfare hires may not consider it. In other words, there are a greater number of viable substitutes to this job for welfare hires, particularly, going back to welfare.

In addition, for a welfare hire to have an education beyond high school, there is no significant impact on the predicted time until separating, while for non-welfare hires it speeds up the time until separating. The magnitude of several of the marginal effects is larger for welfare hires; in terms of the student variable, it possibly indicates that welfare hires place more value on the ability to be able to combine school and work, in the hopes that it will provide them with a better (economic) future. While not statistically significantly different from zero, the impact of previous experience with this employer on time until separation is of interest. Its impact on

[28] The magnitude of the coefficient and marginal effect, however, should make us wary about predicting effects out of sample.

lengthening time until separation for non-welfare hires and speeding up time until separation for welfare hires suggests that non-welfare hires may be better able to take advantage of job match quality information gleaned from the earlier relationship. Non-welfare hires also appear to be more sensitive than welfare hires to the shift of work and to the unemployment rate.

B. The Influence of Work Programs on Separation Behavior

The firm being studied operates over 30 work programs throughout the United States, mainly in major cities.[29] The availability of these programs is not restricted to welfare hires, nor are they offered in all locations that hire welfare recipients. The main program category types are: mentoring programs, in which a more senior employee serves as a guide for the new hire (Mentor); school programs, in which high school or college classes are offered on-site, or at a reduced cost (School); work-related skills programs, in which basic job skill classes are available from local agencies (Work); and transportation programs, which provide the employee with reduced or free transportation to work (Transp).

To examine the impact particular program type availabilities have on the separation behavior of workers, equation (23) will be augmented to include dummy variables representing the type of work-related program available. Thus, equation (23) becomes:

$$\ln(tenure_i) = \delta_0 + \delta_1 X_i + \delta_2 Y_i + \delta_3 Z_i + \delta_4 Welfare_i + \delta_5 Mentor_i + \delta_6 School_i + \delta_7 Work_i + \delta_8 Transp_i + \mu_{2i} \qquad (24)$$

where the δ's represent the parameters to be estimated; the vectors X_i, Y_i, and Z_i and the dummy variable $Welfare_i$ are as described for equation (23); $Mentor_i$, $School_i$, $Work_i$, and $Transp_i$ are the program availability dummy variables as described above; and μ_{2i} is the error term. To focus on

[29] Approximately 28% of the workers in this study have a work program available to them.

the program effects (and for brevity), equation (24) is estimated on the full sample only with the inclusion of interaction terms between welfare and the work program dummy variables to see if the programs have a differential impact by welfare status.

Table 5 presents the coefficients (and marginal effects) from estimating equation (24). Availability of mentoring programs do increase median tenure by 27 days, while all other program types reduce median tenure (work and school programs) or have no significant effect (transportation programs). This provides a strong incentive for firms to actively match welfare hires with a mentor to improve stability. Interacting Welfare with the work program dummy variables indicates that these programs do not have a differential impact across welfare status.

[Table 5 here]

C. Types of Separation: A Competing RisksAnalysis

An individual may separate from his or her employer for a variety of reasons. In addition, separating due to absenteeism is most likely a very different way to end a spell of employment than is separating due to obtaining a different job. A competing risks model is estimated to determine whether welfare hires separate from their jobs for systematically different reasons than non-welfare hires.

Grouping the reasons reported for no longer being employed, there are three distinct processes, identified by the index r:[30]

$r = 1$ job ends due to personal reasons ($N_{NW} = 26{,}692$; $N_W = 1{,}686$)

$r = 2$ job ends due to professional reasons ($N_{NW} = 15{,}051$; $N_W = 698$)

$r = 3$ job ends due to firing for cause ($N_{NW} = 4{,}623$; $N_W = 517$)

[30] The subscript NW refers to non-welfare hires and W refers to welfare hires.

Taking into account covariates and following Cox and Oakes (1984), the log likelihood function for the independent competing risks model is:[31]

$$\ln L = \sum_r \sum_i \log S_r(t_i;\gamma_i) + \sum_r \sum_i d_{ri} * \log h_r(t_i;\gamma_i) \tag{25}$$

where S_r is the survivor function for the rth reason for separating estimated in AFT metric (vs. the log-relative hazard metric of proportional hazard models); h_r is the hazard function for the rth reason for separating estimated in AFT metric; t_i represents observed tenure for the ith employee; d_{ri} is an indicator variable equal to one if individual i separates for reason r, 0 otherwise; and γ_i represents all of the explanatory variables included in equation (23). Assuming independence amounts to assuming that unobservables that contribute to each type of separation are uncorrelated.[32]

The results of the competing risks model are presented separately for welfare and non-welfare hires in Table 6. Being a welfare hire has a significant effect on time until separation for any reason (see notes to Table 6). In particular, tenure is increased if the welfare hire separates for personal reasons. That is, welfare hires tend to delay their time until separation for personal reasons. In addition, welfare hires delay their time until separation for professional reasons and speed up their time until separation for being fired for cause. The view that welfare recipients have many personal issues (child care, etc.) that interfere with their work is not substantiated by these results. However, the result that welfare hires separate faster for being fired for cause

[31] Where an individual is labeled as failing if $r=r_i$, otherwise the individual is censored. See Cox and Oakes (1984).

[32] Söderberg and Lyhagen (1999) propose an information matrix test for dependence between risks. However, since only $\text{tenure}_i=\min(\text{tenure}_{ri})$ and d_i are observed, one cannot test the assumption of independence between tenure_1, tenure_2, and tenure_3 (see Lawless 1982, 483). The assumption of independence is commonly used in research; see Blank (1989), Blank and Ruggles (1994), and Addison and Portugal (1999). For papers using a dependent competing risks framework, see Dolton and van der Klaauw (1999) and van Ophem and Jonker (1997).

suggests that firms may want to monitor the work behavior of welfare hires, such as their attendance. These results are consistent with the job separation study of welfare hires by Berg et al. (1992). It also suggests that it may take a welfare hire longer to find alternative job prospects.

[Table 6 here]

Examining the impact the wage rate has on the predicted time until separation, welfare hires are again found to be more sensitive to changes in the wage rate. In terms of the reason for separating, welfare hires who separate due to professional reasons are most sensitive to a change in the wage rate, while for non-welfare hires, individuals who separate due to being fired for cause are most sensitive to a change in the wage rate.

The greater than high school dummy variable is significant for non-welfare hires, but not for welfare hires. Having greater than a high school education accelerates the time until separation for professional reasons and decelerates the time until separation for being fired for cause (for non-welfare hires). Thus, non-welfare hires who have a high school education or beyond will be more likely to separate sooner, either because they found a different job or because they were dissatisfied with the job match.

Being a student delays the predicted time until separation for both welfare and non-welfare hires, for all separation reasons. Being a student has the largest impact on delaying the time until separation for professional reasons, for both welfare and non-welfare hires. This result is expected since most students have fewer (better) job opportunities available to them, compared to individuals who have completed their education.

Calculating the predicted tenure for welfare hires and non-welfare hires (evaluated at sample averages), by reason for separating, indicates that the average welfare hire is predicted to stay on the job for 50 days if the reason for separation is professional. The average non-welfare

hire is estimated to stay on the job for 34 days if the reason for separating is professional. Looking at personal reasons for separating, the average non-welfare hire's predicted tenure is found to be 84 days; for welfare hires it is 97 days. The predicted tenure for being fired for cause for a welfare hire is 703 days, and for an average non-welfare hire it is 1,293 days.[33] Thus, an average welfare hire's tenure is predicted to be longer than an average non-welfare hire's tenure if the reason for separating is professional or personal, and shorter if the reason for is due to being fired for cause.

V. Summary and Conclusions

This paper looks beyond the probability of welfare recipients finding employment; it focuses on the post-hiring behavior of the welfare recipient and how it compares to the behavior of the non-welfare hire. The results both confirm some earlier findings and provide new insight as to the stability of welfare hires. In particular, a survival analysis finds that welfare hires stay on the job longer than non-welfare hires. At the median tenure, the difference in time until separation may seem relatively small (7 days), but it nevertheless may dispels the idea that welfare hires are unstable workers.

Additionally, welfare hire separations were found to be more sensitive to the wage rate than non-welfare hire separations. If the goal is to increase the retention of welfare hires, increasing the wage rate would be an effective tool; states might consider supplementing the wages of welfare hires directly instead of providing tax credits to the firms hiring them. It also appears as though welfare hire separations are not as sensitive to the shift work as non-welfare hire separations, suggesting firms need not be concerned to which shift they assign welfare hires.

[33] The predicted values for the tenure of being fired for cause should be read with caution. The log likelihood value for this model was much lower than for the other reasons for quitting.

The presence of mentoring programs seems to be of particular importance for lengthening all worker's time to separation. Work and school programs may not directly work in the firm's interest by reducing turnover; however, they could be increasing the general human capital of these employees. The various types of work programs do not have a differential effect on welfare hires, suggesting that these programs are not targeted exclusively to meet the needs of welfare hires, or that welfare hires benefit from the programs by as much as non-welfare hires.

Lastly, the results from a competing risks analysis indicate that welfare hires are not separating for personal reasons at an accelerated rate, compared to non-welfare hires. However, they are separating at an accelerated rate for being fired for cause, and at a slower rate for professional reasons. So, while it may be important to provide for the child care and other personal concerns of welfare recipients to get them into a job, once these issues have been addressed (and the welfare hire is in a job), personal matters do not impact on a welfare hire's separation decision any more than that of a non-welfare hire.

While the results from this study of separation behavior of welfare hires at one firm may or may not be applicable to the population as a whole, this analysis has been able to provide important new insight on a number of questions: (1) welfare hires are not any less stable (and in fact stay slightly longer on the job) than non-welfare hires; (2) the wage level turns out to be the most important factor in determining the time before separation, and is even a stronger determinant for welfare hires than for non-welfare hires; (3) mentoring programs are the best use of resources in lengthening time to separation; and (4) welfare hires do not separate faster for personal reasons, but they do separate faster for being fired for cause, and separate slower for professional reasons.

Table 1: List of Variable Descriptions

Variable Name	Description
Welfare	=1 if welfare-to-work hire; 0 otherwise
<u>Individual Characteristics</u>	
Married	=1 if individual's marital status recorded as married; 0 otherwise (single-divorced is excluded group)
Age	individual's age as of June 1999
Greater than High School	=1 if individual has education greater than high school; 0 otherwise
Student	=1 if individual is recorded as being a student; 0 otherwise
Vet-Handicapped	=1 if individual is recorded as being handicapped or a veteran; 0 otherwise
Female	=1 if female; 0 otherwise
Hispanic	=1 if individual is of Hispanic race; 0 otherwise (excluded racial dummy is Black)
Asian	=1 if individual is of Asian race; 0 otherwise
Native American	=1 if individual is of Native American race; 0 otherwise
White	=1 if individual is of "white" race; 0 otherwise
<u>Job Characteristics</u>	
Wage Rate	hourly wage rate
Previous Experience	=1 if individual recorded as working at company before; 0 otherwise
Sunrise	=1 if individual works sunrise (early AM) shift; 0 otherwise (twilight--approx. 5 PM –8 PM-- is excluded shift)
Night	=1 if individual works night shift (approx. 10 PM – 1 AM); 0 otherwise
Day	=1 if individual works day shift (approx. 11 AM – 2 PM); 0 otherwise
Volume	=volume sorted at location individual works, in 000's (monthly number based on month they started working)
<u>Geographic-specific Variables</u>	
High UR	=1 if unemployment rate for month individual started working is greater than 8%; 0 otherwise
State benefit	State welfare benefit for a single mother of two children, as of 1997

Work Training Programs

Mentor	=1 if facility provides a mentoring program; 0 otherwise
Transp	=1 if facility provides free or reduced-cost transportation; 0 otherwise
Work	=1 if facility provides work-related skills training; 0 otherwise
School	=1 if facility provides high school or college classes on-site or at a reduced cost; 0 otherwise

Table 2: Means of Selected Variables, by Censoring and Welfare Status

Variable	Not Censored (Separate=1)		Censored (Separate=0)	
	Non-Welfare Hires	Welfare Hires	Non-Welfare Hires	Welfare Hires
Age	25 (7.8) [16, 65]	24 (6.6) [17, 53]	25 (8.4) [16, 65]	24 (7.3) [16, 58]
Tenure (days)	47.2 (53.1) [1, 503]	45.9 (53.8) [1, 465]	218.4 (160.4) [3, 729]	212.8 (146.1) [4, 728]
Education (years)	13.0 (1.3) [12, 18]	12.7 (1.0) [12, 18]	12.9 (1.2) [12, 18]	12.7 (1.0) [12,17]
Hourly Wage Rate	$8.51 (0.2) [8.0, 19.8]	$8.50 (0.04) [8.5, 9.0]	$8.59 (0.6) [8.0, 21.5]	$8.54 (0.2) [8.5, 13.9]
Disabled or a Veteran (%)	9	4	7	4
Student (%)	21	22	34	33
% Female	19	46	20	44
% White	37	15	36	13
% Black	49	72	47	68
NOBS	46,366	2,901	29,442	2,125

Note: Standard deviation is in parenthesis; minimums and maximums are in brackets

Table 3: Reasons for Separating

	Non-Welfare Hires	Welfare Hires
Avg. Tenure (days) – Professional Reasons	47.5 (55.3) [1, 503]	44.7 (57.6) [1, 465]
Avg. Tenure – Personal Reasons	47.9 (53.3) [1, 495]	48.9 (56.6) [1, 457]
Avg. Tenure – Fired for Cause	41.8 (43.0) [1, 502]	38.0 (35.5) [1, 433]
NOBS –Professional	15,051 (32.5%)	698 (24.1%)
NOBS – Personal	26,692 (57.6%)	1,686 (58.1%)
NOBS – Fired for Cause	4,623 (10.0%)	517 (17.8%)
NOBS – Total	46,366	2,901

Note: For tenure, standard deviation is in parenthesis and minimums and maximums are in brackets. For NOBS, the percent of classification is in parenthesis.

Table 4: Coefficients and Marginal Effects from Survival Model: Time to Separation

Variable	Full Sample	Non-Welfare Hires	Welfare Hires
Wage rate	0.701***	0.696 ***	8.045 ***
	(0.019)	(0.019)	(0.386)
	[60.52]	[59.58]	[829.28]
Age	-0.078 ***	-0.080 ***	-0.058 **
	(0.006)	(0.006)	(0.028)
	[-6.74]	[-6.82]	[-5.96]
Age squared	0.001 ***	0.001 ***	0.001**
	(0.000)	(0.000)	(0.000)
	[0.10]	[0.01]	[0.12]
Prev. Exp	0.046	0.061	-0.312
	(0.048)	(0.049)	(0.225)
	[4.04]	[5.42]	[-27.76]
Greater than High School	-0.026 *	-0.028 **	-0.011
	(0.014)	(0.014)	(0.054)
	[-2.20]	[-2.37]	[-1.08]
Student	0.268 ***	0.269 ***	0.299 ***
	(0.017)	(0.017)	(0.063)
	[24.79]	[24.60]	[33.18]
Vet-Handicapped	-0.034	-0.030	-0.188
	(0.025)	(0.026)	(0.132)
	[-2.88]	[-2.56]	[-17.77]
Female	-0.106 ***	-0.103 ***	-0.164 ***
	(0.017)	(0.018)	(0.058)
	[-8.84]	[-8.53]	[-16.82]
Hispanic	0.085 ***	0.078 ***	0.105
	(0.023)	(0.023)	(0.089)
	[7.56]	[6.91]	[11.23]
Asian	-0.333***	-0.321 ***	-0.578 ***
	(0.047)	(0.048)	(0.210)
	[24.67]	[-23.67]	[-45.65]
Native American	-0.122 *	-0.131 *	0.021
	(0.073)	(0.076)	(0.272)
	[-9.95]	[-10.53]	[2.21]
White	-0.051 ***	-0.053 ***	-0.039
	(0.015)	(0.015)	(0.077)
	[-4.34]	[-4.47]	[-3.91]

Sunrise	0.069 **	0.074 **	0.077
	(0.033)	(0.034)	(0.116)
	[6.18]	[6.56]	[8.15]
Night	-0.092 ***	-0.093 ***	-0.032
	(0.015)	(0.016)	(0.063)
	[-7.82]	[-7.96]	[-3.25]
Day	-0.055 ***	-0.063 ***	-0.068
	(0.021)	(0.022)	(0.073)
	[-4.64]	[-5.30]	[7.14]
Volume	1.5x10-5 ***	1.5x10-5 ***	1.7x10-5 ***
	(0.000)	(0.000)	(0.000)
	[0.001]	[0.00]	[0.002]
Welfare	0.081 ***	--	--
	(0.028)		
	[7.22]		
State Benefit	0.0011 ***	0.0010***	0.0009***
	(0.000)	(0.000)	(0.000)
	[0.09]	[0.09]	[0.09]
High UR	0.002	0.027 **	-0.314
	(0.218)	(0.228)	(0.748)
	[0.17]	[2.32]	[-27.79]
Married	-0.029	-0.029	0.099
	(0.020)	(0.020)	(0.096)
	[-2.49]	[-2.47]	[10.66]
Constant	-1.614 ***	-1.530 ***	-64.542 ***
	(0.177)	(0.181)	(3.310)
Predicted Mean Tenure (days)		114	128
Log-likelihood	-121976.28	-114624.04	-7208.574
No. Observations	80,834	75,808	5,026

Notes: Standard errors are in parenthesis. Marginal effects are in brackets; they are evaluated at the median tenure. Standard errors for the marginal effects are available from the authors, but indicated levels of significance match those of the parameter coefficients. *** indicates significant at the 99% level; ** indicates significant at the 95% level; * indicates significant at the 90% level.

Table 5: Coefficients and Marginal Effect from Survival Model with Work Program-Specific Dummy Variables

Variable	Coefficient Estimates	Marginal Effects
Wage rate	0.686***	59.07***
	(0.019)	(1.74)
Age	-0.078***	-6.69***
	(0.006)	(0.50)
Age squared	0.001***	0.10***
	(0.000)	(0.01)
Prev. Exp	0.049	4.32
	(0.048)	(4.31)
Greater than High School	-0.030***	-2.61**
	(0.014)	(1.17)
Student	0.279***	25.77***
	(0.017)	(1.68)
Vet-Handicapped	-0.035	-3.00
	(0.025)	(2.09)
Female	-0.099***	-8.32***
	(0.017)	(1.38)
Hispanic	0.060***	5.32***
	(0.023)	(2.05)
Asian	-0.352***	-25.75***
	(0.047)	(2.88)
Native American	-0.130*	-10.52**
	(0.073)	(5.53)
White	-0.060***	-5.14***
	(0.015)	(1.30)
Sunrise	0.051*	4.50
	(0.032)	(2.92)
Night	-0.101***	-8.616
	(0.015)	(1.281)
Day	-0.071***	-5.93***
	(0.021)	(1.70)
Volume	2.7x10-5***	0.0023***

	(1.6x10-6)	(0.0001)
Mentor	0.273***	26.87***
	(0.055)	(6.15)
Trans	0.013	1.17
	(0.026)	(2.30)
Work	-0.419***	-29.83***
	(0.041)	(2.39)
School	-0.307***	-23.87***
	(0.030)	(2.12)
Mentor*Welfare	-0.313	-23.15
	(0.373)	(23.47)
Transp*Welfare	-0.064	-5.33
	(0.117)	(9.48)
Work*Welfare	-0.188	-14.76
	(0.151)	(10.75)
School*Welfare	-0.070	-5.82
	(0.065)	(5.23)
Welfare	0.117***	10.60***
	(0.034)	(3.21)
State Benefit	0.00112***	0.0965***
	(0.00007)	(0.0062)
High UR	-0.017	-1.49
	(0.217)	(18.36)
Married	-0.027	-2.31
	(0.019)	(1.64)
Constant	-1.574***	
	(0.176)	
Log-likelihood	-121841.15	

NOBS=80,834. Standard errors are in parenthesis. *** indicates significant at the 99% level; ** indicates significant at the 95% level; * indicates significant at the 90% level. Marginal effects are evaluated at the median tenure.

Table 6: Coefficients and Marginal Effects from Competing Risks Model: Separation Type

	Non-welfare Hires			Welfare Hires		
Variable	Personal	Professional	Fired for Cause	Personal	Professional	Fired for Cause
Wage rate	0.818***	0.669***	0.886***	7.498 ***	8.780***	8.600***
	(0.029)	(0.032)	(0.093)	(0.506)	(0.786)	(0.966)
	[69.52]	[56.90]	[75.27]	[637.35]	[746.31]	[730.99]
Age	-0.062***	-0.124***	-0.033*	-0.039	-0.137***	0.014
	(0.008)	(0.011)	(0.019)	(0.038)	(0.055)	(0.063)
	[-5.26]	[-10.54]	[-2.84]	[-3.33]	[-11.62]	[1.20]
Age squared	0.001***	0.002***	0.006**	0.001	0.002***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
	[0.09]	[0.15]	[0.050]	[0.07]	[0.20]	[-0.02]
Prev. Exp	0.124**	0.132	-0.245*	0.269	1.195***	-1.419***
	(0.065)	(0.088)	(0.147)	(0.299)	(0.500)	(0.492)
	[11.17]	[11.94]	[-18.56]	[20.11]	[192.60]	[-65.66]
Greater than High School	-0.000	-0.148***	0.246***	-0.001	-0.139	0.184
	(0.019)	(0.025)	(0.044)	(0.072)	(0.108)	(0.125)
	[0.00]	[-12.55]	[21.12]	[0.05]	[-11.69]	[15.94]
Student	0.178***	0.447***	0.278***	0.192***	0.547***	0.264**
	(0.023)	(0.032)	(0.053)	(0.084)	(0.126)	(0.138)
	[15.84]	[42.72]	[23.36]	[17.13]	[53.46]	[24.00]
Vet-Handicapped	0.004	-0.182***	0.373***	0.197	-0.641***	-0.447
	(0.034)	(0.045)	(0.082)	(0.180)	(0.259)	(0.314)
	[0.34]	[-14.38]	[37.30]	[18.39]	[-41.37]	[-31.22]
Female	-0.162***	-0.060*	-0.001	-0.304***	-0.040	0.008
	(0.024)	(0.032)	(0.054)	(0.078)	(0.118)	(0.132)
	[-13.14]	[-4.99]	[-0.12]	[-25.61]	[-3.40]	[0.65]
Hispanic	0.130***	-0.203***	0.533***	0.117***	-0.010	0.368*
	(0.031)	(0.042)	(0.072)	(0.113)	(0.181)	(0.217)
	[11.63]	[-16.00]	[56.10]	[10.39]	[0.88]	[36.07]
Asian	-0.337***	-0.543***	0.555***	-0.968**	-0.298	2.858***
	(0.063)	(0.085)	(0.153)	(0.272)	(0.421)	(0.854)
	[-24.51]	[-36.05]	[62.33]	[-53.50]	[-22.01]	[1335.64]
Native American	-0.096	-0.332***	0.324	0.191	0.128	-0.439
	(0.100)	(0.135)	(0.235)	(0.366)	(0.547)	(0.583)
	[-7.79]	[-24.07]	[32.50]	[17.89]	[11.58]	[-30.30]

White	0.032*	-0.386***	0.585***	0.001	-0.276*	0.137
	(0.020)	(0.028)	(0.048)	(0.102)	(0.154)	(0.178)
	[2.77]	[-31.35]	[54.54]	[0.08]	[-21.31]	[12.22]
Sunrise	0.213***	0.259***	-0.728***	0.167	0.522**	-0.474**
	(0.045)	(0.061)	(0.097)	(0.154)	(0.246)	(0.251)
	[19.93]	[24.68]	[-45.60]	[15.29]	[56.08]	[-33.22]
Night	-0.136***	-0.048*	-0.035	-0.160**	0.190	-0.036
	(0.021)	(0.028)	(0.049)	(0.083)	(0.128)	(0.149)
	[-11.38]	[-4.07]	[-3.05]	[-12.59]	[17.76]	[-3.03]
Day	0.063**	-0.222***	-0.333***	0.181*	0.012	-0.210***
	(0.029)	(0.038)	(0.066)	(0.097)	(0.149)	(0.169)
	[5.48]	[-17.46]	[-25.21]	[16.24]	[0.99]	[-16.91]
Volume	0.000***	0.000***	0.000***	0.000***	0.000***	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	[0.001]	[0.002]	[0.002]	[0.002]	[0.002]	[-0.001]
High UR	0.074	0.456	-1.178	-0.477	-0.241	0.169
	(0.301)	(0.417)	(0.778)	(0.976)	(1.483)	(1.714)
	[6.54]	[49.14]	[-58.90]	[-32.29]	[-18.24]	[15.69]
State Benefit	0.001***	0.001***	-0.000	0.001***	0.001*	-0.010
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	[0.10]	[0.11]	[0.002]	[0.11]	[0.09]	[0.08]
Married	-0.003	-0.101***	0.216***	0.021	0.050	0.560***
	(0.027)	(0.035)	(0.062)	(0.129)	(0.196)	(0.216)
	[-0.24]	[-8.30]	[19.72]	[1.82]	[4.34]	[60.89]
Constant	-2.319***	0.953***	-0.235	-59.589***	-68.736***	-67.857***
	(0.263)	(0.298)	(0.767)	(4.341)	(6.683)	(8.296)
Log-likelihood	-80635.226	-53947.563	-21534.854	-5050.332	-2731.000	-2126.962
Ave. Predicted Time Until Separation (days)	84	34	1,293	97	50	703
NOBS Failed	26,692	15,051	4,623	1,686	698	517

Notes: Dependent variable is log tenure. NOBS=80,834. Standard errors are in parenthesis, marginal effects are in brackets; they are evaluated at the median tenure. *** indicates significant at the 99% level; ** indicates significant at the 95% level; * indicates significant at the 90% level. Results from the competing risk model estimated on the full sample re available from the authors. In that estimation the coefficient [and marginal effect] on the welfare dummy variable are: 0.133*** [12.02] for Personal, 0.219*** [20.52] for Professional, and -0.300*** [-22.48] for Fired for Cause.

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Appendix A: Intermediate Steps for Quit Theory

Derivation of Equations (12) and (13):

Equation (11) can be written as:

$$V(p_t) = U(I_1,0) + \beta EV \text{ if } p < p^* \tag{A1}$$

and

$$V(p_t) = 1/(1-\beta)[U(I_2,0) - U(S,1)]p_t + 1/(1-\beta)U(S,1) \text{ if } p \geq p^* \tag{A2}$$

At p*, equations (A1) and (A2) are equal:

$$U(I_1,0) + \beta EV = 1/(1-\beta)[U(I_2,0) - U(S,1)]p^* + 1/(1-\beta)U(S,1) \tag{A3}$$

Solving for p*, the intermediary steps are:

$$1/(1-\beta)\{[U(I_2,0) - U(S,1)]p^* + U(S,1)\} = U(I_1,0) + \beta EV \tag{A4}$$
$$[U(I_2,0) - U(S,1)]p^* + U(S,1) = [U(I_1,0) + \beta EV][1-\beta] \tag{A5}$$
$$[U(I_2,0) - U(S,1)]p^* = [U(I_1,0) + \beta EV][1-\beta] - U(S,1) \tag{A6}$$

Thus,

$$p^* = \frac{[U(I_1,0) + \beta EV][1-\beta] - U(S,1)}{[U(I_2,0) - U(S,1)]} \tag{A7}$$

which can be re-written as:

$$p^* = \frac{[U(I_1,0)][1-\beta] + \beta EV[1-\beta] - U(S,1)}{[U(I_2,0) - U(S,1)]} \tag{A8}$$

Using this expression for p^* and equation (A3), equations (A1) and (A2) are modified to yield equations (12) and (13) in the text.

Details of Integrating Equations (12) and (13) over p:

Integrating equations (12) and (13) over p , we have:

$$(1-\beta)EV = [U(I_2,0) - U(S,1)]\int_0^{p^*} p^* \, dF(p) + U(S,1)\int_0^{p^*} dF(p) + [U(I_2,0) - U(S,1)]$$

$$\int_{p^*}^{\infty} pdF(p) + U(S,1)\int_{p^*}^{\infty} dF(p) \tag{A9}$$

Which simplifies to:

$$(1-\beta)EV = [U(I_2,0) - U(S,1)]p^* F(p^*) + [U(I_2,0) - U(S,1)]\int_{p^*}^{\infty} pdF(p) + U(S,1)\int_{0}^{\infty} dF(p) \tag{A10}$$

Substituting (1-β)EV from equation (A10) into equation (A8), we have:

$$p^* = \{U(I_1,0)[1-\beta] + \beta\{[U(I_2,0) - U(S,1)]p^* F(p^*) + [U(I_2,0) - U(S,1)]\int_{p^*}^{\infty} pdF(p) + U(S,1)\int_{0}^{\infty} dF(p)\} - U(S,1)\} / [U(I_2,0) - U(S,1)] \tag{A11}$$

Since $\int_{0}^{\infty} dF(p)$ equals one,

$$p^* = \frac{U(I_1,0)[1-\beta] + \beta[U(I_2,0) - U(S,1)]p^* F(p^*) + \beta[U(I_2,0) - U(S,1)]\int_{p^*}^{\infty} pdF(p)}{[U(I_2,0) - U(S,1)]} \tag{A12}$$

which is equation (14) in the text.

Derivation of the Partial Derivatives:

The implicit function rule indicates that $\frac{\partial p^*}{\partial x} = \frac{-H_i}{H_{p^*}}$ where $x = \{I_1, I_2, S, \beta\}$. Taking the derivative of H (equation 16 in the text) with respect to p^*, we have:

$$H_{p^*} = 1 + \beta p^* > 0 \tag{A13}$$

which is greater than zero since the range of p^* is [0,1] and $\beta > 0$

Next, taking the derivative of H with respect to β, we obtain:

$$H_\beta = 1/2(1 + p^{*2}) + \frac{U(I_1,0)}{[U(I_2,0) - U(S,1)]} > 0 \tag{A14}$$

which is greater than zero since the range of p^* is [0,1] and $U(I_2,0) > U(S,1)$ and

$U(I_1,0) > 0$.

Now, taking the derivative of H with respect to I_1:

$$H_{I_1} = \frac{-(1-\beta)U_{I_1}}{[U(I_2,0) - U(S,1)]} < 0 \qquad \text{(A15)}$$

where U_{I_1} refers to $\frac{\partial U}{\partial I_1}$

which is less than zero since $U(I_2,0) > U(S,1)$, $U_{I_1} > 0$, and $\beta > 0$.

Looking at the derivative of H with respect to I_2:

$$H_{I_2} = \frac{U(I_1,0)[1-\beta]U_{I_2}}{[U(I_2,0) - U(S,1)]^2} > 0 \qquad \text{(A16)}$$

where U_{I_2} refers to $\frac{\partial U}{\partial I_2}$, which is greater than zero since $U_{I_2} > 0$, $\beta > 0$, and $U(I_1,0) > 0$.

Finally, the derivative of H with respect to S:

$$H_S = \frac{-U(I_1,0)[1-\beta]U_S}{[U(I_2,0) - U(S,1)]^2} < 0 \qquad \text{(A17)}$$

which is less than zero because $U_S > 0$, $\beta > 0$, and $U(I_1,0) > 0$.

In summary, we found:

$H_{p^*} > 0$ from equation (A13)
$H_\beta > 0$ from equation (A14)
$H_{I_1} < 0$ from equation (A15)
$H_{I_2} > 0$ from equation (A16)
$H_S < 0$ from equation (A17)

This signage leads to the partial derivatives in equations 17-20 in the text.