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GENDER DIFFERENCES IN DEPARTURES FROM A LARGE FIRM

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ABSTRACT

Looking at the personnel records of workers in a large company, where detailed reasons for worker departure are recorded, I find striking differences in the exit patterns between men and women. As is well known, a higher proportion of women leave for a variety of non-market reasons. Further, women state more often that wages, and not opportunities, as a reason for switching jobs. Women, on average, are more likely to leave the firm. This is specially true in periods of early tenure. For both men and women, the likelihood of departure increases in the first two months of tenure, and then declines at a decreasing rate. This decline is stronger for women. Using a proportional hazard model, with controls for observed characteristics, I find that tenure beyond five years, women are less likely to leave the firm than men. Tenure turnover profiles are computed for the different reasons of departure. This detailed breakdown provides additional insights into gender differences in quit behavior.

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1. INTRODUCTION

Several recent studies have focused on the issue of gender differences and job mobility.[1] The main question addressed is whether women have a weaker attachment to their jobs and to the labor market. Most of these studies use micro datasets and the analyses are typically restricted to young workers. Further, the distinctions between different types of turnover behavior have not been a focal point in this literature. The highest level of disaggregation of turnover has been between quits and layoffs. Using mostly discrete choice analysis (probit, logit), and sometimes continuous time models (proportional hazard), these studies estimate the gender gap, after controlling for a variety of worker and job characteristics.[2]

This paper extends this literature on gender differences and quit behavior in several dimensions: (1) I use a unique data set from the personnel records of workers in a large firm; (2) Unlike other studies that focus simply on quits, I differentiate between a variety of reasons for departure and show that gender differentials vary across the different reasons for departure; (3) I discuss gender differences for a variety of tenure turnover profiles, each based on a different reason for departure; and (4) I show that education, in addition to having different effects on the quit behavior of men and women, also has differential effects for the different reasons of departure.

The main findings are:

1. Women, on average, are more likely to leave the firm. Most of the gap is because women are younger and work in lower level jobs.

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[1]Barnes and Ethel (1974), Viscusi (1980), Blau and Kahn (1981), Meitzen (1986), Donohue (1988), Light and Ureta (1990, 1992).

[2]For a good survey of this literature, up to 1988, see Donohue (1988).

2. After controlling for a variety of observed characteristics, especially job grade level and duration in training, the gender gap decreases by more than half, but remains significant.

3. Men and women leave the firm for different reasons. Women leave more for non-market reasons, and when switching jobs they state more than men that wages, and not opportunities, as the main reason for quitting.

4. For both men and women, the likelihood of departure increases in the first 2 months of tenure, and then declines at a decreasing rate. This decline is stronger for women. For tenure beyond five years, women are less likely to leave the firm than men.

5. The effects of tenure and schooling, on the likelihood of departure, vary substantially across the different reasons for departure. These different reasons for departure are found to be statistically different states.

The paper proceeds as follow: Section 2 describes the data set, sex differences in reasons for departure, and the change of the hazard with tenure in the firm. A continuous time, competing risks model of quitting for different reasons is presented in Section 3. The estimation results are reported and discussed in section 4. Section 5 concludes.

An underlying assumption in this paper is that different reasons for departure represent different behaviors aspects of workers (i.e., are statistically distinct states). In Appendix A I test and confirm this hypothesis.

2. THE DATA SET AND DESCRIPTIVE STATISTICS

The data used in this paper are taken from the personnel records of a large insurance company. The company has its headquarter in New York City and has branches all over the United States. The company employs approximately 16,000 workers, exclusive of agents who operate on a commission basis. Workers are "followed" over the period 1971-80. For

workers who entered the firm prior to 1971, the starting date of employment and other variables concerning their work history in the firm are recorded.

Workers in the company are tracked by their salary grade (grade level) and by one of approximately 40 company-wide job foci. Each job focus is assigned a sequence of grade levels. Promotion is defined in terms of salary grade levels. Grade level 50 is of special interest because it indicates that the worker is being trained.

Workers who left the company were asked to state the main reason for doing so.[3] 18 reasons were recorded and 23,299 individuals were reported to leave the firm between 1971 and 1978. Table 1 reports the distribution of different departure reasons by three major categories: Career relevant reasons, non-market reasons, and involuntary departures.[4] The fact that only one reason for departure per individual has two shortcomings: It prevents me from estimating the correlation between different reasons for departure and does not allow a control for the presence of individuals' (unobserved) fixed effects.[5]

Some of the data sets used in other studies do provide various reasons for departure (especially the NLSY and the PSID), but not as detailed as in this firm data. However, the

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[3]Workers who left the firm had to fill a questionnaire in order to get their last pay check, resulting in a response rate of 100 percent. It is possible that not all workers gave a faithful answer (see the high rate of "other"), but there is no indication or reason to assume that there will be a bias towards certain answers when not telling the truth. Only one reason per worker was recorded.

[4]Since labor market and non labor market decisions are made jointly, leaving a job for non market reasons could be motivated by labor market considerations and visa versa. The decision to have a child, for example, and its timing could be influenced by the availability of career opportunities. Change of residence for the purpose of following a spouse ("a tied mover"), is likely to be influenced by the position one has achieved in the firm (see Mincer 1978). Therefore, the classification into these three categories should be considered only as a general classification for expository purposes.

[5]For the possibility to handle heterogeneity as fixed effects, see Chamberlain (1985).

studies that used those data set did not utilize the distinction between different reasons for quitting (or departure). Numerous studies have shown that quits and layoffs are statistically distinct states (e.g., Mincer 1986).[6] Other distinctions between reasons of departure were also found to be important. For example, Flinn and Heckman (1983) found that unemployment and out of the labor force were behaviorally distinct states. Kahn and Griesinger (1989), showed that if men are more likely to quit for career related reasons than women, estimated male-female differences in the effect of tenure on wage growth are likely to be biased (without an appropriate correction.) In this paper I further show that even a detailed breakdown of reasons for departure is important. For example, Donohue (1988) finds an increase in the hazard of quitting for women after about a year of employment (on their first job), and suggests pregnancy as a possible explanation. This dataset allows me to separate quitting due to pregnancy. Unfortunately the data set does not allow me to test to what extent this breakdown is important in predicting future outcome (e.g., unemployment, wage growth).

There are several other advantages to a firm data set over other types of data. Detailed company records are usually more accurate than individual responses. A crucial variable in testing turnover theories is firm tenure. As Brown and Light (1992) have shown, the commonly used panel data sets (PSID and NLS) provide inaccurate measures of tenure, a potential source of problems[7]. The data set used in this paper utilizes the **exact dates of employment** to measure tenure. Most of the other variables are also based on company

[6]McLaughlin (1991) was the first to show that this distinction is also compatible with efficient turnover.

[7]The NLSY-Work History file provides quite a detailed list of employment spells. Nevertheless, it is still based on individuals' self report and subject to more errors than company's records.

records that are, mostly, accurate and provide the exact dates of events. In addition, using a firm data set eliminates heterogeneity due to differences across firms and industries.

Another important characteristic of the data set is that information is provided continuously. Rather than interviews conducted once a year, as in most panel data sets, the company records report the dates of events. The empirical analysis, therefore, is carried out using continuous time models adopted from survival analysis. This technique is most suitable for the continuous-time data set used and is superior to more conventional methods used in estimating transitions models.[8] As mentioned before, in order to estimate different outcomes, a "competing risks" framework is used.

There are several shortcomings to the data that pose some constraints on the analysis. Since it is a firm data set, there is no information about workers prior and post employment histories. Also, the level of occupational sex segregation in the company analyzed is extremely high. Therefore, findings that are attributed to sex differences are likely to be confounded with occupational differences. Although this problem is more noticeable in this data, it is a common problem in most studies of sex differentials in the labor market and is not resolved in the other studies that I cite[9]. Finally, as in the case of every firm data, any general conclusions should be made with caution.

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[8]For example, the parameters of a continuous time model are invariant with respect to the time unit chosen, while discrete time models (e.g. probit or logit) will have different function forms depending on the time unit. Donohue (1988), discusses other advantages of this approach over discrete time modelling.

[9]It seems that the data utilized by Weiss (1984) is an exception.

2.1 Male Female Differences in Reasons for Departure

There are striking differences between men and women in the distribution of reasons for departure (see Table 1).[10] Women are more likely to leave the firm because of personal or household considerations. Twelve percent of women who leave the firm do so because they have changed residence. Only 4 percent of the men leave for that reason. Seven percent of women depart because of household responsibilities: men rarely leave for that reason. Approximately six percent of women leave because of personal health or illness in the family, while 2.6 percent of the men leave for these reasons. Men almost never leave the firm because of illness in the family. Pregnancy is also an important reason for women to depart (5 percent).

Women are more likely to switch to a job nearer home. Dissatisfaction with working conditions or "higher earnings" appear to be more of female departure reasons, while "greater opportunity" is more commonly a male cause of departure. These differences suggest that on-the-job training and long run (career) considerations are more important for explaining male mobility, while short run (market) considerations are a major reason for female job change.

[10]Some of these differences are due to the fact that women, in this company, are younger, less educated, and are in different job levels. I will attempt to control for these differences in my regressions' estimates.

Table 1
Distribution of reasons of departure
by race and sex

Reason for Departure	ALL	MALE	FEMALE	WHITE	NON WHITE
Market related reasons					
Higher earnings	.101	.088	.104	.103	.094
Better working conditions	.028	.004	.009	.008	.007
Greater opportunities	.071	.124	.058	.074	.062
Nearer home	.008	.013	.032	.032	.016
More interesting/suitable work	.096	.088	.098	.103	.077
Enter agent's contract*	.035	.144	.006	.040	.020
Non-market reasons					
Pregnancy	.041		.052	.044	.033
Change of residence	.106	.038	.123	.107	.103
Return to school	.067	.081	.064	.058	.095
Household duties	.055		.069	.058	.045
Health-personal	.033	.019	.037	.029	.045
Illness in family	.016	.007	.018	.013	.023
Military service leave	.002	.008	.001	.001	.004
Other	.150	.127	.156	.144	.169
Involuntary departure					
Dismissal	.099	.097	.100	.074	.174
Position abolished	.032	.020	.036	.034	.027
Retirement	.053	.125	.034	.069	.004
Death	.007	.017	.004	.008	.002
Total	1.00	1.00	1.00	1.00	1.00
Number of observations	23299	4788	18511	17425	5874

* Workers who enter an agent's contract are no longer employed by the firm.

2.2 Tenure in the Firm and the (Empirical) Hazard of Departure.

Economic analyses focused on firm tenure to determine the duration effect on firm separation. It is well known that tenure has a strong negative effect on the likelihood of turnover. This finding has led to an informative debate regarding the determinants of this effect.[11] Previous studies that examined sex differences of the tenure effect remained somewhat inconclusive. Most studies, however, find that the hazard of quitting decreases with tenure for both men and women (e.g., Viscusi (1980), Blau and Kahn (1981)).[12] In section 4.2 I estimate the hazard of departure for men and women separately, and by different reasons of departure. In this section I provide the observed hazard rates of departure, by gender. Although it is a common practice in estimating duration models to conduct a preliminary graphical analysis of the data (see, e.g., Lawless 1982), these rates are not reported in any of the studies I am familiar with.

In Figure 1 the empirical hazards of departure from the firm as a function of tenure in the firm (in months) are plotted for men and women separately.[13] The hazard rate is

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[11]Following Mincer and Jovanovic (1981) the debate has focused on the mirror side of the same problem, namely, whether tenure, independent of market experience, has a positive effect on wages (see, e.g., Abraham and Farber (1987), Altonji and Shakotko (1987), and Topel (1991)).

[12]One exception is Meitzen (1986) who finds that, contrary to men, the probability of quitting for women is increases with tenure. His sample, taken from the Employment Opportunities Pilot Programs Employers' Survey (EOPP) was limited to recently hired, primarily low skilled, workers.

[13]Let d_t be the number of workers that depart from the firm at time t and n_t the number of individuals at risk of departure at time t. Individuals at risk are all those who are observed in the firm at time t, and include those who depart and those who stay. $\hat{\lambda}_t=d_t/n_t$ is therefore an estimator for the hazard of departure at time t. Different versions of this estimator are discussed in the statistical literature (see, e.g. Lawless 1982), and it is mostly known as the Kaplan-Meier estimate. Under suitable assumptions this estimator is the maximum likelihood estimator of the nonparametric hazard function.

decreasing at a declining rate for both men and women. The reduction of the hazard rate is larger for women than for men, but remains higher for women at every level of tenure[14]. In the statistical analysis I test whether the difference is significant and whether it prevails after controlling for different individual characteristics. In addition I examine the male-female disparity regarding different reasons for departure.

An interesting point to make concerns the initial increase in the hazard at a low level of tenure. There are several reasons why would one expect an initial increase in the hazard (it is also one of the implications of Jovanovic's (1979) matching model). Such an increase is observed, for both men and women, only during the first couple of months of employment.[15]

[14]Farber (1992) finds, using the NLSY, that females have a lower exit rate from the first job.

[15]Meitzen (1986) finds a positive duration effect only for women, over the first 2.5 years of employment. Donohue (1988) and Farber (1992) also finds a positive duration effect up to 3-6 months, for workers in their first job.

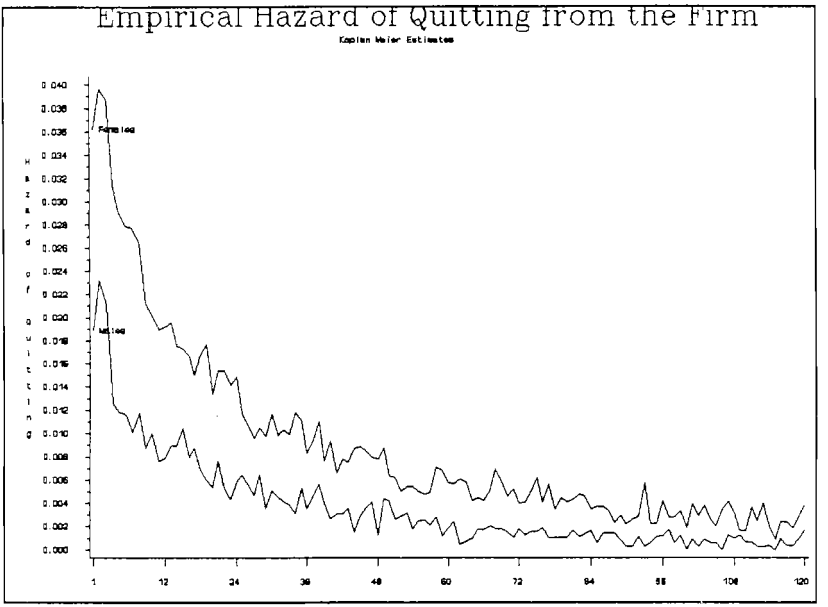
Empirical Hazard of Quitting from the Firm
Kaplan Meier Estimates
Females
Males
0.040
0.038
0.036
0.034
0.032
0.030
0.028
0.026
0.024
0.022
0.020
0.018
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
1
12
24
36
48
60
72
84
96
108
120

Figure 1

3. THE STATISTICAL MODEL[16]

The statistical analysis is conducted using continuous-time duration models (see, e.g., Kalbfleisch and Prentice, 1980 (K&P)). Individuals are observed continuously from 1971 until December 1980. For all those employed in 1971 the starting date of their employment is recorded, thus no left-truncation or censoring is present. Workers who do not leave the firm by the end of the survey are considered as right censored observations. This type of censoring poses few problems in the analysis.[17] Although we do not know whether or when will those who are censored leave the firm, we do know that they have been in the firm, without leaving, at least until the time of censoring. This partial information is taken into account in the estimation procedure.

Let T be a non-negative random variable representing the departure time from the firm. For a fixed time t, the survivor function is defined as

$$S(t) = P(T \geq t),\ 0 < t < \infty. \tag{1}$$

Under this specification, S(t) gives the cumulative distribution function of the right tail of the distribution, i.e., S(t)=1-F(t), where F(t) is the cumulative distribution function. S(t) is a monotone nonincreasing left continuous function with S(0)=1 and $\lim_{t\to\infty} S(t)=0$.
The probability density function (p.d.f.) of T is

$$f(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T < t+\Delta t)}{\Delta t} = \frac{-dS(t)}{dt}. \tag{2}$$

The hazard function specifies the instantaneous rate of failure at T=t, conditional

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[16]Readers who are familiar with survival analysis can skip equations (1)-(6).

[17]For a discussion of right censoring problems see, for example, Lawless 1982, and Cox and Oakes 1984.

upon survival to time t and is defined as

$$h(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T < t+\Delta t \mid T \geq t)}{\Delta t} = \frac{f(t)}{S(t)}. \tag{3}$$

It can be seen that h(t) specifies the distribution of T since, from (3),

$$h(t) = \frac{-d \log S(t)}{dt} \tag{4}$$

So that integrating and using $S(0)=1$, we obtain

$$S(t) = \exp\left[-\int_0^t h(u)du\right] \tag{5}$$

The p.d.f. of T can be written in terms of h(t) as

$$f(t) = h(t) \exp\left[-\int_0^t h(u)du\right] \tag{6}$$

Duration dependence exists if $dh(t)/dt \neq 0$.

The objective of the present analysis is to analyze the conditional duration distribution where the conditioning is with respect to observed variables. For the estimation procedure I adopt a "flexible" Box-Cox proportional hazard model, given by:[18]

$$h(t \mid x) = \exp\left\{ x'(t)\beta + \left[\frac{t^{\lambda_1} - 1}{\lambda_1}\right] \tau_1 + \left[\frac{t^{\lambda_2} - 1}{\lambda_2}\right] \tau_2 \right\} \tag{7}$$

[18]In using this model I follow Flinn and Heckman (1982) and Heckman and Singer (1984).

where $\lambda_1 \neq \lambda_2$, x(t) is a 1 x k vector of regressors and β is a k x 1 vector of parameters.

This model is flexible in the sense that it nests many standard models as a special case. Setting, for example, $\beta = 0$, $\lambda_1 = 0$ and $\tau_2 = 0$ produces a conventional Weibull hazard; setting $\lambda_2 = 0$ and $\lambda_1 = 1$ produces a Gompertz hazard; Setting $\tau_1 = \tau_2 = 0$ produces an exponential model. By setting $\lambda_1 = 1$ and $\lambda_2 = 2$ we allow the duration effect to change signs. I will call this class of models "quadratic."[19] Under this specification the hazard function is given by:

$$h(t|x) = \exp\{ x'(t)\beta + (t-1)\tau_1 + ((t^2-1)/2)\tau_2\}. \quad (8)$$

In the empirical analysis I use this specification because it provided the best fit to the data.

So far all reasons for departure were aggregated under one category. In other words the coefficients of different variables on the likelihood of departure from the firm were constrained to be equal across different reasons for departure. A major question in this research is whether different reasons for departure are statistically distinct. In other words, do different observed characteristics have different effects on the likelihood of leaving the firm for different reasons?

Let each worker be associated with a pair (T,R) where T is tenure with the firm at the time of departure and R is the reason for departure. R is assumed to take values in the set {1,2,..,k}. The joint distribution of T and R can be represented through cause-specific hazard, survivor, or probability density functions defined as follows for j=1,2,...,k :

$$h_j(t) = \lim_{\Delta t \to 0} \frac{P(t \leq T < t+\Delta t \ , \ R=j | T \geq t)}{\Delta t} \quad (9a)$$

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[19]The estimation of the model is conducted by using a computer program designed for the purpose of estimating continuous time models (CTM). The program was developed at NORC and written by George Yates. For details see Yi (1987).

$$S_j(t) = P(T \geq t\ ,\ R=j) \tag{9b}$$

$$f_j(t) = \frac{-dS(t)}{dt} \tag{9c}$$

If a worker ceases to be observed as soon as $T=\min(T_1,T_2,\ldots,T_k)$ is observed, the contribution to the likelihood of a worker who depart for reason j at tenure level t_j is[20]

$$h_j(t)\ \exp\left[-\int_0^{t_j}\sum_{\ell=1}^{k} h_\ell(u)du\right]. \tag{10}$$

Not all workers are observed departing the firm by the end of the study. Indicating censored observations by $\delta_i=0$ (and uncensored observations by $\delta_i=1$) and assuming an independent noninformative censoring mechanism, the likelihood function of observing a sample of n workers with observed characteristics Z_i and departure time t_i is given by

$$\prod_{i=1}^{n}\left[[h_{ij}(t_i|Z_i)]^{\delta i}S(t_i|Z_i)\right] = \prod_{i=1}^{n}\left[[h_{ij}(t_i|Z_i)]^{\delta i}\prod_{j=1}^{k}\exp\left[-\int_0^{ti} h_{ij}(u|Z_i)du\right]\right]. \tag{11}$$

It is interesting to observe (see K&P) that under the assumptions made so far, without unobserved heterogeneity across individuals, the likelihood factor involving a specific $h_{ij}(t\,|\,Z)$ is identical to that which would be obtained by regarding all failures of types other than j as censored at the individual's departure time. Therefore we can adopt the same estimation method used earlier in estimating the competing risks models.

Let the conditional hazard of individual i to leave the firm for reason j be given by:

$$h_{ij}(t_{ij}|x) = \exp\left\{x'(t)\beta_j + \left[\frac{t^{\lambda_1}-1}{\lambda_1}\right]\tau_{ij} + \left[\frac{t^{\lambda_2}-1}{\lambda_2}\right]\tau_{2j}\right\}, \tag{12}$$

[20]For details see Lawless (1982) pp. 481-482.

where t_{ij} is duration in the firm before departure for reason j, $\lambda_1 \neq \lambda_2$, x(t) is a 1 x k vector of regressors and β_j is a destination specific k x 1 vector of parameters. The estimated parameters of equation (12) for different reasons of departure were obtained separately for men and women, using maximum likelihood estimation, and setting $\lambda_1 = 1$ and $\lambda_2 = 2$. The advantage of this specification is that it allows the duration effect to be non-linear. The results are reported in tables 3 and 4.

The nature of the data set and the assumption of independence across risks, do not allow me to examine two important issues: The interrelation between different reasons for departure, and the estimation of departure rate for a certain reason given the "removal" of some or all other quitting reasons. A suitable data set for such an analysis will have information on multiple exit reasons, either simultaneously or sequentially.

The hazard function in equation (12) could be extended to include person-specific unobserved heterogeneity component (see Heckman and Singer, 1985). Although controlling for unobserved heterogeneity could be important in studying gender differences, my attempts to include various specifications for unobserved heterogeneity failed[21]. I could not achieve convergence.

4. RESULTS

4.1 Gender Differences and Heterogeneity

A standard approach in the discrimination literature is to estimate the gender gap after controlling for characteristics that are likely to explain, at least part of, the observed

[21]For the potential importance of controlling for unobserved heterogeneity, see Light and Ureta (1992). The dataset they use, however, differs in two respects: It provides multiple spells of employment per individual and includes a much more heterogeneous population.

differential between men and women. In the firm I study in this paper, a major source for the gender gap in departure rates is that women are younger, less educated, train less[22], and most important, work in lower level jobs, where departure rates are much higher. The results reported in Table 2 show that after controlling for grade level, and time spent in the different grade levels, the gender gap is cut by more than half, but remains significant. In section 4.2 I show how this gap shrinks with tenure in the firm.

Other recent studies that used individual microdata found that after controlling for certain personal and job characteristics, the quit rates of young women and men are about the same. Weiss (1984), using a sample of newly hired semiskilled production workers, and estimating a probit equation, found no gender differences for the first six months of employment. Blau and Kahn (1981), using the National Longitudinal Surveys of Young Men and Women (1969-1972), found that after controlling for a set of observed characteristics, women were less likely to quit[23]. Light and Ureta (1992), who used the same dataset, over a longer period (1966-1981), found that only after adding a control for unobserved heterogeneity, women were less likely to quit[24]. It was not the result of the time periods used, because, as they show, among later cohorts, women become more similar to men in their quit behavior. However, Lynch (1992), using the NLS Youth dataset (1979-1985), estimated a proportional hazard model, where in addition to the standard set of variables, also controlled for a rich set of on-the-job and off-the-job training variables, found that men

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[22]The incidence and duration in grade level 50 (job training) is much lower for women.

[23]The method they use is running separate probit regressions for men and women and then predict quit rates by substituting the male values of the variables into the female probit functions (and also the other way around).

[24]They estimated proportional hazard models.

were still less likely to leave their employer, although the coefficients were not significant. Donohue (1988), who limited his sample to first full time jobs[25], found, using a proportional hazard model, that at very early tenure, women have higher quit rates. The gender difference convergence, but start increasing after about 12-18 months. He does control for unobserved heterogeneity, but not for wages, union status, occupation, and industry.[26]

Women in the firm I study earn, on average, half the salary of men. Since variations in salary within grade levels are mainly due to adjustments over time and across regions (for local market differences[27]), most of the variation in departure rates due to wage differences is captured by the control for grade level. I found grade levels to be more informative than wages in predicting the likelihood of departure. I could not achieve convergence by using both grade level and salary (independently or as interaction) as covariates.

Using a firm data set eliminates heterogeneity due to differences across firms and industries. As I already indicated, the level of occupational sex segregation in the company analyzed is very high. This problem is common to any study that attempts to control for detailed occupations and where the number of observations is not extremely high.[28] The relevant question, however, is what part of the gap is not captured by human capital variables. The question why women are more likely to work in specific jobs is important but

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[25]Using the NLS of young men and women (1968-71) and NLSY (1979-82).

[26]The control in other studies for occupation and industry is very limited.

[27]The data I was provided with did not contain any information on residency.

[28]O'Neill and Sicherman (1990), for example, show that when looking at gender differences in wages in academia, the high level of segregation does not allow a proper estimation of the gender gap within many disciplines.

not dealt with in this paper.

4.2 Tenure in the Firm and the Hazard of Departure.

In Table 3 the estimation results of equation (8) are reported. As can be seen in the table and figure 2, at low levels of tenure the hazard of quitting to another job is much higher for women than for men. The negative tenure effect, however, is stronger for women than for men. Among workers with more than five years of seniority, women are less likely to quit.

Several other studies found that while women have higher quitting rates initially, over time the differences between men and women narrow, especially after controlling for different individual and job characteristics. Viscusi (1980), using the PSID, argues that with proper controls, sex differences in quit rates virtually disappear after a year. Further support for the hypothesis that the differences between quit rates for men and women narrow over time is provided by job tenure data (see, e.g., Hayghe, 1974.) However, Blau and Kahn (1981) and Light and Ureta (1992), found that the negative tenure effect is stronger for men than for women.

Some of the discrepancies in different studies are due to the use of different samples. Many are limited to recently hired, low skilled, or young workers. The analysis conducted in this paper includes workers in a variety of white collar occupations, and includes all ages (although I control for age, among other variables). The ability to look at different reasons for departure provides an opportunity to test whether the tenure effect is different, depending on the cause of departure.

As was indicated earlier, the role of tenure in the firm as a determinant of labor turnover is a subject of controversy among labor economists. Human capital theory predicts that a higher level of investment in firm specific human capital will result in a stronger

attachment between the worker and the firm. The theory predicts, therefore, a negative effect of firm specific training on the likelihood of firm separation. If tenure in the firm, holding time in the labor market constant, is an indirect measure of investment in firm specific human capital, a negative correlation between tenure and the hazard of departure is expected.

A negative tenure effect could also be an artifact of unobserved heterogeneity across workers. Workers with high propensity to quit will quit early, leaving behind a higher proportion of workers who are less likely to quit. This alone generates a down sloping tenure turnover profile. Similarly, a decreasing hazard could be the result of a matching process, on account of a learning mechanism based on the arrival of new information: A mismatch between a worker and his employer is more likely to be detected early than late. Hence, more mismatches occur early than late which results in the observed negative relationship between turnover and tenure.

With the type of data I use (as with most other standard data sets), it is virtually impossible to measure to what extent the decreasing profile is due to a duration effect (accumulation of specific capital), worker heterogeneity, or a job matching process[29]. Since women in this firm (and in general) train less, my finding that their turnover profiles are steeper, seem, *prima facie*, to contradict the human capital hypothesis.

Meitzen (1986), finds an increasing hazard for women at low levels of tenure, and argues that the job-matching process operates differently for females than it does for males. He claims that men discover the quality of their match quickly, while women have more on-the-job learning to do, which causes them to make their match-quality decisions later in the match.

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[29]See Kiefer (1988).

An alternative explanation, that is consistent with both my finding and human capital theory, was provided recently by Munasinghe (1993). If workers base their quitting decisions on expectations with regard to future training, promotions, etc., and if men have higher expectations with regard to such events, they will have a lower and flatter tenure turnover profile. If workers anticipate on receiving more training/promotions in the future, they will have a lower initial quit rate.

Tables 4 and 5 report the estimation results of the competing risk model, estimated separately for men and women. In figures 4-6, which are based on these tables, the hazards of departure at different levels of tenure, and for different reasons of departure, are plotted for men and women separately. It should be noted that since I control only for workers' age upon entry to the firm, the tenure coefficients confound an aging effect. Nevertheless, the plots are calculated after subtracting the aging effect and would be identical to those that would have been obtained controlling for age rather than age upon entry.

Women have higher rates of departure at low levels of tenure for two reasons. Some of their quits are due to reasons that men rarely quit for (household reasons). But also, their initial probability of quitting is higher for most other reasons as well.

The plots show that, except for departure due to pregnancy, the hazard of departure decreases with tenure. The magnitude of the tenure effect is different, depending on the reason for departure. These differences were found to be significant using likelihood ratio tests. For men tenure has a relatively strong negative effect on departures for the following reasons: a more interesting job, health/personal reasons, and dismissal. The effect of tenure on quitting to jobs that offer greater opportunities or higher earnings is relatively low for

both men and women.[30] The likelihood of leaving for better conditions or to a job nearer home are relatively unaffected by tenure for both men and women.

For women the negative tenure effect is much stronger for all reasons of departure. An interesting question would be whether the turnover profiles for women would look different had they not faced (for whatever reason) the alternative of non-market activities. Unfortunately, this problem (labeled in the statistical literature as the effect of removing a risk) is unsolvable given this type of data set.[31]

4.3 education

Economic theory does not provide a clear prediction concerning the effect of schooling on the likelihood of firm separation. Within the framework of specific human capital theory, if more educated workers are also provided with more training on the job, and part of this training is firm specific, a negative correlation between schooling and departure is predicted.

Within the framework of job search theory there is no clear prediction concerning the relationship between schooling and the likelihood of finding a better job. More educated workers are likely to face a higher arrival rate of job offers because they face a larger labor market, a larger variety of jobs, and are more efficient in search while employed or unemployed (see Mincer 1988). But since more educated workers will also have a higher

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[30]This finding is consistent with the theory of career mobility (Sicherman and Galor, 1990), where skills learned in one job are carried to a next job along a career path. In such a model even a positive duration effect is possible.

[31]This question was of major interest in analyzing the effects of different treatments on the survival of cancer patients. One of the alternatives was no treatment at all and the question was whether it is possible to get any predictions without actually leaving a group of patients without any treatment. The answer was that without additional strong assumptions such an inference is not possible.

reservation wage, the effect of schooling on departure is ambiguous. However, as Flinn and Heckman (1983) demonstrate, if the wage offer distribution is log concave, higher arrival rates of wage offers imply higher departure rates. Several examples of log concave distributions are given in their paper and the normal distribution is one of them.

There are two reasons why more educated workers have higher reservation wages. One is the prediction of a standard search model[32] that a higher rate of arrival of job offers increases the reservation wage. The other reason is due to the fact that more educated workers also have higher wages within the firm.

Schooling has a non monotonic effect on the hazard of departure. Aggregating all reasons of quitting for market related reasons, it is shown (table 3 and figure 3) that at lower levels of schooling, the effect on quitting is negative. However, for women beyond five years of schooling and for men beyond eleven years, schooling has a positive effect on the likelihood of quitting. The effect is stronger on women than on men. Looking at different reasons for departure separately, it can be seen that schooling has different effects on the likelihood of departure. These effects vary in magnitude and sign and are different for men and women.

Table 6 reports the effects of an additional year of schooling on the likelihood of departure for different reasons, for men and women separately. These derivatives are calculated at 12 and 16 years of schooling, based on the estimation results reported in tables 4 and 5.

Schooling has a strong and positive effect on quitting to jobs that offer greater opportunities. The effect is increasing with the level of schooling. If "greater opportunities"

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[32]Not all search models will have this characteristic. See Flinn and Heckman (1983) for details.

indicate greater training opportunities, this observation is an implication of the general finding that more educated workers are involved in more on-the-job training. When the realization of an optimal path of investment cannot take place within one firm, inter-firm mobility might become optimal (Rosen, 1972, Sicherman and Galor, 1990). I don't have a general explanation to the finding that this effect is stronger for women than for men. It might be due to the specific nature of this firm, where women are more likely to work in jobs that have limited advancement opportunities.[33]

Schooling has a negative effect on dismissals, an observation made in other studies as well. Schooling also has a negative effect on departures for most of the non-market related reasons. These reasons include pregnancy, household duties, health and personal reasons, and illness in the family. One explanation is that education is more valuable in the labor market than in household production. Another alternative is that if one of the benefits of education is higher productivity in on-the-job training, those who plan a shorter (or interrupted) working career, will be less likely initially to invest in schooling.

5. SUMMARY AND CONCLUSIONS

In this paper I use a unique firm level data set, in which a variety of reasons for departure are recorded to study gender differences in firm mobility in a detailed manner not done before.

A higher proportion of women leave for a variety of non-market reasons and proximity to home is a more important reason to switch jobs. Further, women state more often that wages, and not opportunities, as a reason for switching jobs. These differences

[33]This issue is discussed by Spilerman and Petersen (1990), who utilize the same data set.

suggest that on-the-job training and long run considerations are more important for explaining male mobility, while short run (market) considerations are a major reason for female departures.

Women, on average, are more likely to leave the firm. This is specially true in periods of early tenure. For both men and women, the likelihood of departure increases in the first 2 months of tenure, and then declines at a decreasing rate. This decline is stronger for women. Using a proportional hazard model, with controls for observed characteristics, I find that for tenure beyond five years, women are less likely to leave the firm than men.

For men tenure has a relatively strong effect on departures for a more interesting job, or due to health/personal reasons and dismissal. The effect of tenure on quitting to jobs that offer greater opportunities or higher earnings is relatively low. Leaving for better conditions or to a job nearer home are the least affected by tenure in the firm.

Schooling increases the likelihood of quitting to a job that offers "greater opportunities," for both men and women, beyond a certain level of schooling. The effect is increasing with the level of schooling, and is stronger for women than for men.

Table 2
The Hazard of Departure from the Firm
A maximum likelihood estimations of Box-Cox Proportional Hazard Models

Intercept	1.9487	1.5441
	(0.06)	(0.05)
log time (months/100) (τ_1)	-0.3332	-0.1495
	(0.01)	(0.00)
Sex (1=male)	-0.4673	-0.1573
	(0.02)	(0.02)
Race (1=non-white)	0.0040	0.0460
	(0.02)	(0.02)
Schooling (years/10)	-0.0588	0.4186
	(0.04)	(0.04)
Age (years/10)	-0.5664	
	(0.01)	
If married (1=yes;0=no)	-1.4202	-1.3424
	(0.02)	(0.02)
Grade level dummies (excluded are grades 1-5):		
Grade 21		-4.6528
		(0.43)
Grade 50		-0.0107
		(0.09)
Grades 6-10		-2.1029
		(0.04)
Grades 11-14		-2.8875
		(0.09)
Grades 15-20		-3.3452
		(0.14)
Duration in grade levels:		
Grades 1-5		-8.7299
		(0.09)
Grades 6-10		-3.4896
		(0.15)
Grades 11-14		-2.3199
		(0.42)
Grades 15-20		-1.8209
		(0.54)
Grade 21		-0.0381
		(0.47)
Grade 50		-15.021
		(0.79)
-log likelihood	1591	222.47

TABLE 3
THE HAZARD OF QUITTING FROM THE FIRM
A PROPORTIONAL HAZARD MODEL

	Males	Females	Mean Levels Males	Females
Intercept	-2.5986	-4.8138		
	(0.43)	(0.19)		
time (γ_1)	-1.6588	-3.8657	9.5 (years)	3.75
	(0.15)	(0.11)		
time^2 (γ_2)	0.5055	1.2612		
	(0.14)	(0.14)		
race (0=white)	0.0128	-0.2522	.20	.26
	(0.06)	(0.03)		
schooling	-0.1469	-0.0255	14.5	12.95
	(0.03)	(0.02)		
schooling^2	0.6657	0.2258		
	(0.14)	(0.08)		
if has children	-1.8595	-0.7925	.30	.145
	(0.10)	(0.05)		
age joined firm	0.6818	0.5704	31	27
	(0.24)	(0.10)		
(age joined)^2	-0.2130	-0.1358		
	(0.04)	(0.01)		
-log likelihood	4887	15298		
No. of workers	9003	27732		

Time (tenure in the firm) is measured in (months/100) units.
Age is in (years/10) units.
Schooling is in years, but (schooling)^2 = (YEARS/10)^2 .

The reasons of departure that are aggregated are: Higher earnings, better working conditions, greater opportunities, near home or better transportation, and more interesting or suitable job.

TABLE 4
THE HAZARD OF DEPARTURE FROM THE FIRM
A COMPETING RISK MODEL

MALES

	Higher Ernings	Better Condtn	Greater Opprtnt	Nr Hom Bfr tr	More Intrsng	Change Rsdnce	Health Persnl	Army	"Other"	"Agent cntrct"	Dismssl
Intercept	-1.9433	-3.2767	-2.5539	-4.8409	-3.2009	-3.0364	-9.4887	-14.8590	-2.1624	-15.716	-2.706)
	(0.81)	(36.8)	(0.75)	(5.92)	(0.72)	(1.18)	(1.54)	(14.38)	(0.47)	(0.71)	(0.57)
time (γ_1)	-1.3315	-1.7982	-1.1640	-1.4191	-2.6804	-2.1203	-6.0517	2.8236	-2.2971	-8.8117	-2.1983
	(0.30)	(2.28)	(0.23)	(2.09)	(0.35)	(0.42)	(1.16)	(3.399)	(0.12)	(0.33)	(0.15)
time^2 (γ_2)	0.2630	0.4951	0.4179	-1.3698	0.5125	0.6429	1.8364	-18.2785	0.8903	3.5086	0.7970
	(0.32)	(2.92)	(0.19)	(5.53)	(0.39)	(0.37)	(2.52)	(13.62)	(0.05)	(0.26)	(0.07)
race (0=white)	0.1066	0.1013	0.0696	-1.0481	-0.0443	0.6144	0.6926	0.4143	0.5690	-0.6802	1.0831
	(0.12)	(0.78)	(0.11)	(0.42)	(0.12)	(0.16)	(0.23)	(0.404)	(0.09)	(0.11)	(0.09)
schooling	-0.1159	0.1467	-0.2279	0.5029	-0.0906	0.0551	0.4298	0.7040	-0.1377	-0.1336	0.1181
	(0.05)	(5.08)	(0.04)	(0.89)	(0.05)	(0.11)	(0.13)	(1.764)	(0.03)	(0.05)	(0.05)
schooling^2	0.4026	-0.4601	1.1031	-2.1913	0.4694	-0.1714	-2.9345	-3.4716	0.4055	1.1105	-1.1107
	(0.24)	(18.3)	(0.19)	(3.09)	(0.24)	(0.45)	(0.71)	(6.953)	(0.16)	(0.23)	(0.22)
if has children	-1.8729	-1.0929	-1.8263	-1.6745	-2.0105	-1.5884	-1.7368	-0.6699	-1.6141	-1.4830	-1.5011
	(0.19)	(0.90)	(0.15)	(0.60)	(0.20)	(0.29)	(0.44)	(1.160)	(0.14)	(0.21)	(0.16)
age joined firm	0.6412	-1.9584	1.5124	-1.4097	0.4594	-0.4561	1.3483	6.5986	0.3903	7.1211	0.4207
	(0.49)	(4.22)	(0.48)	(1.13)	(0.42)	(0.54)	(0.82)	(15.77)	(0.25)	(0.39)	(0.31)
(age joined)^2	-0.2123	0.1583	-0.3588	0.1001	-0.1563	-0.0320	-0.2387	-2.7701	-0.0954	-1.4937	-0.1313
	(0.08)	(0.67)	(0.08)	(0.16)	(0.06)	(0.07)	(0.12)	(4.078)	(0.03)	(0.06)	(0.04)
-log likelihood	1217	114	1541	280	1162	667	341	124	1698	1164	1345

Time (tenure in the firm) is measured in (months/100) units.
Age is in (years/10) units.
Schooling is in years, but (schooling)^2 = (YEARS/10)^2 .

TABLE 5
THE HAZARD OF DEPARTURE FROM THE FIRM
A COMPETING RISK MODEL

FEMALES

	Higher Earnings	Better Condtnls	Greater Opprtnts	Near Hm Btr Trnsp	More Intrst	Pregnancy	Change Residenc	Bck to School	Hshold duties	Health Personal	"Other"	Illness in fam.	"Agent contract"	Dsmissed
Intercept	-4.4840	-7.1786	-3.9334	-1.3967	-6.7913	-13.202	-2.8776	2.2153	-5.2704	-6.9041	-3.2619	-8.7179	-16.647	-4.0261
	(0.31)	(1.17)	(0.44)	(0.59)	(0.35)	(1.10)	(0.29)	(0.78)	(0.33)	(0.53)	(0.21)	(0.65)	(3.59)	(0.24)
time (γ_1)	-3.8169	-3.6516	-2.3122	-2.0955	-5.7686	0.882	-2.5037	-5.7763	-1.2384	-4.6971	-2.8334	-5.4876	-3.7672	-3.6260
	(0.19)	(0.88)	(0.22)	(0.36)	(0.20)	(0.26)	(0.14)	(0.40)	(0.14)	(0.38)	(0.08)	(0.52)	(0.57)	(0.11)
time^2 (γ_2)	1.0752	1.1996	0.3652	-0.1671	2.0076	-1.650	0.8068	2.0449	0.2499	1.5677	1.0490	1.8671	1.6779	1.2815
	(0.23)	(1.68)	(0.31)	(0.59)	(0.23)	(0.38)	(0.17)	(1.01)	(0.13)	(0.69)	(0.04)	(0.81)	(0.38)	(0.09)
race (0=white)	-0.1616	-0.2372	-0.1101	-0.8134	-0.2826	-0.439	-0.1419	0.3780	-0.2296	0.4420	0.2753	0.5807	-0.0715	0.5711
	(0.05)	(0.19)	(0.07)	(0.12)	(0.06)	(0.08)	(0.05)	(0.06)	(0.07)	(0.08)	(0.04)	(0.12)	(0.22)	(0.04)
schooling	0.0115	-0.0890	-0.1494	0.0174	0.0509	0.024	-0.1032	-0.1992	0.0387	0.2013	0.0028	0.1216	0.1904	0.0927
	(0.03)	(0.08)	(0.03)	(0.05)	(0.03)	(0.03)	(0.02)	(0.04)	(0.03)	(0.06)	(0.02)	(0.07)	(0.43)	(0.02)
schooling^2	-0.0755	0.2755	1.0658	-0.4393	0.0011	-0.700	0.7006	1.5168	-0.6563	-1.4564	-0.2831	-0.9746	0.7671	-0.9199
	(0.14)	(0.43)	(0.16)	(0.27)	(0.15)	(0.20)	(0.12)	(0.19)	(0.17)	(0.28)	(0.10)	(0.35)	(1.48)	(0.13)
if has children	-0.5856	-0.7239	-0.7303	-0.5226	-1.2078	-1.776	-0.6102	-1.2253	-0.6927	-1.7691	-1.2750	-0.6320	-0.2951	-0.9270
	(0.08)	(0.29)	(0.12)	(0.17)	(0.10)	(0.20)	(0.08)	(0.21)	(0.09)	(0.20)	(0.08)	(0.17)	(0.33)	(0.07)
age joined	0.7175	1.4326	0.6429	-1.0813	0.8865	10.809	0.5616	-4.7057	2.4012	0.9295	0.7225	1.2776	4.4462	0.6487
	(0.18)	(0.71)	(0.26)	(0.35)	(0.17)	(0.92)	(0.17)	(0.58)	(0.20)	(0.25)	(0.11)	(0.33)	(1.23)	(0.13)
(age joined)^2	-0.1639	-0.2547	-0.1585	0.0737	-0.1612	-2.316	-0.1596	0.4778	-0.3952	-0.1508	-0.1182	-0.1841	-0.7305	-0.1096
	(0.03)	(0.11)	(0.04)	(0.05)	(0.02)	(0.19)	(0.02)	(0.11)	(0.03)	(0.04)	(0.02)	(0.05)	(0.20)	(0.02)
-log likelihood	4251	786	3068	2010	3751	2650	4867	2353	3725	2067	5740	1298	534	4996

Time (tenure in the firm) is measured in (months/100) units.
Age is in (years/10) units.
Schooling is in years, but (schooling)^2 = (YEARS/10)^2 .

Table 6
The Schooling Effect on the Likelihood of Quitting the Firm
Partial Derivatives

	MALES		FEMALES	
Reason for Departure	Level of Schooling		Level of Schooling	
	12 years	16 years	12 years	16 years
Market related reasons				
Higher earnings	-.001050*	.000695*	-.000465	-.000855
Better working conditions	.000056	-.000001	-.000166	-.000006
Greater opportunities	.002544*	.011941*	.005639*	.018436*
Nearer home	-.000142	-.000788	-.002411	-.002212
More interesting/suitable work	.000732	.002328	.001479	.001818
Enter agent's contract	.000273*	.000927*	.001292	.007603
Non-market reasons				
Pregnancy			-.02339	-.016329
Change of residence	.000240	.000004	.00767*	.020726*
Return to school			.00058*	.002514*
Household duties			-.017889*	-.014438*
Health-personal	-.001468*	-.000568*	-.002882*	-.002254*
Illness in family			-.000838*	-.000775*
Military service leave	-.000000	-.000000		
Other	-.002758*	-.000492*	-.010113*	-.010037*
Involuntary departure				
Dismissal	-.012630*	-.009333*	-.013744	-.011191

* Significant at 1% percent level.

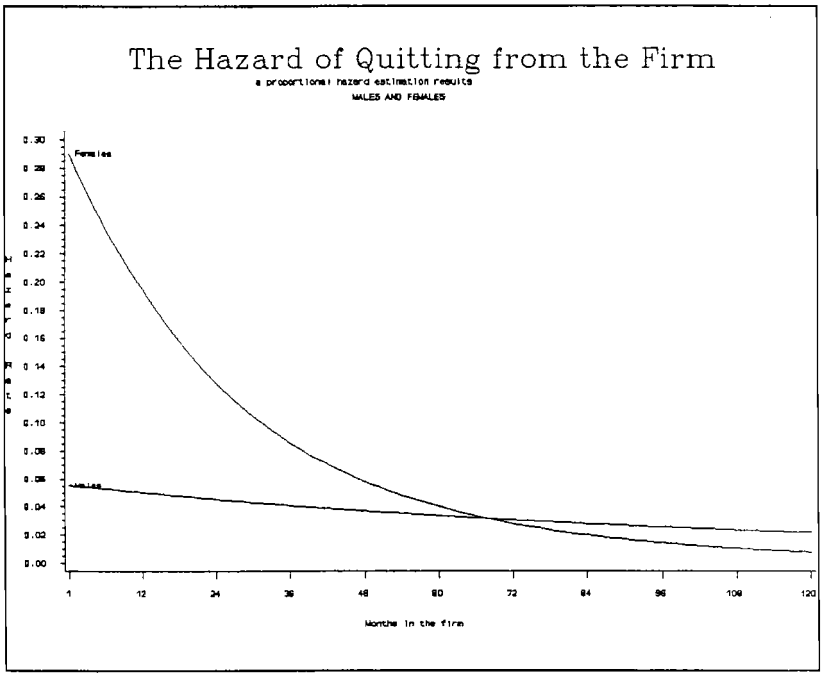
The Hazard of Quitting from the Firm
a proportional hazard estimation results
MALES AND FEMALES
Females
Months in the firm

Figure 2

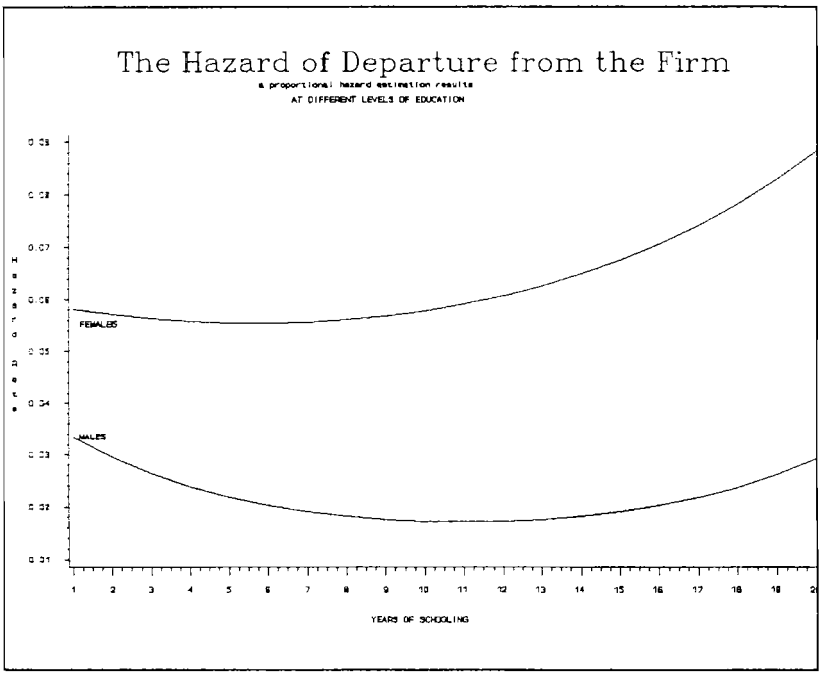
The Hazard of Departure from the Firm
a proportional hazard estimation results
AT DIFFERENT LEVELS OF EDUCATION
FEMALES
MALES
YEARS OF SCHOOLING

Figure 3

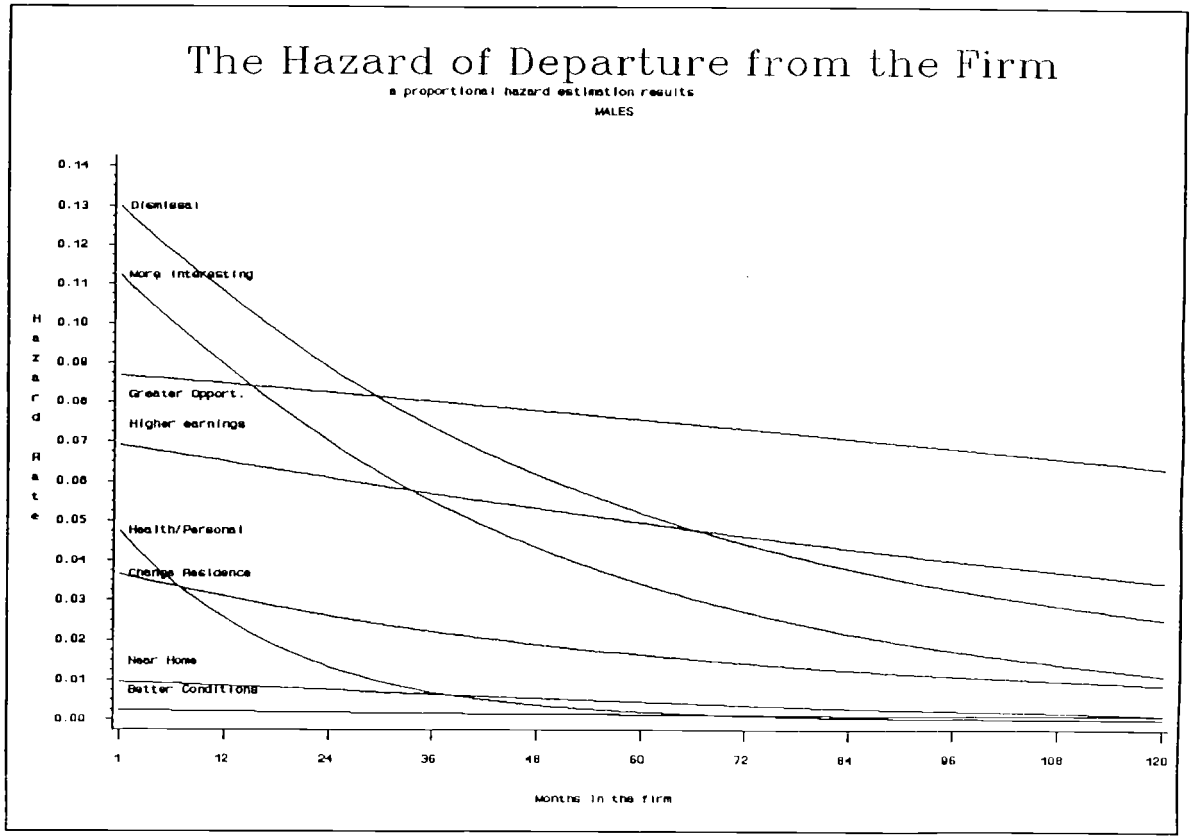
The Hazard of Departure from the Firm
a proportional hazard estimation results
MALES
Hazard Rate
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Dismissal
More interesting
Greater Opport.
Higher earnings
Health/Personal
Change Residence
Near Home
Better Conditions
1
12
24
36
48
60
72
84
96
108
120
Months in the firm

figure 4

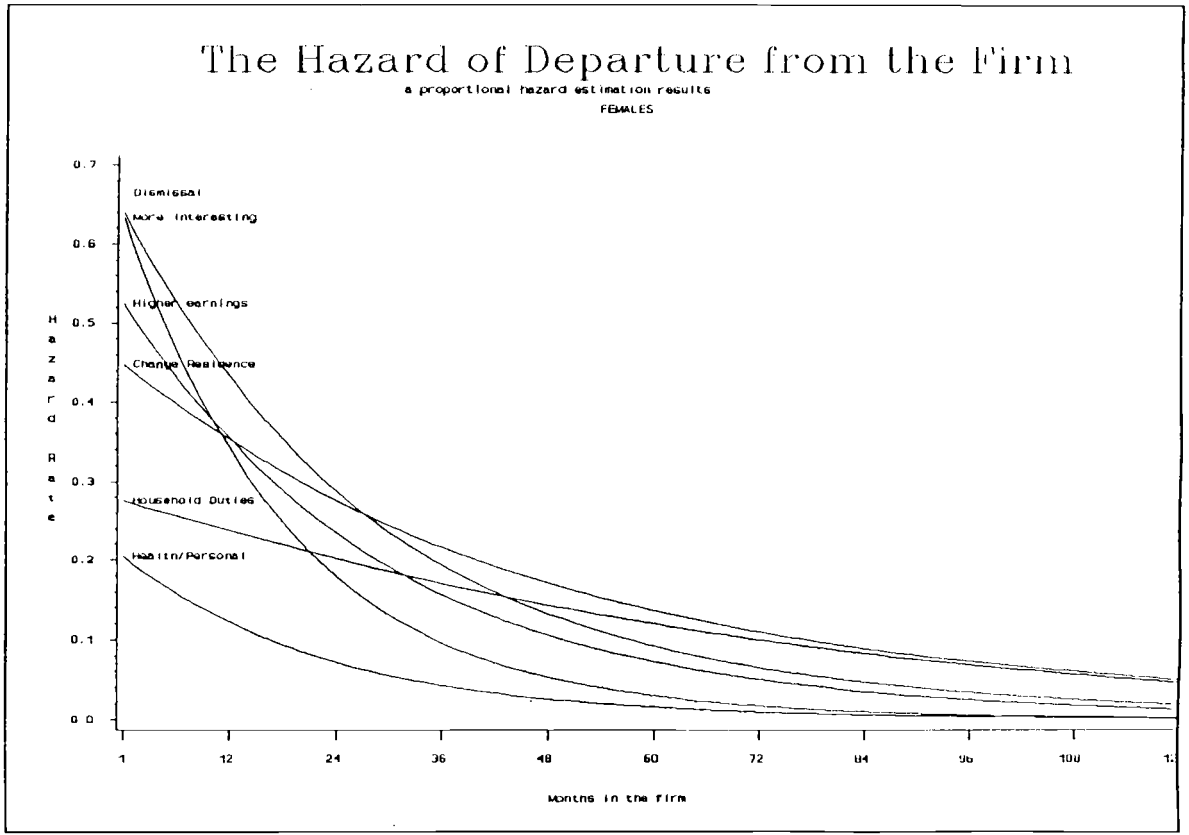
The Hazard of Departure from the Firm
a proportional hazard estimation results
FEMALES
Dismissal
More Interesting
Higher earnings
Change Residence
Household Duties
Health/Personal
Hazard Rate
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
12
24
36
48
60
72
84
96
100
Months in the firm

figure 5

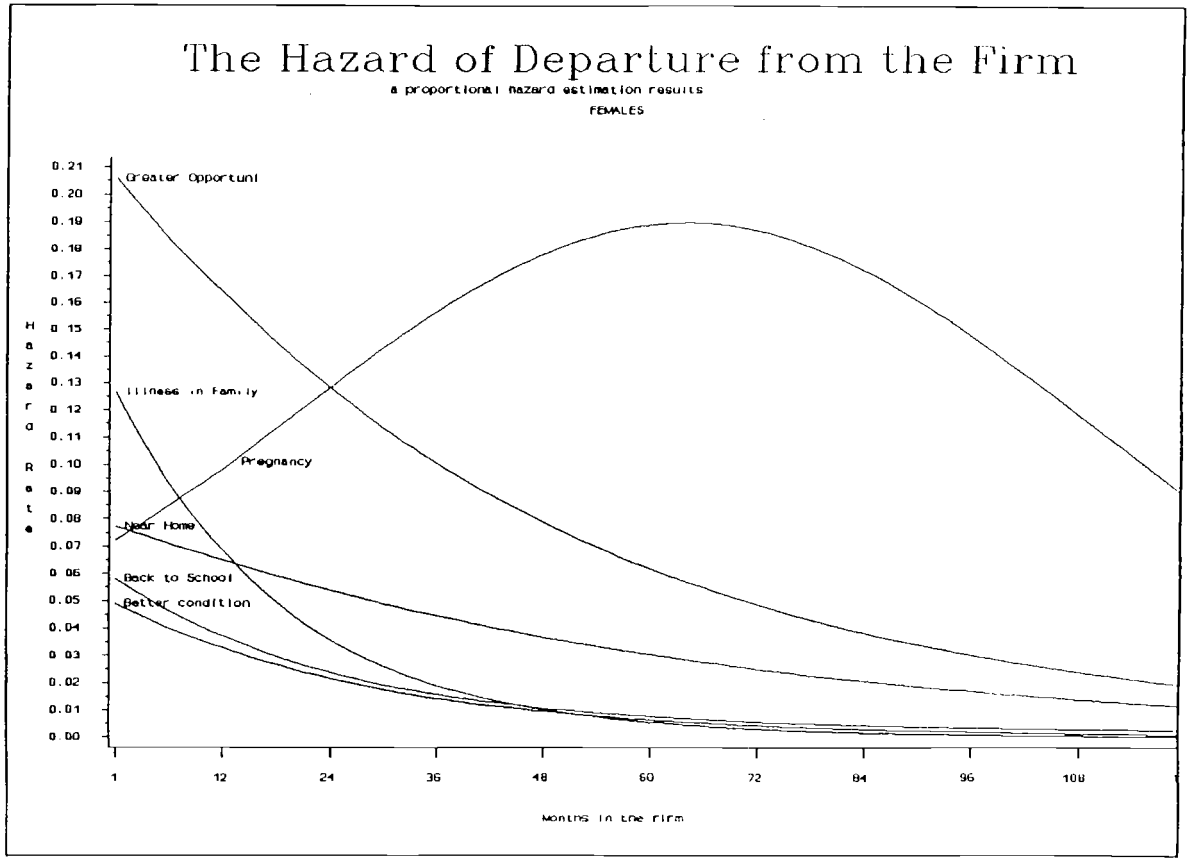
The Hazard of Departure from the Firm
a proportional hazard estimation results
FEMALES
Hazard Rate
0.21
0.20
0.19
0.18
0.17
0.16
0.15
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Greater Opportunt
Illness in Family
Pregnancy
Near Home
Back to School
Better condition
1
12
24
36
48
60
72
84
96
108
Months in the firm

figure 6

Appendix A

Are different reasons for departure behaviorally distinct states?

The underlying assumption in this paper is that different reasons for departure describe different behaviors of workers. To validate this assumption I test, after controlling for observed workers' characteristics, whether the departures rates to different destinations are similar. This test is equivalent to testing the proposition that two (or more) destinations can be aggregated into one category.[34]

In order to test this proposition two models are estimated. First, all coefficients are constrained to be equal across destinations (the restricted model). Then, in estimating the unrestricted model, the coefficients are allowed to vary across destinations. Performing a likelihood ratio test on the restricted versus the unrestricted model will allow us to reject or accept the proposition that the different destinations are artificial distinctions.

An example of such a test is reported in Appendix Table 1. The likelihood ratio test enables us to reject the hypothesis that departures to a job that pays higher earnings and leaving to jobs that offer greater opportunities are behaviorally similar for women. The value for the test statistic is 1818 which is distributed $\chi^2(9)$. The critical value for a 1% significance level is 21.666.

Trying different combinations for both men and women give similar results. For every combination tested the different destinations were found to be significantly distinctive.

[34]For more details see Flinn and Heckman (1983).

APPENDIX TABLE 1
THE HAZARD OF DEPARTURE FROM THE FIRM
A COMPETING RISK MODEL
Restricting Vs. Not Restricting "Higher Earnings" and "Greater Opportunities" as Distinctive States

FEMALES

	Unrestricted Model		Restricted Model
	Higher Earnings	Greater Opportunities	Higher earnings or Greater Opportunities
Intercept	-4.4840	-3.9334	-5.0864
	(0.31)	(0.44)	(0.30)
time (γ_1)	-3.8169	-2.3122	-3.8119
	(0.19)	(0.22)	(0.18)
time^2 (γ_2)	1.0752	0.3652	1.1119
	(0.23)	(0.31)	(0.23)
race (0=white)	-0.1616	-0.1101	-0.1675
	(0.05)	(0.07)	(0.05)
schooling	0.0115	-0.1494	0.0002
	(0.03)	(0.03)	(0.03)
schooling^2	-0.0755	1.0658	-0.0363
	(0.14)	(0.16)	(0.13)
if has children	-0.5856	-0.7303	-0.5970
	(0.08)	(0.12)	(0.08)
age joined	0.7175	0.6429	0.7759
	(0.18)	(0.26)	(0.18)
(age joined)^2	-0.1639	-0.1585	-0.1713
	(0.03)	(0.04)	(0.03)
-log likelihood	7319		5910

Time (tenure in the firm) is measured in (months/100) units.
Age is in (years/10) units.
Schooling is in years, but (schooling)^2 = (YEARS/10)^2 .

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