

Promotions, Pay, Performance Ratings and Quits

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I. INTRODUCTION

This study investigates the determinants of quits among professional and managerial employees of a large manufacturing firm. It is the first study to utilize detailed personnel data to study quit behavior among these types of employees.¹ The role of recent promotions is emphasized below, where it is argued that the firm's internal labor market is segmented into non-competing groups, based on educational background and organizational experience and training. This segmentation, and the stochastic nature of promotional opportunities, results in unequal promotion probabilities among equally able employees. Two testable hypotheses emerge from this model: (1) absence of recent promotion will, *ceteris paribus*, increase the likelihood of a quit; and (2) the more homogeneous the group of employees studied the smaller this effect will be. If the first hypothesis is correct it is a serious concern for management, since the increased quit rate is both costly and, given the nature of the problem, difficult to change.

Models of quit rates are estimated for both the complete sample and for sub-samples of employees who are defined by the factors that segment the internal labor market. Estimates of the effect of promotion on quits among the subsamples suggest whether those factors have produced unequal promotional opportunities that encouraged quits. For the entire sample of almost 8,500 employees, absence of recent promotion significantly increases the likelihood of quitting. However, the estimates for the subsamples show that in most cases, recent promotion has no significant effect on quit probabilities among the more homogeneous groups of employees.

The balance of this paper is organized as follows: in the second section some of the recent literature on quit behavior is reviewed, and a quit model that incorporates the concepts of a segmented internal labor market and a stochastic promotion process is formulated. The third section uses the personnel data to create the variables relevant to the study. The fourth section presents the parameter estimates of the various models and the last contains some concluding remarks.

Models of Quit Behavior

Economists have only recently begun to study quit behavior within organizations, although a substantial body of research on the subject can be found in psychology and management journals (Arnold and Feldman, 1982; Dreher, 1982; Keller, 1984; Scholl, 1983). This organizational research generally focuses on job satisfaction as a major determinant of quitting; job satisfaction depending on satisfaction with pay, promotions, supervision and work content. Other important factors are perceived external opportunities, organizational commitment

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(Scholl), performance, and absenteeism (Dreher, Keller). Keller for example, found that low performance ratings were associated with high turnover rates. Findings that low pay, poor perceived promotional opportunities, or low performance ratings increase quits is consistent with both economic and job satisfaction models of turnover.

Economic research has moved from studies of turnover rates using industry data (Parsons, 1977), to studies utilizing longitudinal survey data, or personnel records of firms, to investigate individual quit behavior. The recent studies that use longitudinal data have been concerned with race and gender differences in quit rates (Blau and Kahn, 1981; Viscusi, 1980; Meitzen, 1986), or with testing human capital and job match theories of quitting (Mincer and Jovanovic, 1982; Miller, 1984). Other recent work has shown that non-portable pension benefits reduce quit rates (Mitchell, 1982).

Recently, Weiss (1984) studied quit behavior among newly hired production workers of a manufacturing firm. Weiss' model includes variables that represent expected alternative wages (i.e. human capital variables), job satisfaction, and the cost of quitting. He found that high school graduates and those employed when they applied for work at the subject firm were significantly less likely to quit during the first six months on the job. On the other hand, whites and those with more complex jobs were significantly more likely to quit.

The present study analyzes the quit behavior of a diverse group of professional and managerial employees of a major manufacturing firm. The heterogeneity of the sample suggests a model of job quitting that incorporates the idea of a segmented internal labor market. Although the data set does not contain direct information on job satisfaction, the wage and job histories of the employees, as well as their personal attributes, provide a rich basis for analyzing the determinants of quit behavior.

A simple economic model of quit behavior can be based on utility maximization. In each time period (a one year period is used here), each employee compares the present value of the expected lifetime utility of his current job with that of his other alternatives, including leisure.² If the discounted expected utility of any alternative is greater than the cost of quitting plus the discounted expected utility of the current job, the employee quits.

$$(1) \quad Q = 1 \text{ if } V(U_j) > V(U_o) + C \text{ (employee quits)} \\ = 0 \text{ if } V(U_j) \leq V(U_o) + C \text{ (employee does not quit)}$$

where

$V(U_j)$ = discounted expected lifetime utility of alternate job j , $j = 1, \dots, n$

$V(U_o)$ = discounted expected lifetime utility of current job

C = cost of quitting

Since the expected utilities (and the cost of quitting) are not directly observable, the empirical model necessarily relies on proxy variables. $V(U_j)$ depends primarily on the personal attributes of the employee that affect his productivity. Since the job market for each occupation will generate a different distribution of wage offers, variables that represent occupation are included in the model. Note that $V(U_o)$ also depends on personal attributes, as well as on management decisions, and various aspects of the specific job that determine job satisfaction. Management decisions with respect to pay, performance ratings and promotions are signals that the employee translates into expectations about future progress within the firm. The cost of quitting depends on personal risk preferences with respect to job stability vs job change, the extent of family responsibilities, and vested, non-portable pension benefits. The specific

variables that proxy for these factors in the empirical analysis are discussed in the next section.

The preceding discussion states that some personal attributes will influence both $V(U_j)$ and $V(U_o)$. Although these effects are not individually observable, the net effect of these personal attributes on the quit probability depends on the relative size of the two effects. For attribute X_i , (1) implies

$$\partial Q / \partial X_i = \partial V(U_j) / \partial X_i - \partial V(U_o) / \partial X_i$$

Attributes that represent general training (e.g. educational attainment and prior work experience) are most likely to affect both $V(U_j)$ and $V(U_o)$, since that type of training raises productivity (and presumably compensation) among all employers. Weiss, for example, found that years of schooling was negatively related to quit propensity, but that a variable that proxied for the better job alternatives associated with increased educational attainment was positively (but not significantly) related to quit propensity.

The empirical model is derived from (1) by positing the following relationships:

$$(2) \quad V(U_j) = f(X_i) \\ (3) \quad V(U_o) = g(X_i, W_j) \\ (4) \quad C = h(Z_t, R, e)$$

Where

X_i = personal attributes that affect productivity on all jobs

W_j = job characteristics and management signals that determine current job satisfaction and productivity, and thus expected future values of current job

Z_t = variables reflecting family responsibilities

R = vested, non-portable pension benefits (assumed to depend on length of job tenure)

e = personal risk preference (a normally and independently distributed random variable)

The emphasis in this study is on the impact on quits of management signals, i.e., pay, performance ratings, and promotions. These are policy variables for the firm. The expected effect of pay is clear: higher wages should reduce quitting, since it increases $V(U_o)$ relative to the alternatives $V(U_j)$. The argument with regard to performance ratings is more subtle. Better performers may have more attractive employment opportunities outside the firm to balance the expected bright future with their current employer. However, internal performance appraisals are likely to have more value within the firm than to external observers, to whom the appraisal process is not well known. This is especially true for the subject firm, which maintains a "promotion from within" policy that gives clear signals as to the expected returns to continued high performance. Thus logic suggests that good performance will enhance the expected returns at the present job more than at alternative jobs, and thus reduce the quit propensity.³

The role of promotions is complex, because they depend not only on the ability and skills of the employees, but also on the existence of openings for which they are qualified. Random events, beyond management control, create different promotional opportunities across the firm (Wise, 1975). Vacancies occur randomly due to quits, unexpected retirements, deaths, or disabilities, or unequal rates of expansion or contraction of different components of the firm.

If the firm operated as a single internal labor market, and all non-entry level vacancies were filled from within, the random aspect of promotional opportunities would cause no problems. The most able employee eligible for each vacancy would be promoted.⁴ However, if

the firm's internal labor market is segmented into non-competing groups, with limited mobility among them, then promotion rates will not be equalized among equally able employees. In other words, "being in the right place at the right time" can effect promotion probabilities.

Why should the firm have a segmented internal labor market? The underlying reason is the heterogeneity of its professional and managerial work force. In most cases, engineers are not substitutes for accountants, nor are marketing managers for production managers. Differences in educational background and work assignments give rise to differences in specific training, which create non-competing groups.⁵

Table 1 sheds some light on the variance in promotion rates at the subject firm in 1980. Table 1 presents the percent of employees promoted during the year by major field of study and functional division, by most recent performance rating (the highest rating is 5, the lowest is 2). The table shows a wide variation in promotion rates across majors and functions within each performance rating group. Table 1 also shows the expected monotonic decline in promotion rates across performance rating groups.

If, as hypothesized, absence of recent promotion increases quit propensity, one cost of a segmented internal labor market will be increased turnover. Moreover, the specialization of labor that gives rise to the segmentation is not something a large, complex firm can easily reduce; nor will it necessarily find it desirable to do so.

If promotion rates were equal among equally qualified employees, and all the relevant factors that enter the promotion decision could be accurately measured, then a promotion

TABLE 1
Percent Promoted by Major Field of Study Function and Performance Rating*

Major Field	Performance Rating			
	5	4	3	2
Chemical Engineering	33.5%	30.1%	24.2%	11.6%
Electrical Engineering	45.7	28.7	19.3	8.7
Mechanical Engineering	29.6	26.9	19.8	7.5
Other Engineering	30.2	26.5	14.5	0.0
Chemistry	29.4	20.0	12.7	3.4
Physics	21.7	22.6	14.5	0.0
Biology	51.1	42.9	31.2	28.6
Other Sciences	62.5	41.2	31.6	0.0
Other Technical	60.0	23.1	18.5	0.0
Math	54.2	40.3	13.6	0.0
Computer Science	70.6	41.7	26.7	0.0
Accounting	41.7	43.2	39.2	0.0
Finance	42.9	42.9	28.6	0.0
Business	37.7	32.7	21.4	4.9
<i>Function</i>				
Finance/Auditing	48.8%	41.1%	22.3%	0.0%
Production	36.1	31.7	23.2	7.7
Research	28.7	21.4	12.4	4.9
Personnel	34.4	30.1	21.4	0.0
Marketing	37.1	30.8	24.0	14.2
Other	37.9	25.8	18.7	1.8

* = The highest performance rating is 5, the lowest is 2.

dummy variable would be redundant in a quit model that included those factors. However, the random occurrence of vacancies, and the fact that all the factors that determine promotion rates cannot be measured, implies that the promotion probability will effect the quit probability independently of the other variables in the quit model.

In the case of stochastic promotion probabilities, the probability of being promoted (P) can be expressed as:

$$(5) \quad P = \alpha_i X_i + \beta_j W_j + u$$

where X and W are the personal and job related factors defined above (with promotions deleted from W), and u is a random disturbance that accounts for the stochastic factors that determine vacancies, and the factors the analyst cannot measure. If P effects quits, omitting it from the model reduces the model's explanatory power, and may also produce biased parameter estimates for the variables correlated with P. Therefore, a variable reflecting recent promotion experience is included in the model.

The heterogeneity of labor in the firm plays a key role in the influence of promotions on quits. The more homogeneous the group of employees, the less *ceteris paribus*, will be the within group variance in promotion rates, because the employees are closer substitutes. Therefore, the impact of promotions on quits should be smaller among more homogeneous groups of employees. Below, quit models are estimated for both the entire sample of employees, and for subsamples of more homogeneous employees. The subsamples are defined by major field of study for highest degree attained, and by functional division of the firm. If the labor market segmentation hypothesis is correct, these factors are most likely to give rise to differences in promotion probabilities, so estimates of the promotion effect on quits should be most sensitive to these groupings.

Using the symbols defined above, the empirical model is obtained by substituting (2), (3), and (4) into (1).

$$(6) \quad Q = f(X_i, W_j, Z_t, R, e)$$

The vector W, includes variables that measure pay, performance ratings and recent promotion, as well as location among the firm's functional divisions and pay grades. The specific variables are described fully in the next section.

One aspect of the model presented here warrants further discussion. Although most models of quit behavior include a measure of job tenure (Blau and Kahn, Viscusi, Keller, Mitchell (1982)), Weiss has argued that it is endogenous to a quit model, and its inclusion results in sample selection bias. In effect, longer service employees are those who each year choose not to quit, and thus are assumed to differ from shorter service employees in some systematic but unmeasured way. Therefore, the error term in the quit model will be correlated with years of service, resulting in biased parameter estimates for the service variable, and for the other variables in the model correlated with length of service (which will be all the variables correlated with quits, if this view is correct).

The selection bias argument rests on the assumption that there are unmeasured personal attributes that affect both length of service and annual quit probability. The sample selection criteria used here deletes from the study both short and long term employees, two groups which should and do have different quit probabilities than the balance of the employees.⁶ Job-matching theory (Miller, Mincer and Jovanovic) suggests that in their first few years of service employees go through an evaluation period, during which the true nature of their job is revealed. The high rate of separations among short tenure employees reflects decisions based on

information about the job that could only be obtained after employment. Individuals who find a poor match with their expectations thus have a very high likelihood of quitting. Employees with less than three years of service were deleted from the study.

On the other hand, the quit behavior of long service employees is often influenced by health and retirement considerations. Since quit rates rise sharply after about 25 years of service, employees with more than that much service were also deleted from the study. Thus the employees in this study are clearly more homogeneous with respect to obvious unmeasured attributes that influence quit behavior than all the employees of the firm. The potential bias that remains is evaluated below.

Data and Variables

The data used in this study were drawn from the personnel file of a large U.S. manufacturing firm. To limit the scope of the study, and avoid possible racial and sexual differences in job mobility preferences, the sample was restricted to white males. The sample was further limited to professional and managerial employees (exempt under the Fair Labor Standards Act) who had from three to twenty-five years of service as of January 1, 1981, the beginning of the year studied. These restrictions resulted in a sample of over 9,000 employees.

Preliminary tabulations revealed that the separation rates among employees with the lowest performance rating ("unsatisfactory") were over 90%. These terminations were judged not to be truly voluntary separations.⁷ Therefore, the very low performers were also deleted from the study. After deletions for missing data the sample consisted of 8424 employees.

The variables used in the empirical analysis are defined below. They are grouped into three categories, corresponding to the vectors X, W and Z, and length of service.

1. *Personal attributes affecting productivity.*
 - a. *Previous experience (and its square):* The estimated years in the labor force between receipt of bachelor's degree and date of employment at the firm. It is reduced by two years for receipt of a master's degree and five years for receipt of a doctorate.
 - b. *Educational attainment:* Two dummy variables for receipt of a master's or a doctorate (all employees in the sample had at least a bachelor's degree).
 - c. *Major field of study:* A set of eight dummy variables reflecting the field of the person's highest degree (see Table 1 for the fields; employees with engineering degrees, and those with science degrees, were each aggregated into a single group.)
2. *Job characteristics*
 - a. *Grade level:* Two dummy variables indicating employment in (1) the lowest two salary grades or (2) the third salary grade, as of 1/1/81.
 - b. *Performance ratings:* Three dummy variables indicating the rating received most recently prior to 1/1/81. The lowest rating included in the study (satisfactory) is the omitted reference group.
 - c. *Salary:* The ratio of the individual's salary to the mean salary in his salary grade. This relative measure seemed most appropriate in representing the signals management gives employees. This is the comparison that the employee will find most revealing of his apparent worth to the firm.
 - d. *Salary change:* The percentage increase in salary between 1/1/78 and 1/1/81. This variable is another management signal that may affect separation decisions.

- e. *Functional area:* Is a set of dummy variables to distinguish jobs among the major operating divisions of the firm (see Table 1).
 - f. *Promotion:* A dummy variable to identify employees who received a promotion during 1980, the year prior to that studied. Promotion was defined as an increase in salary grade level.
3. *Family responsibility*
 - a. *Marital status:* A dummy variable to distinguish married (1) versus single (0) employees.
 - b. *Children:* A dummy variable that has the value of one for married employees with children under age 18 in the household, and is zero otherwise.
 4. *Length of Service (and its square):* Measured from date of employment to January 1, 1981.

Empirical Findings

This section presents the parameters estimated for equation (6). First, the model is estimated for the entire sample of 8424 employees. Then, estimates were made for three groups of subsamples, defined by major field of study, functional area within the firm, and performance rating. The first two groups test the labor market segmentation hypothesis, showing whether the promotion variable has a smaller, less significant impact on quits among the more homogeneous groups of employees than for the sample as a whole. The latter group tests whether the promotion effect is constant across all performance ratings. There is reason to believe that employees with high performance ratings will be less sensitive to absence of promotion than employees with lower ratings. The better performers may realize, and may have been informed by their superiors, that the absence of promotion is the result of the absence of an appropriate vacancy, and that a promotion is forthcoming with the next appropriate opening. Similar realizations or assurances are much less likely for poorer performers, who are thus more likely to respond to the absence of promotion by quitting.

Table 2 presents the logit estimates of the parameters of equation (6). Note that the overall quit rate for the year (1981) was only 2.04 percent. Therefore, since the variance of the quit rate is quite small (.02), it is difficult to "explain" much of that variance. As hypothesized, recent promotion significantly reduces the quit probability, by approximately one percentage point (.0094) at the mean quit probability. Employees receiving any of the three highest performance ratings are significantly less likely to quit than employees who received only a satisfactory rating. Neither the relative salary variable (RSAL) nor the change in salary variable (DSAL) are significant, although each has the expected inverse relationship with the quit probability. Thus the major management rewards (and signals to employees) all have the expected impact on the quit probability.

The variables that proxy for the cost of quitting also have a significant impact on the quit probability. Employees who are married, and who have children under age 18 in the household, are significantly less likely to quit than unmarried employees or those without children. Years of service, entered in quadratic form, shows a falling quit probability until about 20.5 years of service, after which it rises gradually. This is generally consistent with the hypothesis that tenure reduces quit propensities. The rise after 20 years of service may reveal the beginning of early retirement decisions.

The variables that represent general training, educational attainment (MASTERS, DOCTORATE) and previous experience (PREVEXP), do not have a significant effect on

TABLE 2
Logit Estimates of Quit Model
(N = 8424; Mean of Quit = .0204)

Variable	Mean	Beta	Standard Error	Chi-Square*
Intercept		.942	1.400	.45
Prevexp	1.736	.011	.053	.04
Prevexp ²	13.275	-.002	.003	.58
Service	13.600	-.275	.062	19.51
Service ²	225.577	.007	.002	9.51
Masters	.216	-.316	.222	2.02
Doctorate	.205	-.329	.309	1.13
Salary Ratio	1.001	-.554	1.328	.17
Salary Change	.412	-1.082	.696	2.42
Married	.903	-.457	.217	4.44
Children	.657	-.558	.195	8.22
PERFORMANCE = 3	.325	-.792	.244	10.55
PERFORMANCE = 4	.438	-1.281	.263	23.65
PERFORMANCE = 5	.173	-1.011	.318	10.08
Promoted	.227	-.511	.226	5.10
Fin/Audit	.060	-1.110	.534	4.31
Production	.296	.148	.225	.43
Personnel	.030	-.185	.614	.09
Research	.173	.147	.314	.22
Marketing	.194	.409	.250	2.68
Comp. Science	.004	1.364	.653	4.37
Accounting	.015	1.290	.578	4.99
Finance	.004	2.145	.689	9.68
Technician	.004	.317	.818	.15
Math	.015	.660	.603	1.20
Business	.145	-.228	.381	.36
Sciences	.271	-.271	.349	.61
Engineering	.485	-.116	.330	.12
Grade 1 or 2	.006	1.157	.447	6.70
Grade 3	.042	.285	.275	1.08

*Wald (MLE) Chi-square statistic = (Beta/Standard error)². Values greater than 3.84 indicate significance at the .05 level for a two-tailed test.

quits. This is consistent with the choice model which indicated that these factors would effect both the expected utility of the current job and of alternative jobs.

Table 2 also shows that some major fields, functions and salary grades significantly influence the quit probability. Employees with degrees in computer science, accounting and finance were more likely to quit than employees with other degrees. However, employees in the financial and auditing division (FINAUDIT) were less likely to quit. In addition, employees in the lowest salary grades were more likely to quit than other employees. A likelihood ratio test was used to determine whether the sets of major field and function dummy variables were significant. Each test was significant, indicating that major and function as groups are significant factors, providing support for the subsample analysis that follows.⁸

Table 3 presents the parameter estimates for the promotion variable for the various subsamples referred to above.⁹ As can be seen from the table, the sample was divided into three

TABLE 3
Logit Estimates of Promotion Effect on Quit Probability by Major Field, Function, Salary Grade and Performance Rating

Group	N	Percent Promoted	Beta	Standard Error	Chi-Square
<i>Major Field</i>					
Engineering	4088	22.4	-.619	.326	3.61
Sciences	2446	20.2	-.123	.442	.08
Business ^a	1410	28.4	-1.346	.606	4.94
<i>Function</i>					
Administration ^b	2833	23.5	-1.137	.533	4.55
Production	2498	22.9	-.706	.396	3.19
Research	1456	18.8	-.302	.619	.24
Marketing	1637	24.7	-.105	.420	.06
<i>Performance Rating</i>					
Satisfactory (2)	535	3.2	-1.467	1.362	1.16
Good (3)	2736	17.2	-1.273	.472	7.28
Very Good (4)	3695	25.6	.087	.334	.07
Excellent (5)	1458	33.0	-.668	.534	1.56

^aIncludes computer science, accounting, finance and business.

^bIncludes Financial/Auditing, Personnel, and other.

major fields of study (rather than the fourteen shown in Table 1), and four functional areas (rather than the six in Table 1). These groupings were dictated by the need to maintain reasonable sample sizes. As the sample size diminishes the likelihood of observing a significant effect falls as well, tending to bias the results in the hypothesized direction. Thus the subsamples chosen here are more heterogeneous than desired, but represent a reasonable compromise between competing constraints.

Among the major fields, Table 3 shows no effect of promotions on quits for scientists, a small but not significant impact for engineers, and a large, significant impact for business-related majors (computer science, accounting, finance and business). One interpretation of these results is that the business related majors have the best alternatives (or perhaps less commitment to the firm), and are therefore more responsive to absence of promotion than are employees in the sciences or engineering. Alternatively, if this group is more heterogeneous than the other groups, the variance of promotions might be greater, resulting in a more significant relationship with quitting. In fact, the variance of promotions is greater among business majors (.204) than among engineers (.174) or scientists (.161). However, the difference is probably too small to account for the significant effect of promotions on quitting estimated for the group.

Among the functional divisions, promotion has no effect on quitting among research and marketing employees. However, there is a negative but not significant effect for production employees, and a significant effect for administration (finance, auditing, personnel and other) employees. Although the administration group is the most heterogeneous, the variance of promotions among its employees is not larger than for the marketing and production groups. Thus, the greater sensitivity to absence of promotion may reflect better alternatives, or some unknown source of job dissatisfaction.

The performance rating subsamples estimates suggest that low performers are more sensitive than high performers to absence of promotion, as expected. The two lowest performance groups have large, negative coefficients, although only for the "good" group is the relationship significant. (The lack of significance for the "satisfactory" group may be due to the small sample size, which inflated the standard error of the coefficient.) The best performers also show some sensitivity of quitting to absence of promotion, although the effect is not significant. For these "excellent" performers, the pull of attractive alternatives may be especially important.

CONCLUSIONS

The study sought to test whether absence of recent promotion increased the likelihood of voluntary separation, and whether the promotion effect was the result of labor heterogeneity. The results clearly support the first hypothesis: a significant negative relationship was estimated between recent promotion and quit probability. The estimated coefficient indicated a sizeable effect; those promoted had almost a one point lower probability of quitting than those who were not promoted. The average quit rate of those promoted is .014, compared with .023 for those not promoted.

With respect to the heterogeneity argument, there is some support for the hypothesis. However, among the employees who majored in business related subjects, a significant promotion effect remained. If sample size limitations allowed further subdivision to individual majors, a more thorough test would be possible. Among the firm's functions, there is some evidence that absence of promotion increases quit probabilities, although only one coefficient is significant. In summary, promotion rates have a smaller effect on the more homogeneous groups of employees, although the smaller sample sizes may have influenced this outcome.

One concern, noted above, was the possible bias that results from unmeasured attributes correlated with both the length of service variables and the quit probability. Although service is significantly related to the quit probability, the simple correlation is not high ($r = -.11$), and the relationship is quantitatively small. Calculated at the mean length of service and quit probability, an additional year of service reduces the quit probability by less than four-tenths of one percent (.0037). Since the correlations between the unmeasured attributes and the other explanatory variables are unknown, it is difficult to assess the biases that may result. However, in light of the sample restrictions and the small impact of length of service on the quit probability, they are probably not large. Perhaps the best alternatives are to estimate quit models for cohorts having the same length of service, or a hazard function which accounts for variations in the quit probability with length of service. These approaches are beyond the scope of this study.

The major implications of these results is that failure to equalize promotion rates among equally able employees results in increased turnover. The need for employees to develop specific skills, not transferable within the firm, is probably unavoidable. An interesting direction for future research would be the development and testing of a model that minimized turnover cost subject to the firm's skill requirements. This, however, would require estimation of a production function with numerous distinct labor inputs. Another desirable addition to the turnover literature would be an analysis of a comprehensive data set that included job satisfaction indicators for employees, as well as detailed personnel records.

FOOTNOTES

1. In general, previous research has either used more aggregated data or data from multiple employers, studied blue collar workers, or focused on job satisfaction indicators obtained from employee surveys. These approaches to quit behavior are reviewed below.
2. The following discussion loosely follows Weiss.
3. Keller found that performance ratings were inversely related to quitting. Note that the model assumes the W_j have no effect on alternative job offers $V(U_j)$. To the extent that the management signals (pay, performance ratings and promotions), which are hypothesized to be negatively related to quits, do influence $V(U_j)$, their coefficients will tend towards zero. Thus significant negative relationships unambiguously support the model.
4. Eligible here means employed in a position which qualifies the incumbent for the vacancy.
5. One might argue that specific training differences become less important at higher managerial levels, and thus that location in the firm's hierarchy is also a segmentation factor. In this study very high level executives and managers were deleted from the sample. Within the sample there was no systematic variation in promotion rates across salary grades.
6. Tabulation of quit rates by years of service reveals that the rate is over 7% for the first two years, falls to an average of about 2.0% for three through 24 years, rises to 5% for years 25 through 33, and averages about 29 percent for employees with more than 33 years of service. Unfortunately, employee age is not known, so it could not be used in sample selection.
7. Discussions with the personnel department of the firm confirmed my judgment regarding the low-rated performers. Separation codes in these data are not an accurate means of determining separation reason. However, the firm has a policy of terminating, or asking for the resignation of only these employees who are rated as unsatisfactory.
8. The procedure used was to estimate the model without the set of dummy variables. The difference in -2 (log likelihood) between the full and the restricted models follows a chi-square distribution with degrees of freedom = number of omitted variables. For the major field dummies the calculated figure is 21.86 (8), significant at $p = .01$; for the functions the figure is 11.10 (5), significant at $p = .05$.
9. The complete equation (6), less the appropriate major or function dummies, was estimated for each group. Only the promotion coefficients are presented here; the model behaved consistently across groups, although some variables were not significant for these smaller samples.

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