PROMOTIONS DYNAMICS AND INTRAFIRM JOB MOBILITY: INCUMBENTS VS. NEW HIRES

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The objective of this paper is to contribute to the growing literature on internal labor markets and intra-firm job mobility by focusing on the determinants of career advancement. The paper uses five years of personnel records from a single large U.S. corporation. The history of the worker at the firm is examined, therefore making it possible to control for state dependence on past promotions and seniority at the firm. Confirming previous literature, males, whites, and better educated workers have a higher probability of promotion. The main contribution of the findings is that past career advancement does not result in a higher probability of subsequent promotion, even after controlling for fixed heterogeneity and tenure on the current job, neglecting the presence of "fast tracks" in careers within the organization. Moreover, new hires appear to have an advantage when competing with incumbents for a higher position. These results do not hold once other job changes (lateral transfers, task reorganizations) are considered. The differences in promotion dynamics perceived among incumbents and new hires, and among single and multiple promoted workers, are consistent with the "Peter Principle" (Peter and Hull, 1969; Lazear, 2004), which suggests that individuals are "promoted to their level of incompetence," as well as with behavioral theories that suggest that whenever workers make efforts beyond their capabilities when competing for promotions, their incentive to be "over-productive" may decline after reaching the desired higher position.

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I. Introduction

The objective of this paper is to present evidence concerning job mobility within a firm, in particular, by focusing on the determinants of the probability of being promoted to a higher level. Promotions are often seen as the prize of a tournament in which several co-workers compete for a limited number of slots (Lazear and Rosen, 1981). The assignment to a particular job is usually based on relative rather than absolute performance; the individual who gets the promotion is the best, but this does not imply that his competitors are not suitable for the position.

In general, promotions should be seen as linked with both compensation and performance. Lazear (1992) found that individuals who change jobs within a firm experience larger growth in wages. As pointed out by Baker, Jensen and Murphy (1988), in recent decades firms have made an "overwhelming use of promotion-based compensation schemes". Several theoretical papers describe how employers decide promotions in a firm; however, little evidence on how people differ in their probability of "climbing the corporate ladder" has been presented to date.[1]

This paper presents empirical results on the determinants of promotion hazard rates, with an emphasis on the differences between incumbents (workers with previous promotions) and "new-hires." The main purpose is to distinguish career advancement opportunities for those with previous promotions at the firm as opposed to those hired from outside, in terms of working in a particular position. To do so, one must control not only for observable demographic characteristics of the employee, such as age, gender, education, and tenure, but also for unobserved heterogeneity. To this end, the paper uses a unique dataset of employment records

[1] Theoretical papers on promotions include Jovanovic (1979), Carmichael (1983), Milgrom (1988), Bernhardt and Scoones (1993), Prendergast (1993), Bernhardt (1995), Gibbs (1995), Prendergast and Topel (1996), Chiappori, Salanie and Valentin (1999), Gibbons and Waldman (1999), Fairburn and Malcomson (2001), and Lazear (2004).

from a single large U.S. corporation, which can account for the entire history of every employee that has worked for the company over a five-year period. Although the five-year window is not a long time span for workers to achieve many promotions, the data provide valuable evidence on initial career advancement.

In effect, some workers are naturally more talented, productive, sociable, or otherwise different in the eyes of their employers. However, a difficulty arises in that worker's performance, sometimes observed by the employer, is not usually available to the econometrician. Even in the exceptional cases in which performance ratings can be obtained from personnel records, an additional problem arises: ratings are usually not fully objective, as they can rely on supervisors' opinions, which do not necessarily reflect the true productivity of the worker.

Therefore, controlling for unobserved heterogeneity is an important goal in this type of analysis. Heckman (1981a) distinguished between "fixed heterogeneity" and "state dependence" as the main components of individual heterogeneity. The former corresponds to the set of unmeasured variables that influence a current outcome (a promotion), but are themselves not influenced by past outcomes, while the latter refers to the effect that past outcomes (previous promotions) might have on the current outcome. Underlying differences in promotion rates can therefore be characterized as either "fixed over time across workers" or as "variable with workers changing types over time."

The approach taken in the paper is to control for both fixed heterogeneity and state dependence by focusing on the history of the worker at the firm. The "state dependence" component is accounted for by adding controls for career dynamics and advancement (prior promotions). The approach to control for unmeasured quality of the worker by looking at the

history at the firm was introduced by Chiappori, Salanie and Valentin (1999), who proposed a dynamic setting for promotions and wages in order to overcome the lack of performance proxies.

Several papers have presented evidence on empirical hazard rates for promotions and career advancement (Doeringer and Piore, 1971; Medoff and Abraham, 1980, 1983; Lazear, 1992; Baker, Gibbs and Holmstrom, 1994 a and b; Gibbs, 1995; McCue, 1996; Ariga, Ohkusa and Brunello, 1999; Chiappori, Salanie and Valentin, 1999; Lazear, 1999; Seltzer and Merrett, 2000; Lazear and Oyer, 2003; Belzil and Bognanno, 2004; Gibbs and Hendricks; 2004). However, none has highlighted the role of previous successful history at the corporation as a main determinant of subsequent promotions. Moreover, no previous study has ever looked in detail at the potential differences among incumbents and new hires when competing for a higher position at a firm.[2]

Similarly, most of the literature focused on job mobility (i.e., Farber, 1994) has typically used as sources of information longitudinal workers' surveys (such as the CPS, PSID or NLSY), as long as they have detailed data on both worker and job characteristics (including estimates of job duration). However, to study job mobility within a firm (intra-firm mobility), these surveys are not useful because they do not consider the interaction of the workers with their co-workers. Tournament models predict that co-workers' mobility usually matters for particular individual careers at a firm. Examples of intra-firm job mobility studies using longitudinal surveys are

[2] Almost no previous study has conditioned promotion hazard rates on previous positions at the firm. An exception is Belzil and Bognanno (2004), who summarized the causal effect of previous promotion histories in a single variable related to the speed of past promotions. They found a negative correlation between subsequent promotions and the speed of past promotions and relate the finding to the "Peter Principle" prediction. Also, none has properly highlighted the potential differences among new-hired workers and incumbents in terms of career success. One mention of differences in career paths among both groups appears in Heywood, Ho and Wei (1999), who remarked that, although many firms employed older workers, the majority of them did not hire older workers. The other remark closer to the current topic is in Baker, Gibbs and Holmstrom (1994a), who noted that, in their firm, external hires are initially promoted more quickly than are incumbents. They view the finding as signaling the limited importance of "firm-specific" human capital as opposed to "general human capital." Besides a rapid initial promotion, new hires do not experience greater advancement over their careers in their sample firm. A drawback of these statements is that the evidence is purely descriptive, without conditioning on observable characteristics or worker heterogeneity. Therefore, no conclusions regarding differences in ability or performance can be extracted.

McCue (1996), with PSID data, and Belzil and Bognanno (2004), with a survey of American executives.

In contrast, personnel records usually contain much better and comparable employment history than do any longitudinal survey, allowing the reconstruction of a complete history of past mobility, which is useful for controlling for heterogeneity across workers in promotion rates. The disadvantage of this type of case study is that the conclusions pertain only to what happened in a particular firm, so it is necessary to be cautious in interpreting the results, as they may be idiosyncratic. However, the evidence is invaluable because the dynamics of a firm's decisions are clearly represented.

The main results of the paper are as follows: (a) previous promotions do not imply a higher probability of future promotion, even after controlling for fixed heterogeneity and tenure on the current job; and (b) new hires seem to have an advantage when competing with incumbents for a higher position. In fact, promotion is strongly negatively related to the frequency of prior promotions. However, this is not true once other job changes (i.e., lateral transfers) are considered. The evidence contradicts the claim that "job-specific" and "firm-specific" human capital is the driving force in promotion decisions. Moreover, unlike in Baker, Gibbs and Holmstrom (1994 a), the results reject the substantial presence of "fast tracks" in careers (serial correlation in promotions) within the organization. Several explanations are tested in order to support this finding.

In effect, a worker who has been promoted in the past at the firm ("insider") could have a different prospect for achieving further career advancement when compared to those who have been recently hired. However, the sign of the difference is "a priori" unpredictable. On the one hand, if promotion is an outcome of the higher productivity or superior ability of a certain worker, it is reasonable to expect that workers with previous promotions should be more likely to

be promoted again, as they have already proved to be valuable to the firm. On the other hand, although it is true that new hires have less "firm-specific" human capital than do incumbents, they may compensate for it with higher ability or general human capital, or the firm would not have considered them in the first place.

Alternative theories also may account for the lack of positive relationship between past and future promotions. For instance, Fairburn and Malcomson (2001) and Lazear (2004) made an interesting point concerning promotions and performance. Their theoretical prediction is known in the literature as the "Peter Principle," originally formulated by Peter and Hull (1969). The principle states that as people are usually promoted "to their level of incompetence" ("individuals who are good in one job are not necessarily good in the job into which they are promoted"), it would be natural to expect individuals to perform worse after promotion has been achieved.[3] Therefore, there is the potential for the promoted worked to appear less competent compared to the pool of new co-workers. According to Lazear's (2004) formulation, it is true that firms adjust their promotion rule to take into account the decline in performance, but "this does not negate the observation that ability declines after promotion". "Promotion to the level of incompetence" would therefore imply that previously promoted workers have a disadvantage when competing for future higher positions.

Workers' incentives after promotion also may play a significant role. If workers make efforts beyond their capabilities in order to be promoted, after reaching the desired higher position, their incentive to be "over-productive" may be reduced. An example frequently cited is the view that tenure may reduce productivity in academic job markets. The fact that performance is usually imperfectly observed by employers, the presence of downward rigidities in

[3] Lazear (2004) gives other examples in which the "Peter Principle" can be applied: (a) movie sequels are systematically worse than the original on which they are based; (b) follow-up visits to good restaurants provide poorer meals than the first sampling; (c) second-term elected officials are less effective than they were during the first term.

compensation, and the infrequency of demotions and output-related compensation can make this differential behavior possible.

Of course, promotion decisions could be decided under other criteria or administrative rules different from performance, such as loyalty, influence, favoritism, or personal relationships or by privileging the relationship between co-workers by creating an "equal-opportunity" environment.[4] Some companies may even have a tendency to overvalue unfamiliar candidates and undervalue known ones. Prendergast and Topel (1996) suggest that, as firms usually rely on subjective supervisors' judgments of employees' performance when selecting potential candidates to promote, there is always a door open to favoritism (evaluators acting on personal preferences toward subordinates) or bribes. If so, the cost of favoritism may come in the form of arbitrary rewards and less productive job assignments. In the absence of verifiability of performance and "principal-agent" contracts, such as output-related compensations, these practices are more likely to emerge.

The rest of the work is organized as follows. Section II presents the data used in the present study. Section III includes descriptive statistics and empirical hazard rates for promotions. Section IV introduces the main evidence of the determinants of intra-firm job mobility and suggests some theories that are consistent with the results. The paper concludes with brief comments in Section V.

II. Data.

The data used in this paper come from computerized detailed personnel records of a large U.S. firm, with several vertically-integrated businesses (organizational units), for the period

January 1989 to August 1994.[5] The dataset was previously used in Gibbs and Hendricks (2004) for exploring salary systems and personnel policies. The firm is based in the U.S. Midwest, but has employees throughout the country. Gibbs and Hendricks (2004) emphasized that the firm is representative of a typical large U.S. firm by comparing its assets, market value, CEO compensation, sales, and number of employees to some firms in the same industry, the S&P 500, and the universe of firms in the ExecuComp database. Within all comparison groups, the percentile rankings were virtually identical across all measures.[6]

The records include demographics (age, gender, educational level, and marital status) and job characteristics (salary, occupation, sector, and plant unit) for individuals who have worked for the firm during all or part of the cited period. Moreover, the firm's personnel department has coded the dates when the individuals entered the firm, any change in their occupational status, and when they left the company (although information about the causes of ending are not recorded). Therefore, with precision, one can determine the length of each job at the firm.

Unfortunately, due to the existence of over 14,000 different job codes, it was impossible to present a hierarchy chart. Hence, the definition of job transition is different from previous studies that infer transition by looking at the movement between job titles (such as in Baker, Gibbs and Holmstrom, 1994a). In this case, the personnel department classified job changes as a merit promotion, a demotion, a lateral transfer, or a scheduled change in occupation, according to their particular criteria, and one of these classifications is assigned to each job transition in the dataset.[7] The dataset also includes compensations (the main focus in Gibbs and Hendricks, 2004)

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[4] See Milgrom (1988), Prendergast and Topel (1996), Fairburn and Malcomson (2001), and Pfann and Hamermesh (2001).

[5] The identity of the corporation must be kept confidential.

[6] They also compared yearly salary increases to those from private sector workers and those in the same industry using BLS data, and the firm also seems representative.

[7] Gibbs and Hendricks (2004) mention that the classification of promotions and demotions corresponds to changes in responsibility and hierarchical level, while lateral transfers do not.

and performance rating for each worker; however, both are only available at job transition dates (i.e., only when a worker is hired, transferred, promoted or demoted).[8]

The available data records include all workers in the firm, but only contain compensation and detailed movements along a career path starting in 1989. This implies that previous history for those already working in 1989 is not fully observed. Due to this limitation, the paper will only analyze job transitions for those hired since 1989. Table 1 shows the composition of the full-time labor force in the sample for a particular date. The table presents department/sector of placement for employees working on December 31, 1993, as well as quartiles for annual compensation within each category and the proportion of females within sector. For this subset of 5,470 individuals, 19.4% were employed in the operations and distribution department, followed in importance by finance, manufacturing, research and development, marketing, regional affairs, and electronic data processing. Overall, the firm has a large proportion of females (57%). Within departments, there is a wide dispersion in compensation, suggesting that several job levels are present in each department.[9]

This description pertains to a particular moment during the sample period under consideration. Between January 1, 1989 and August 31, 1994 (the right censored date), a total of 7,691 full time workers were hired by the firm. Of them, 1,332 have some missing demographic information (gender, race, marital status, or education). Out of the remaining 6,359, a total of 411 have salary missing for at least one of the occupations at the firm and therefore were dropped from the sample. Finally, three workers were dropped due to missing information on

[8] Moreover, it is impossible to perfectly associate a performance rating to a particular job in the dataset. It could correspond to the current job or to the previous one.

[9] Compensation is based almost exclusively on three formal salary systems: Hay and Grade (for managers and white-collar occupations), and PAQ (clerical and technical office jobs). Gibbs and Hendricks (2004) describe these compensation policies in detail.

sector or plant unit in one of their jobs at the firm. The final sample for the analysis is therefore 5,945 individuals.[10]

Table 2 shows "promotion ports" for these workers, considering their relative position in the wage distribution within department. Also shown in Gibbs and Hendricks (2004), the evidence suggests that most promoted workers had low compensation levels. For instance, 20.7% worked at the lowest wage level in their department, and 42.8% were promoted from the lowest three wage deciles. Moreover, only 2.8% were promoted while working at top positions (tenth decile) in the hierarchy. Unlike Baker, Gibbs and Holmstrom (1994a) and Ariga, Ohkusa and Brunello (1999), in this case, entry and exit "ports" are clearly identified.[11] Workers also seem to mostly enter and exit at lower levels of the hierarchy. The evidence for exits indicates that presumably most quitters leave due to limited prospects for career advancement.

Table 3 contains sample average demographic and job characteristics of these workers and their jobs. The first row presents demographic characteristics for the entire sample. The second row describes the group of employees who have been promoted at least once, the third row is the sub-sample of those with two or more previous positions in the firm, and so on. In this case, the definition of "positions" exclusively includes jobs ending in promotion or exit. Therefore, if a worker enters into a particular job at the firm, and then is only subject to lateral transfers but no promotions, he would be classified as a worker with a single "position." The total number of "positions" is 9,059 for these 5,945 individuals.

Table 3 shows that 34% of the workers in the sample of those hired since January 1989 were promoted at least once. Men were more likely to be promoted; while males are 42% of the sample, 48% of those with four or more positions in the firm are men. Additionally, whites were

[10] Due to these additional data requirements, the final sample differs from that used in Gibbs and Hendricks (2004).
[11] Baker, Gibbs and Holmstrom (1994a) found no evidence of ports of entry and exit. In their firm, significant entry occurs at all jobs and all levels, and exit was also uniformly distributed. The same result is found in Ariga, Ohkusa and Brunello (1999).

more likely to be promoted (83% of individuals with three or more promotions were whites, while whites were 75% of total employees). Although this may be suggesting some sort of disadvantage for women and non-whites in promotion competition, these are just general trends without controlling for other characteristics (such as education, tenure, or previous history). Regarding education, those with college and post-graduate degrees were more likely to achieve career advancement.

The chances of being promoted increase with tenure at the firm, and younger workers (classified by the age of entry into the firm) were more mobile across positions in the firm. If only tenure at the first position is considered, the table shows that those workers with multiple promotions spent less time at their entry assigned position.[12] Moreover, this advantage in timing to first promotion for multiply promoted individual is surely understated, as most leavers (81%) were never promoted in the past. This evidence could be interpreted in principle as consistent with the existence of "fast-tracks" in careers, although the discussion is delayed to Section IV.d.

Additionally, those with multiple promotions seem to have started at a lower level in the "job ladder," as they have received, on average, a lower starting salary. Salary increases are higher after a second or third promotion compared to the initial promotion. Finally, only 24% of the promotions implied changes in sectors (defined by fields or broad categories as in Table 1), although those who had a fruitful history of previous promotions were more likely to switch to a different type of occupation (27% of those with four or more positions at the company).

III. Hazard Functions for Promotions.

[12] Similarly, the time spent for a second promotion is less for those with multiple promotions; while those with two promotions stayed an average of 14.1 months at the second position before gaining a new promotion, for those with more promotions, the waiting time was 11.4 months.

The previous section showed mean workers' characteristics by grouping them according to their history of mobility at the firm. However, it also would be interesting to examine the probability of being promoted conditional on the time spent at the current position. Figure 1 plots the monthly hazard rates for promotion, based on seniority at the current job. These hazard rates are computed for every job at the firm, taking it as a single observation, disregarding previous experience in other positions at the firm. In this case, the hazard rate for promotion is equivalent to the probability of getting a promotion. Hazard functions were calculated as $f(t)/\left[1-F(t)\right]$, where F is the cumulative density function at month t (number of individuals not promoted in the t months before) and f is the probability density function of promotions at month t (number of workers promoted at time t).

The figure shows that the monthly hazard rate of promotion is not monotonically increasing in tenure, as theories stressing the important role of "job-specific" and "firm-specific" human capital accumulation would predict. The probability of being promoted in month one is 3.5%, and this probability increases to a maximum of 8% at month twelve and declines thereafter. In effect, the peak of the probability of promotion is reached at exactly one year of tenure at the current position. Figure 2 shows the quarterly version of the empirical hazard rates for promotion. The plot indicates that the maximum probability of promotion is 10% at the fourth quarter after starting the job.

The increase with tenure of the probability of promotion is also predicted by learning and job matching theories such as that of Jovanovic (1979), who emphasized that both firms and workers need time to learn whether they are a good match. From this point of view, the hazard plot suggests that this period of "proof" is roughly one year or at least that promotion decisions are decided after one year of experience at the current position. However, after a year, the probability of promotion starts to decline until the twenty-fourth month (or eighth quarter), when

there is another peak. The evidence seems to suggest that most evaluations seem to take place once a year, as a sort of "administrative rule." Thereafter, if the employee has not been promoted yet, the probability of ascending in rank decreases and approaches zero. This finding is consistent with Baker, Gibbs and Holmstrom (1994b), who show that, as job tenure rises, wage raises and promotions rates fall. This is also consistent with Lazear's (1992) suggestion that job-to-job turnover within the firm (and also for movement between firms) occurs most frequently at the beginning of the job and dies out thereafter. Two years of experience at the current job seem to be a sufficiently large period for evaluating whether the worker deserves a higher position in the firm.

Table 4 shows the relationship between tenure and number of promotions for workers hired since 1989. This sort of "job transition matrix" shows that promotions are highly correlated with tenure; those with more experience at the firm have more chances to climb the "corporate ladder." As an example, among those individuals with less than one year of tenure (35% of total), 91% kept the original position for which they were hired. This picture changes dramatically for those who have an additional year of experience in the firm (26%): 27% experience a promotion in their careers and 4% experience even two promotions. Those with two or more years of tenure (38%) are more likely to have at least one occupation upgrade.

This evidence shows that promotion probabilities change substantially with time spent at the firm and at the current job. However, the estimated hazard functions in Figures 1 and 2 represent average responses for the whole set of workers, without taking into account individual demographic or job characteristics. Unobserved (to the econometrician) heterogeneity could play an important role in explaining why employees have different perspective for their careers. Moreover, it is easy to dismiss the possibility that promotions only depend on "fixed" worker heterogeneity, without any state dependence. The empirical hazard rates show that the

probability of ascending the hierarchy of the firm changes with tenure at the current job, but it would be more interesting to base the hazard rates on the previous history of the worker. The next section will provide parametric estimates of the determinants of promotion rates, controlling for demographic characteristics, fixed heterogeneity, and the particular work history at the firm for each individual hired since 1989.

IV. State Dependence, Incumbents vs. New Hires, and Promotions

IV.a. Model.

Ignoring state dependence as a component of unobserved heterogeneity in the process of being promoted to a superior level in the hierarchy in a firm could seriously distort any estimate of the determinants of promotion hazard rates. As pointed out in Lazear (1992), individuals who remain on the job longer usually do worse than those who are promoted early. Medoff and Abraham (1980) also reported that workers' performance evaluations were worse the longer they remain on the job. Gibbs and Hendricks (2004) found that wages raise and bonuses fell with seniority.

Certainly, it is possible to partially infer how individuals will differ in their future careers in a firm by examining their history at the firm. The history of the worker can be broken down into seniority and previous job positions at the firm. Seniority could certainly play a significant role in achieving promotion. "Firm-specific" human capital can be earned with time spent working at the firm. Besides, learning and job matching theories (Jovanovic, 1979) predict that firms and workers need time to learn their true productivity and the best match among the pool of positions available at the firm.

Previous promotions also can influence subsequent chances of promotions. If employers decide on promotions on a productivity basis, and if productivity within a firm depends on the natural ability of certain workers to perform better than their co-workers, it is reasonable to believe that those who were promoted in the past will be more likely to ascend the hierarchy again in a short period (e.g., "fast track"). However, several theories also have predicted a negative relationship between past and future promotions.

For instance, Lazear (2004) showed that output after promotion is statistically expected to fall. Being promoted is evidence that a standard has been met, regression to the mean implies that future productivity should decline on average ("Peter Principle"). Strategic behavior could also lead individuals to perform worse after receiving a promotion; those promoted in the past, due to their "outstanding" performance, may have fewer incentives to maintain high levels of effort once promoted. Finally, if promoted workers slowly acclimate to their new position and duties, they may have a disadvantage with respect to those who have been working at the same occupation for a long time and have acquired more "job-specific" human capital.[13]

Similarly, several hypotheses could be mentioned related to the promotion prospect for new hires. If new hires do not differ substantially in quality from incumbents, and if "firm-specific" human capital is an important component of the skills of a particular worker, conditional on being in the same job level (same wage decile in a given department) and having spent the same amount of time at the current job, a disadvantage in terms of subsequent promotions for workers recently hired should be expected. In comparison, probation placement could lead to a rapid promotion for recent new hires, without implying future success in their careers. Even more, if the firm needs substantial time to learn the quality of the job-worker match and, if as a

[13] This could be a plausible explanation only if individuals do not differ much in the rate at which they learn; in this way, those promoted quickly once may need to wait longer for their next promotion.

consequence, the company only decides to hire "super-productive" workers (people with really outstanding prospects in a future career at the firm), promotions could be biased towards employers recently incorporated into the firm (Carrillo, 2003).

A simple model derived from Lazear (2004) can illustrate these ideas. Let's assume that worker ability has both a time invariant (a) and a transitory component (e). Only the sum of both ("performance") is actually observed by the firm. The time invariant component has a distribution $f(a)$, and the corresponding distribution of the transitory component if $g(e)$, with $E(e)=0$, $E(a,e)=0$, and $E(e_t,e_{t+1})=0$. Assume that, only after two periods, the firm can observe with certainty the permanent component a.

There are three possible positions: worker, supervisor, and boss. The productivity of each position is given by $\theta + \beta(a + e)$ for the worker, and $\kappa + \psi(a + e)$ for the supervisor, with $\theta > \kappa$ and $\beta < \psi$. Therefore, only if $(a + e) > (\theta - \kappa)/(\beta < \psi) = A^*$ is it optimal to assign someone the supervisor position. After the first period, only those workers achieving at least A^* are promoted to the supervisor position. For those workers, the expectation of the transitory component in the first period (e_1), given that they were promoted, is given by,

$$E(e_1 \mid a + e_1 > A^*) = \int_{-\infty}^{\infty} \int_{A^*-a}^{\infty} \frac{1}{1 - G(A^* - a)} e g(e) f(a) \partial e \partial a = \int_{-\infty}^{\infty} E(e \mid e > A^* - a) f(a) \partial a > 0$$

which is greater than zero, as the conditional expectation of e being greater than any number is positive. Assume that the firm is considering hiring a new worker for the supervisor position. They will do so if the prospective worker has an expected permanent ability a greater than the existing supervisors. This is true, as the firm will only hire someone who has an overall expected performance greater or equal than the existing employee. If so,

$$E(a_N + e_N) = E(a_N) \geq E(a + e_1 \mid a + e_1 > A^*) = E(a \mid a + e_1 > A^*) + E(e_1 \mid a + e_1 > A^*)$$

which implies that,

$$E(a_N) - E(a \mid a + e_1 > A^*) \geq E(e_1 \mid a + e_1 > A^*) > 0$$

Therefore, the firm will only hire a new worker if and only if his or her expected permanent ability component is higher than the inferred permanent ability of existing workers (after they had spent a period of tenure at a lower position).

Now, consider a promotion tournament to a "boss" position between the new hire and the incumbent. As shown in Lazear (2004), in period 2, the expected productivity of the incumbent supervisor will be lower than in the previous period. This is because in period 2, the expected transitory component for the incumbent is $E(e_2 \mid a + e_1 > A^*) = 0$, as e_2 is both independent of a and e_1. As $E(a \mid a + e_1 > A^*) + E(e_1 \mid a + e_1 > A^*) > E(a \mid a + e_1 > A^*) + E(e_2 \mid a + e_1 > A^*)$, we can conclude that the expected performance for incumbents will fall from period 1 to period 2. Therefore,

$$E(a_N + e_N) - E(a + e_2 \mid a + e_1 > A^*) > 0$$

which, in turn, implies that the new hire has a higher ex-ante expected performance than did the incumbent at the beginning on period 2. The prediction of the model is that the new hire is more likely to be promoted to a boss position as compared to the incumbent.

IV.b. Estimation Strategy.

To explore how these issues related to the role of state dependence can influence the probability of being promoted, a model for a binary dependent variable related to the promotion outcome of worker *i* at time *t* is estimated. The dependent variable y_{it} is defined as:

$y_{it} = 1$ if worker *i* is promoted in month *t*

$= 0$ otherwise

The estimation strategy adopted is that of an unobserved effects binary response model of the form:

$$P\left(y_{it} = 1 / x_{it}, y_{it-1}, \delta_t, \mu_i\right) = G\left(x_{it}'\beta + y_{it-1}'\gamma + \delta_t + \mu_i + \varepsilon_{it}\right)$$

where $i = 1,\ldots, N$ denotes the set of workers, and $t = 1,\ldots, T$ the time index (in months), x_{it} is the set of demographic and job characteristics for each individual, δ_t is a time component common to all workers, μ_i represents the individual effects, ε_{it} is the individual/time error term, and *G* is the cumulative distribution function. One of the issues that needs to be addressed is the treatment of the individual effects. Assuming that the individual effects are normally and independently distributed across employees and periods greatly simplifies the analysis, although the results obtained would be difficult to defend. Moreover, in a context of state dependence, the error terms for each individual are likely to be correlated across periods, hence the i.i.d. assumption would be incorrectly specified (Heckman, 1981b). Unlike a probit specification, which cannot escape from the incidental parameter problem, a logistic specification can

consistently estimate β by conditional MLE fixed effect specification that maximizes the log likelihood over β and the individual parameters μ_i (see Wooldridge, 2002).

An alternative is to treat the problem as a random effects model. Unfortunately, for estimating this model, it is necessary to make a restrictive assumption regarding the relationship between x and μ_i: they should be independent and μ_i should have a normal distribution. Under this assumption, a conditional maximum likelihood approach is available for estimating β. This requires finding the joint distribution of ($y_{i1}, ..., y_{iT}$), conditional on x_i and integrating out μ_i. Since μ_i has a normal distribution conditional on x_i,

$$f\left(y_1,...,y_T / x_i;\beta;\sigma_\mu\right) = \int_{-\infty}^{\infty}\left[\prod_{t=1}^{T}\Phi\left(x_t\beta+\mu\right)^{y_t}\left[1-\Phi\left(x_t\beta+\mu\right)\right]^{1-y_t}\right]\left(1/\sigma_\mu\right)\phi\left(\mu/\sigma_\mu\right)d\mu$$

where ϕ is the normal probability density function and Φ is the cumulative normal distribution function. The random effects assumption, although somehow restrictive, avoids the computationally difficult task of integrating a T-dimension multivariate normal distribution function. The results using this estimation strategy (not reported here) turned out to be remarkably similar to the main estimates reported using fixed effects models. However, the analysis that follows will be based on conditional (fixed effects) techniques, as one does not need to specify a particular distribution for the individual effects. This method is also more suitable than a Cox's proportional hazard model, as the latter does not properly deal with individual effects.

IV.c. Promotion for Demographic Groups

Table 5 shows the results for promotion rates. The panel is comprised of monthly observations for every individual who worked for the firm during any period between January 1989 and July 1994. The monthly frequency is chosen over quarterly or annual alternatives in order to avoid missing substantial variation in the hazard rates. The first three columns present a model specification for the first occupation in the firm for every employee (a total of 77,101 monthly observations for the 5,495 workers). The coefficients reported are the average marginal effects expressed in percentages. Standard errors are clustered at the individual level.

Column (1) only controls for demographic characteristics and year indicators, attempting to capture the overall performance of the firm that may similarly affect the careers of all workers. In the first column, only demographic characteristics are included. The results show that there appears to be no evidence of gender differences in the probability of promotion, but this is not true regarding race: conditional on the same covariates, whites have a higher chance of ascending the hierarchy of the firm than do non-whites in any particular month (around 0.49 percentage points more). Married workers also seem to have an advantage compared to single or divorced workers, a fact that could be explained by an employer's belief that married employees are less mobile and less likely to leave the company in the future (Pfann and Hamermesh, 2001). There is a negative relationship between age at entry and the probability of promotion: older workers have a lower probability of promotion. Finally, more educated people seem to have a positive differential for climbing the "corporate ladder" (for instance, post-graduates have 0.4 percentage points more probability than do those with an incomplete college education). This positive correlation between promotion rates and education could be seen as either education

reflecting higher productivity or that promotions are decided by credentials (signals of higher ability).

However, these estimates do not take into account the type of job performed at the firm. Adding plant units and job departments/sectors indicators are not enough to control for job positions/titles at the firm. By looking at Table 1, one can see that within each category there is substantial dispersion regarding wages. Table 2 also shows that promotion ports seem to be located mostly at lower levels in the hierarchy. It is perfectly natural to believe that those at the bottom of the hierarchy should have more chances of promotion than those already at the top. One way to control for job levels within occupations is to assign deciles in the distribution of wages in each category to each position. By adding indicators for job categories and wage deciles, one is more accurately controlling for job levels at the firm.

Therefore, Model (2) adds a broad set of job controls, including plant units, departments/sectors, and wage decile levels. It also incorporates entry cohort indicators (year of entry). The coefficients on wage deciles (not reported) exhibit a declining pattern according to the position at the occupational ladder (those at the bottom have a higher probability of promotion). Age is no longer significant, suggesting that the advantage in the probability of subsequent promotion for young people, captured in the previous specification, was probably due to the fact that they were starting at lower levels in the hierarchy. Finally, the impact of a higher degree is much more important (1.6 additional percentage points for post-graduate degrees) with respect to those with an incomplete college education), conditional on being at the same sector and job level.[14]

[14] As pointed out in Lazear (1992), it seems that wage levels fully describe the "job ladder" in the firm, without the need to look at specific job titles. Baker, Gibbs and Holmstrom (1994a) also recognize the importance of compensation in the determination of job levels.

Column (3) adds the first component of state dependent: tenure at the current job. The results for different demographic groups remain. More interestingly, the tenure coefficients show the same pattern as that reported in Figure 2: the probabilities of promotion are greater at quarters 4 and 8, i.e., after a complete year period. In other words, even after controlling for observable differences, the pattern of yearly peaks remains. Promotion decisions seem to be made mostly after the worker completes a year period working at the current position.

Column (4) replicates the analysis in column (3), but this time looking at all jobs at the firm for every employee (122,399 positions for the 5,495 employees). The results found for the first jobs remain, with the exception that, when considering the entire career history of each worker, men have a general advantage in getting promotions. However, when looking at the full history of jobs for a particular worker in a firm, it is not only necessary to consider tenure at the current job in order to estimate promotion hazard rates, but also tenure at the firm, another state dependence component.

The addition of tenure at the firm in a non-linear specification in column (5) suggests that conditional on tenure at the firm, promotion probabilities monotonically increase with tenure at the current job. At the same time, after controlling for tenure at the current job, those with greater previous experience at the firm (at other positions) have a disadvantage in getting a further promotion, although this effect disappears for highly experienced workers (exhibiting a U-shape relationship between promotion and tenure at the firm).

However, one has to be careful with the addition of firm seniority in estimating promotion hazard rates. A potential problem is that tenure at the firm can be correlated with unobserved determinants of the likelihood of achieving a promotion. The decision to stay in the firm can be determined by the possibility of future promotions. If this is true, estimates in column (5) are inconsistent, as tenure at the firm would be endogenous. In any case, the addition of tenure at the

firm as a state dependent component confirms the importance of previous history for promotion outcomes.

IV.d. Fast Tracks in Careers

It would be interesting to test the existence of "fast tracks" in promotions in the firm. Baker, Gibbs and Holmstrom (1994a) defined "fast-track" as career paths for which those promoted quickly at one level are promoted quickly at the next level. Bernhardt (1995) and Gibbons and Waldman (1999) contribute theoretical arguments in favor of the existence of fast tracks in careers. For Bernhardt (1995), promotions signal ability to competing firms. Therefore, workers who get promoted rapidly are more likely to receive subsequent promotions in order to avoid being bid away by outside firms. For Gibbons and Waldman (1999), more able workers are promoted quickly and it is their differential innate ability that drives their continued success.

Baker, Gibbs and Holmstrom (1994a) documented the existence of "fast tracks" in their firm by using job transition matrices, suggesting that their presence reveals the lack of importance of seniority at the firm for better career achievement. Gibbs and Hendricks (2004) remarked on the difficulty of looking for fast track effects in careers using job transition matrices, given only five years of data.[15] However, in a regression framework, one can base promotion probabilities on tenure at the previous job and extract some conclusions related to the existence of rapid career paths in the firm. A similar methodology for analyzing the existence of fast track by conditioning subsequent promotions on the speed of past promotions is performed in Ariga, Ohkusa and Brunello (1999) and Belzil and Bognanno (2004).

[15] Nevertheless, Gibbs and Hendricks (2004) interpret, as evidence of "fast tracks," that those who were promoted quickly the first time are more likely to be promoted again within three years.

Table 6 shows the results for promotion hazard rates for individuals with at least one promotion in their history at the firm. The control of interest is the number of months spent at the immediate previous position at the firm. For multiple promoted workers, each position at the firm represents a new observation. Column (1) indicates that the existence of "fast tracks" in careers can be rejected for the firm. There is no significant relationship between the speed of future promotions and the speed of past promotions.

To present robust estimates, several alternative samples are analyzed in columns (2) to (4). Column (2) presents results only for stayers, as the previous evidence could be contaminated by sample selection of individuals leaving the firm (in particular, if they are systematically more or less successful than stayers; see Section III.g for further discussion). The relationship between future and past speed of promotions is even weaker for stayers. Column (3) includes only stayers and individuals with three or more complete years working at the firm. The main conclusion remains. Finally, to avoid repetition of positions for the same multiple promoted worker, column (4) presents results only looking at the second job for each worker. The presence of fast tracks is once again rejected.

In other words, the evidence rejects the presence of "fast tracks" in careers in this firm. However, this should not be interpreted as a signal that seniority and "firm-specific" human capital play a significant role in explaining successful promotion experiences. Indeed, column (5) in Table 5 shows that, in fact, there is a negative relationship between seniority at the firm and promotions. Alternative explanations should be explored in order to substantiate the findings. For instance, declining performance and disincentive effects right after achieving promotion could be consistent with both negligible "firm-specific" human capital and the absence of "fast tracks" effects.

IV.e. Incumbents vs. New Hires and Previous Promotions

As stated above, one interesting aspect not analyzed in the previous literature is the differences in career path prospects for new hires compared to incumbents, i.e., workers with previous job experience at the firm. To this effect, Table 7 compares the outcomes for new hires versus incumbents by adding controls for previous promotions. The comparison reflects any difference in the likelihood of being promoted among two competitors working at the same sector, with the same experience (tenure) at the job and receiving similar compensations: an "insider" (an employee hired for a lower position who had managed to be promoted) and a worker hired directly for the job. Being an insider (i.e., having a previous promotion at the firm) appears to substantially reduce the probability of a subsequent promotion (0.77 percentage points less in a given month, a 30% decrease compared to the mean probability of 2.54% of being promoted in a given month). As noted before, Baker, Gibbs and Holmstrom (1994a) also found that new hires are initially promoted more quickly than are incumbents.[16]

This result is consistent with several hypotheses concerning ability and performance after promotion. One group of explanations would suggest differences in the ability or skill component among incumbents and new hires (as in Gibbons and Waldman, 1999), combined with low or negligible returns to "firm-specific" human capital. In effect, this would be true, for instance, if the firm had a policy of only hiring "super-productive" workers, i.e., individuals with outstanding prospects. Or, alternatively, if the firm places new hires in "probation" positions; if managers are uncertain of whether employees are a good match to the firm, they could initially place them in lower positions according to their expected productivity. In either case, the

[16] As the specification includes controls for tenure at the current job, it is not true that the "insiders" group is constituted mostly of long-termers left behind in previous promotion tournaments.

prediction is that new hires would have greater-than-average ex post realization of productivity, compared to incumbents currently working at positions already suitable to their maximum capabilities. In fact, without proper controls for true ability or skill component for each worker, the finding could just be showing that new hires are systematically different than incumbents in ability for the position in which they are initially placed.

A second group of hypotheses could be more related to promotion rules or even to performance or behavioral differences for people already promoted. The evidence also agrees with Lazear's (2004) version of the "Peter Principle," which states that "people are promoted to their level of incompetence." The analogy comes from the fact that, if a significant portion of the workforce reaches their respective level of incompetence, subsequent career advancement would be negatively related to the event history of a previous promotion. An alternative explanation that also would predict decline in performance after promotion is related to disincentive effects right after achieving the goal. One could state that workers seeking promotion could be "out-performing" by more than their natural capabilities in their current position and "relax" thereafter upon success.

In other words, several alternative explanations could potentially explain this finding. It is necessary to find testable implications in order to discriminate between these competing theories. One way to discriminate among theories stressing differences in ability or skills versus other hypotheses related to promotion rules or changes in behavior after achieving promotion is by adding individual components in the regression specification in order to capture "fixed heterogeneity" among workers. If new hires are systematically more able than incumbents upon entry into a given job, they would have a permanent advantage over time. Therefore, by looking at within variability across time for a particular worker, the negative relationship between past and future promotion should disappear once taken into account fixed heterogeneity. This test

does not apply to "probation" practices, as a given individual could be relatively more able than his or her co-workers at the initial position, but this would not necessarily be true after achieving the first promotion.

To this effect, column (2) shows the results of a conditional logit (fixed effect) regression looking at within variation across time for a giver worker (marginal effects are not available as the individual effects are not actually estimated; demeaned variables are used in the estimation procedure). Controlling for unobserved fixed individual heterogeneity removes the permanent individual component (i.e., ability) in promotion dynamics. Identification in a conditional logit setting requires that the analysis applies only to individuals who indeed achieve at least one promotion in their work history at the firm. The negative relationship between past and subsequent promotions remains, which indicates that a theory suggesting that the firm only hires "super-able" workers does not apply here.

Sample selection problems may arise from the fact that column (2) only looks at the set of successful workers (those who at least achieved a promotion). To test whether this is a valid concern, an analysis with no individual fixed effects (column 1) was performed using only "successful" workers, which yielded similar results in terms of the negative relationship between past and future promotions. As such, sample restriction does not seem to be driving the main result in column (2).

The existence of probation practices, in contrast, would predict a rapid initial promotion for new hires, but thereafter, there would be no differences between new hires and other incumbents in subsequent competitions for promotions. Therefore, a test for this hypothesis would be to look at differences in the likelihood of obtaining a promotion for individuals who have been promoted at least once in the past. Indeed, Baker, Gibbs and Holmstrom (1994a) found evidence of "probation" practices, as in their firm (without controlling for individual characteristics) new

hires are initially promoted more quickly than incumbents, but do not experience further greater advancement over the course of their careers compared to other workers.

Column (3) shows the results of this test, presenting workers with at least one promotion experience. The results show that individuals with multiple past promotions are still less likely to obtain a further promotion compared to workers with only one previous position at the firm. The marginal effect is lower compared to that found when looking at differences among new hires and incumbents, but it still helps to rule out a probation story: individuals with fewer past promotions have an advantage in further ascending hierarchy.

This negative relationship remains significant even after controlling for tenure at the firm (column 4). Conditional on same job level and tenure at the current job, those who spent less time at previous jobs have a greater probability of promotion, i.e., these workers seem to be qualitatively different than those who took longer to reach the current position. However, the negative and significant relationship between past and previous promotions remains. The existence of "fast tracks" inside the firm seems to be once again rejected by the evidence. Column (5) contains the results of a logit fixed effect regression for this subsample in order to control for fixed heterogeneity, with the main result unchanged.

Indeed, the evidence seems to point toward hypotheses more related to promotion rules and performance differences for promoted workers than to permanent differences in ability. Lazear's "Peter Principle" story of "promotion to level of incompetence" seems suitable to explain this phenomenon; it is also a story emphasizing that individuals relax after achieving promotion. One important piece of evidence to look at would be whether this disincentive effect after promotion is differential for individuals with a different promotion history at the firm. A corollary of the "Peter Principle" idea is that multiple promoted people should be even less likely to obtain a subsequent promotion than those who are single promoted, as they are presumably nearer to their

level of incompetence. Similarly, disincentive effects are probably stronger for people with multiple promotions as opposed to individuals with only one previous experience of climbing the job ladder.

To this effect, column (6) includes all the occupations for every employee and a full set of controls for the number of previous promotions. All the coefficients for previous promotions are negative, suggesting that new hires have a decisive advantage over incumbents. Moreover, the coefficients increase in absolute value when the number of previous promotions rises. The equality of the coefficients can be rejected at a 1% level ($p = 0.008$). The evidence therefore supports the "Peter Principle" corollary of declining performance, as well as any argument of disincentive effects after achieving promotion.

However, a valid concern is whether these estimates are really capturing a negative effect of achieving a promotion or just any time component associated with tenure at the firm. To avoid this spurious interpretation, the results in column (7) are from an analysis once again restricted to those who already had achieved at least one promotion, adding controls for having a second and third promotion in their history, as well as for firm seniority. The declining pattern of the coefficients on previous promotions remains, suggesting that it is not just a result of a disadvantage for those spending more time at their previous positions, but a real negative effect of being previously promoted. Nevertheless, those who spent less time at lower positions indeed have a premium in promotion competition. Finally, column (8) presents the results of a fixed effects logit estimation taking into account any fixed heterogeneity component. The results are robust to the inclusion of individual fixed effects.

The evidence seems to point to advantages for new hires with respect to incumbents in obtaining a rapid promotion. Several reasons can substantiate this discovery; however, the evidence is more consistent with theories reflecting a decline in performance after promotion

rather than with permanent differences in ability or a "high standard" rule for hiring new workers. The nature of the decline is not clearly identified. One explanation could be the existence of a policy of promoting the employees to their "level of incompetence," naturally implying the difficulty of obtaining a promotion right after achieving one. Another plausible explanation is strategic behavior on the part of the employees of "outperforming" before a promotion, and "relaxing" or returning to their natural productivity levels thereafter.

IV.f. Variation Across Demographic Groups.

Do these results vary substantially across different groups? Table 8 presents estimates of the probabilities of promotion for sub-samples of the workforce: the groups are differentiated according to gender, race, and education. Regarding previous promotions, the analysis identifies differences among those with a single promotion and those with multiple promotions (two or more), without a further desegregation (third or fourth promotion), due to the lack of sufficient observations within each workforce group. The estimated models are otherwise similar to what is seen in column (6) in Table 7.

In all cases, previous promotions are negatively correlated with the probability of subsequent promotion, suggesting that the advantage for new hires is present across all demographic groups. For certain subgroups, notably women and less educated workers, the evidence is also consistent with Lazear's (2004) "Peter Principle" prediction, as not only do the coefficients for previous promotion decrease with the number of past outcomes, but also their equality is rejected at a 1% level using traditional Wald tests. Indeed, for these subgroups, the incentives to over-perform seem to be even lower for individuals with multiple past promotions.

This does not seem to hold true for males and highly educated workers (holding a post-graduate degree).

Other interesting results are the following: (a) gender differences only appear among whites and less educated workers; b) racial differences seem to be present mainly among males and highly educated workers; and (c) more educated workers have higher promotion probabilities, regardless or gender or race.

IV.g. Further Robustness Checks.

One of the reader's concerns may come from the fact that these estimates include all individuals who have worked for the firm during at least one month between January 1989 and July 1994, irrespectively of their initial position in the hierarchy. For instance, promotions for executives or for workers at the top of the hierarchy in their respective departments are naturally rare, as they are already at higher levels in the organization. Indeed, Table 2 shows that only 8.8% of ever promoted workers were initially placed in the top three wage deciles in their respective division at their immediate previous job. Therefore, it would be advisable to estimate promotion dynamics only for individuals at lower positions, who have a better prospect of career advancement.

To this effect, column (1) in Table 9 presents the estimates of promotion hazard rates for all workers except those placed at the Executive Department and those already in the top-three wage deciles levels in their respective sectors. The main conclusion regarding the effect of being a new hire remains: they have a substantially higher chance of being promoted. Moreover, those with multiple promotions have a lower promotion likelihood compared to those with a single

promotion history, evidence in favor of the "Peter Principle" prediction. In effect, the equality of the coefficients for the number of previous promotions is rejected at a 10% level.

Following this argument, even across sectors, promotion rules may differ. Departments certainly differ in the characteristics of the type of work performed. For instance, it would be advisable to distinguish between "blue collar" and "white collar" jobs in the estimation of promotion hazard rates. To do so, two typical broad categories of occupations at the firm were selected according to their higher number of observations relative to other tasks: Operations and Distributions (a typical "blue collar" sector) and Research and Development (typically "white collar"). Because less than 25% of the promotions represented changes in sector, this distinction reflects, in fact, different tracks for a typical employee entering the firm at one of these job occupational categories. Once again, within these occupations, job levels are identified according to the relative position in the distribution of wages.

Column (2) shows the results of the analysis only for those working at Operation and Distributions, while column (3) shows the results of the same analysis for the Research and Development division. The advantage for new hires seems to be present across both types of jobs. However, there is no difference in promotion probabilities for single promoted versus multiple promoted workers in the Research and Development department. This evidence seems to point out that, while in a "white collar" job there are still promotion advantages for new hires, there are no further differences after achieving the first promotion.

The personnel records include "leavers," a subgroup that includes those who quit to work outside the company, retired, died, or were laid off. It would be important to ask the counterfactual question of what the probability of promotion would have been for those who left the company. They certainly would have had different careers prospects had they stayed at the firm. Perhaps leavers were those who had less probability of promotion and hence decided to

find a better job match in another company or were fired because their performance was lower than what the firm expected. It is infrequent that a firm demotes their employees; instead of doing that, employers usually prefer to lower wages or just to fire the worker (Gibbons and Waldman, 1999).[17] However, maybe those who quit were instead those outstanding workers who had received better offers from outside, so their probability of promotion was indeed higher. In any case, it is not simple to predict the sign of the sample selection bias.[18]

Unfortunately, the data do not record the reasons for leaving the company. Sample sensitivity analysis by including and excluding quitters and laid-off workers, in turn, cannot be performed in this case. But it is possible at least to measure the strength of the bias by excluding all the observations for those who left the firm before August 1994. This reduces the sample size from 5,945 employees to 3,471, the total number of positions from 9,059 to 5,999, and the total monthly observation for each worker in each position from 122,399 to 87,987. The results for "stayers" are presented in Column (4), with similar conclusions to the base analysis: previous promotions exhibit a declining pattern concerning future promotion probabilities.

However, among "stayers" in the analysis are people just recently hired. Because the analysis is truncated at year 1994, it is not possible to observe whether recent hires are indeed making substantial progress in their careers at the firm. A narrow and appropriate analysis should look at the promotion dynamics of workers who have spent a reasonably large amount of time at the company. Column (5) presents the results for only those with three or more years of seniority. Once again, the main conclusion concerning the differences among workers with different work histories at the firm remains. Columns (4) and (5) show that, in any case, sample selectivity issues do not seem to be substantially biasing the results.

[17] Only 0.43% of the changes in job positions within the firm were demotions.
[18] As noted earlier (Section II.b), exits are relatively abundant at lower wage levels and 81% of the "leavers" were never promoted, suggesting that a positive bias toward "stayers" is more likely to be present.

IV.h. Lateral Transfers.

A final robustness check involves looking at other changes in positions that do not necessarily imply a promotion. Examples include any kind of lateral transfers, scheduled non-merit upgrades, and other task reorganizations or job reclassifications. In principle, any explanation related to declining performance or behavioral motives should not apply to the general case of lateral transfers, as they usually do not involve substantial changes in compensations or do not imply career advancement, per se. As opposed to promotions, they are more likely to be a result of internal structure reorganizations or other motives far away from merit recognition. Probably, lateral transfers constitute an opportunity given to a worker with a decent performance, but placed in the "wrong" job.

To highlight differences in promotion and lateral transfer rates, Table 10 presents a multinomial logit analysis analog to the previous evidence concerning promotions, but this time the dependent variable y_{it} takes the following form:

$y_{it} = 2$ if worker i is laterally transferred at month t

$= 1$ if worker i is promoted at month t

$= 0$ if worker i stays at the current position at month t

In this model with three potential outcomes, the response probabilities are expressed as:

$$P(y = j / X) = \exp(X'\beta_j) / \left[1 + \sum_{h=0}^{2} \exp(X'\beta_h) \right], \quad j = 0, 1, 2.$$

To identify the model, the set of coefficients corresponding to the outcome "stay" (β_0) is arbitrarily set to 0. This allows the calculation of "relative risk ratios," i.e., the relative probability of each of the other two potential outcomes ("promotion" or "lateral transfer") with respect to the base category ("stay"). For instance, the relative probability of a lateral transfer relative to permanence at the current position is given by:

$$\frac{P(y = lat.transfer)}{P(y = stay)} = \exp(X'\beta_2)$$

The estimation of the set of relative coefficients with respect to the base category therefore can be estimated by conditional maximum likelihood techniques, as suggested in McFadden (1974).

Lateral transfers and other changes in positions out of promotions are much more common in the firm. For instance, 10.7% of the employees in the sample had three or more lateral transfers, but, as seen in Table 4, only 2.5% of them had three or more promotions. The average monthly probability of any change in job is 5.4%, compared to 2.5% of obtaining an effective promotion. Model 1 includes a control related to being an incumbent, i.e., having a previous job at the firm. The first column presents the results for promotions and the second one for lateral transfers.

There are remarkable differences in the predictable power of demographic characteristics for the case of promotions compared to other lateral job changes. For instance, education clearly increases the likelihood of promotions, but this is not necessarily true for lateral transfers. Whether education is a proxy for ability or just signals ability to the employer, in both cases it

seems not to be relevant for "non-merit" changes in position across the firm. Similarly, gender, marital status, and racial differences clearly affect promotion hazard rates, but do not imply differences in the likelihood of being laterally transferred.

Concerning differences among incumbents and new hires in career paths, the evidence is conclusive. While for promotions, new hires have an advantage in career advancement, the difference for incumbents is exactly the opposite for the case of lateral transfers. New hires have an advantage in obtaining a subsequent promotion, but, at the same time, they are less likely to change occupations for other reasons besides promotions when compared to incumbents at the same job level and tenure at the current position. The results once again suggest differences in performance or motivation after achieving promotion for incumbents, as differences in ability in favor of new hires would not be consistent with their relative disadvantage for other job changes. In contrast, lateral transfers are presumably relatively abundant among incumbents, as the firm would prefer to test other job matches for workers for whom training investments are now sunk costs.

Model 2 includes a full set of controls for the number of previous jobs. It seems that, in general, the likelihood of a lateral transfer increases with the number of previous job changes (previous promotions or lateral transfers), just opposite to the evidence presented throughout the paper for the case of career advancement through promotions. Indeed, it seems that there are certain employees with a higher propensity to move from position to position inside the firm (positive serial correlation), without achieving career advancement.

Estimates in Model 2 include past history of job changes without discriminating among promotions or lateral transfers. In contrast, Model 3 attempts to identify differential impacts according to the nature of the job change. In this case, the likelihood of achieving a future promotion is negatively influenced by past promotions, but not necessarily by past lateral

transfers. In contrast, both previous promotions and previous lateral transfers seem to substantially positively affect the future chances of moving laterally across jobs. These differential impacts could be explained by the fact that past lateral transfers are not necessarily merit driven, so declining performance after a lateral movement should not be expected. In comparison, previously promoted workers are certainly valuable to the firm, so in the event of a decline in performance the employer may certainly prefer to try them at other positions at the firm before deciding that they are no longer useful for the company. This last result is also consistent with Ariga, Ohkusa and Brunello (1999), who found a negative relationship between "horizontal-level" promotions (equivalent to our definition of "lateral transfers") and earlier previous promotion in a single firm.

Finally, Model 4 uses sensitivity analysis to check the robustness of the findings by excluding leavers and workers with less than three years of seniority at the firm. Workers with a bad prospect at the firm may prefer to leave the company rather than to experience a lateral transfer or change in occupation. Moreover, the firm may prefer to fire a bad match or low productivity worker instead of wasting time and money through rotation across positions. In any case, the results do not substantially change the relationship between past and future changes in types of jobs when the analysis is restricted to long-term stayers.

To sum up, the evidence for lateral transfers suggest that the forces driving changes in occupation are dramatically different, depending on the nature of the change. Promotions are usually merit-driven changes of positions based on performance, as opposed to lateral transfers or task reorganizations. The empirical evidence in this papers suggests that incentives and strategic behavior seem to play a significant role in determining pre- and post-promotion performance, while for lateral transfers, these forces are absent.

V. Synthesis and Conclusions.

This paper shows estimates of the probability of ascending the hierarchy of a firm (promotion), using personnel records data. The main findings indicate that previous promotions do not imply a higher probability of subsequent promotion and that new hires seem to have an advantage when competing with incumbents for a higher position. This evidence appears to be consistent with the "Peter Principle," suggested by Lazear (2004), that workers are usually promoted "to their level of incompetence." It also seems to agree with behavioral theories related to workers outperforming at their jobs in order to compete for a promotion and then relaxing after achieving their immediate goal. The evidence cannot discriminate among these competing theories with different implications for the design of promotion schemes for principals and managers. Moreover, these forces seem to be absent once other "administrative" or "scheduled" job changes and lateral transfers are considered. A valid concern is the relatively short time span (five years of data). Whenever available, these predictions should be better tested on a longer period.

Of course, other alternative explanations for this fact that do not allude to promotions tied to performance can be suggested. If promotions are not based solely on productivity, but decided instead by other criteria, different than performance, such as loyalty, influence, favoritism, and other personal relationships or by privileging the relationship between co-workers by creating an "equal-opportunity" environment, this result can be accounted for by these alternative theories. Unfortunately, it is difficult to distinguish among them with the information available. In any case, what is reflected in the data is that those with a successful history at the firm do not seem to have an advantage when future promotions are made.

References

Ariga, K., Y. Ohkusa, and G. Brunello (1999), "Fast Tracks: Is it in the Genes? The Promotion Policy of a Large Japanese Firm", *Journal of Economic Behavior and Organization* **38**: 385-402.

Baker, G., M. Gibbs, and B. Holmstrom (1994 a), "The Internal Economics of the Firm: Evidence from Personnel Data", *Quarterly Journal of Economics* **109**: 881-919.

Baker, G., M. Gibbs, and B. Holmstrom (1994 b), "The Wage Policy of a Firm", *Quarterly Journal of Economics* **109**: 921-955.

Baker, G., M. Jensen, and K. Murphy (1988), "Compensation and Incentives: Practice vs. Theory", *Journal of Finance* **43**: 593-616.

Bernhardt, D. (1995), "Strategic Promotion and Compensation", *Review of Economic Studies* **62**: 315-339.

Bernhardt, D., and D. Scoones (1993), "Promotions, Turnover, and Preemptive Wage Offers", *American Economic Review* **84**: 771-791.

Belzil, C. and M. Bonagnno (2004), "The Promotion Dynamics of American Executives", Discussion Paper 1003, IZA.

Carmichael, L. (1983), "Firm-Specific Human Capital and Promotion Ladders", *Bell Journal of Economics* **14**: 251-258.

Carrillo, J. (2003), "Job Assignment as a Screening Device", *International Journal of Industrial Organization* **21**: 881-905.

Chiappori, P., B. Salanie, and J. Valentin (1999), "Early Starters versus Late Beginners", *Journal of Political Economy* **107**: 731-760.

Doeringer, P., and M. Piore (1971), *Internal Labor Markets and Manpower Analysis*. Lexington, MA, D.C. Heath and Company.

Fairburn, J., and J. Malcomson (2001), "Performance, Promotion, and the Peter Principle", *Review of Economic Studies* **68**: 45-66

Farber, H. (1994), "The Analysis of Interfirm Worker Mobility", *Journal of Labor Economics* **12**: 554-593.

Gibbons, R., and M. Waldman (1999), "A Theory of Wage and Promotion Dynamics", *Quarterly Journal of Economics* **114**: 1351-1358.

Gibbs, M. (1995), "Incentive Compensation in a Corporate Hierarchy", *Journal of Accounting and Economics* **19**: 247-277.

Gibbs, M., and W. Hendricks (2004), "Do Formal Salary Systems Really Matters?", *Industrial and Labor Relations Review* **58**: 71-93.

Heckman, J. (1981a), "Heterogeneity and State Dependence", in *Studies in Labor Markets*, ed. S. Rosen. Chicago, I.L., University of Chicago Press.

Heckman, J. (1981b), "Statistical Models for Discrete Panel Data", in *Structural Analysis of Discrete Data with Econometric Applications*, eds. C. Manski and D. McFadden. Boston, M.A., M.I.T. Press.

Heywood, J., L. Ho, and X. Wei (1999), "The Determinants of Hiring Older Workers: Evidence from Hong Kong", *Industrial and Labor Relations Review* **52**: 444-459.

Jovanovic, B. (1979), "Job Matching and the Theory of Turnover", *Journal of Political Economy* **87**: 972-990.

Lazear, E. (1992), "The Job as a Concept", in *Performance Measurement, Evaluations, and Incentives*, ed. W. Bruns. Boston, M.A., Harvard Business School Press.

Lazear, E. (1999), "Personnel Economics: Past Lessons and Future Directions", *Journal of Labor Economics* **17**: 199-236.

Lazear, E. (2004), "The Peter Principle: A Theory of Decline", *Journal of Political Economy* **112**: S141-S163.

Lazear, E., and P. Oyer (2003), "Internal and External Labor Markets: A Personnel Economics Approach", Working Paper 10192, NBER.

Lazear, E., and S. Rosen (1981), "Rank-Order Tournaments as Optimal Labor Contracts", *Journal of Political Economy* **89**: 841-864.

McCue, K. (1996), "Promotions and Wage Growth", *Journal of Labor Economics* **14**: 175-209.

McFadden, D. (1974), "Conditional Logit Analysis of Qualitative Choice Analysis", in *Frontiers in Econometrics*, ed. P. Zarembka. New York, N.Y., Academic Press.

Medoff, J., and K. Abraham (1980), "Experience, Performance, and Earnings", *Quarterly Journal of Economics* **95**: 703-736.

Medoff, J., and K. Abraham (1983), "Years of Service and Probability of Promotions", Working Paper 1191, NBER.

Milgrom, P. (1988), "Employment Contracts, Influence Activities, and Efficient Organization Design", *Journal of Political Economy* **96**: 42-60.

Peter, L., and R. Hull (1969), *The Peter Principle: Why Things Always Go Wrong*. New York, NY, Morrow.

Pfann, G., and D. Hamermesh (2001), "Two-Sided Learning, Labor Turnover and Displacement", Working Paper 8273, NBER.

Prendergast, C. (1993), "A Theory of 'Yes Men'", *American Economic Review* **83**: 757-770.

Prendergast, C., and R. Topel (1996), "Favoritism in Organizations", *Journal of Political Economy* **104**: 958-978.

Seltzer, A., and D. Merrett (2000), "Personnel Policies at the Union Bank of Australia: Evidence from the 1888-1900 Entry Cohorts", *Journal of Labor Economics* **18**: 573-613.

Wooldridge, J. (2002), *Econometric Analysis of Cross Section and Panel Data*, Boston, M.A., M.I.T. Press.

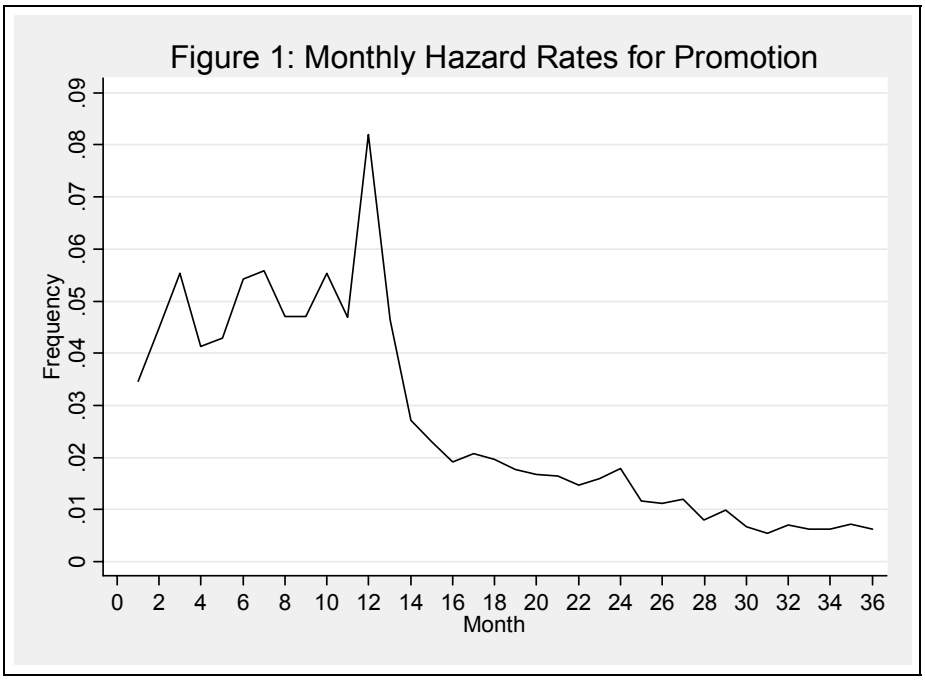
Figure 1: Monthly Hazard Rates for Promotion
Frequency
0
.01
.02
.03
.04
.05
.06
.07
.08
.09
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
Month

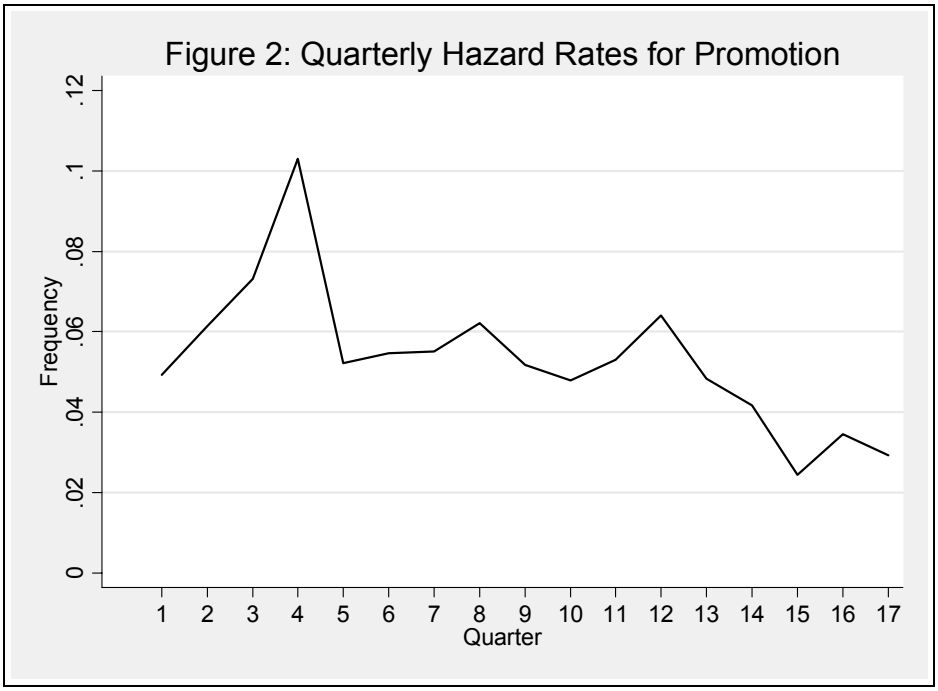
Figure 2: Quarterly Hazard Rates for Promotion
Frequency
0
.02
.04
.06
.08
.1
.12
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Quarter

Table 1: Full-Time Job Categories at December 31st, 1993

Job Categories	Number	%	Wages			% Females
			1 Q	Median	3 Q	
Executive Management	52	1.0	34,476	81,500	161,400	69.2
Business Planning	41	0.7	32,860	55,000	65,000	74.1
Administratives	84	1.5	21,062	26,467	45,382	59.2
Human Resources	222	4.1	27,100	39,555	58,563	77.8
Corporate Finance	20	0.4	30,000	31,278	31,906	47.4
Finance	737	13.5	14,352	22,500	37,700	73.6
Regional Affairs	476	8.7	23,330	33,888	47,078	55.1
Legal	51	0.9	29,000	36,444	88,395	79.3
Public Affairs	7	0.1	32,100	42,500	62,500	75.0
Marketing	512	9.4	29,672	41,600	61,500	64.3
Operations / Distributions	1,060	19.4	20,856	24,024	30,672	67.5
Manufacturing	704	12.9	22,280	33,500	43,768	29.1
Sales Representatives	246	4.5	33,000	40,000	50,000	44.5
Sales Management	150	2.7	26,000	47,609	65,000	68.1
Research and Development	630	11.5	32,564	42,140	55,216	40.2
Electronic Data Process	337	6.2	33,101	39,095	45,741	31.1
Health Care	115	2.1	20,000	22,065	24,408	84.7
Scientific Affairs	26	0.5	25,000	49,906	67,888	73.3
Total	5,470	100.0	22,932	32,782	47,400	57.0

Note: Workers hired after January 1st, 1989.

Table 2: Entry, Promotion and Exit Ports - 1989/1994

Wage Deciles	Entry (%)	Promotion (%)	Exit (%)
1	19.5	20.7	20.0
2	14.7	12.1	16.0
3	10.9	10.1	10.3
4	10.6	11.0	9.9
5	11.2	10.2	10.9
6	9.1	9.4	9.3
7	8.1	9.2	7.0
8	7.5	8.8	7.5
9	5.3	5.8	5.9
10	3.3	2.8	3.2
Total	5,945	3,114	2,474

Table 3: Employee's Characteristics - 1989/1994

Positions in the Firm	Number of Employees	Men	Whites	Married	Some College	College	Post Degree
		%	%	%	%	%	%
1	5,945	41.63	75.26	54.16	41.72	42.07	16.22
2	2,219	43.71	77.56	56.83	35.20	46.69	18.12
3	718	44.99	78.97	56.27	31.48	51.11	17.41
4 or more	177	47.46	82.49	57.23	23.16	58.76	18.08

Positions in the Firm	Avg. Age at Entry	Avg. Tenure at Firm	Avg. Tenure at First Pos.	Avg. Starting Salary	Salary Increase	Changing Sector
	Years	Months	Months	Dollars	%	%
1	31.45	20.58	10.58	31,222	-	-
2	29.80	30.64	10.19	30,219	16.82	24.20
3	28.03	37.96	8.31	28,464	19.62	22.70
4 or more	27.36	44.66	7.00	26,441	17.73	27.12

Note: The sample contains all the individuals that were hired after 1/1/1989 until 8/31/1994. The number of hires during this period is 5,829 and their characteristics are reflected in the first row. The second row corresponds to the subsample of those workers who has been promoted at least once; the subsample of those workers who has been promoted at least once; the third row to those promoted at least twice, etc.

Table 4: Number of Promotions and Tenure at the Firm - 1989/1994

Tenure at the Firm	Number of Promotions				Total Workers
	0	1	2	3 and More	
Less than 1 year	1,888	191	6	-	2,085
Between 1 and 2 years	1,070	432	67	7	1,576
Between 2 and 3 years	434	426	169	23	1,052
Between 3 and 4 years	266	346	228	58	898
More than 4 years	68	106	99	61	334
Total workers	3,726	1,501	569	149	5,945

Table 5: Logit Estimates of Monthly Promotion Rates

Jobs	First			All	
Model	(1)	(2)	(3)	(4)	(5)
Men	-0.024	0.143	0.138	0.252***	0.179**
	(0.123)	(0.128)	(0.123)	(0.088)	(0.087)
Married	0.331***	0.415***	0.393***	0.231***	0.259***
	(0.122)	(0.116)	(0.112)	(0.077)	(0.077)
White	0.487***	0.427***	0.406***	0.281***	0.257***
	(0.128)	(0.123)	(0.118)	(0.086)	(0.084)
Age (entry)	-0.165***	0.013	0.012	0.023	-0.036
	(0.056)	(0.056)	(0.054)	(0.041)	(0.039)
Age Squared (entry)	0.001	-0.001	-0.001	-0.001**	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
College	0.290**	0.748***	0.702***	0.835***	0.687***
	(0.141)	(0.152)	(0.147)	(0.105)	(0.102)
Post-Degree	0.409**	1.555***	1.467***	1.653***	1.324***
	(0.192)	(0.273)	(0.261)	(0.205)	(0.198)
Tenure at the firm (months)					-0.386***
					(0.019)
Tenure at the firm squared (months)					0.004***
					(0.000)
Tenure at current job (bw 1 and 2 quarters)			0.913***	1.000***	2.571***
			(0.209)	(0.181)	(0.252)
Tenure at current job (bw 2 and 3 quarters)			1.288***	1.395***	5.666***
			(0.246)	(0.210)	(0.494)
Tenure at current job (bw 3 and 4 quarters)			3.110***	3.136***	13.630***
			(0.340)	(0.286)	(1.119)
Tenure at current job (bw 4 and 5 quarters)			0.334	0.932***	11.830***
			(0.266)	(0.235)	(1.361)
Tenure at current job (bw 5 and 6 quarters)			-0.137	0.975***	16.810***
			(0.269)	(0.260)	(2.056)
Tenure at current job (bw 6 and 7 quarters)			0.068	0.776***	21.060***
			(0.308)	(0.277)	(2.770)
Tenure at current job (bw 7 and 8 quarters)			0.668**	1.566***	30.873***
			(0.370)	(0.344)	(3.817)
Tenure at current job (more than 8 quarters)			0.358	0.814***	30.232***
			(0.241)	(0.209)	(3.754)
Wage Deciles	No	Yes	Yes	Yes	Yes
Cohort Indicators	No	Yes	Yes	Yes	Yes
Sector Indicators	No	Yes	Yes	Yes	Yes
Plant Unit Indicators	No	Yes	Yes	Yes	Yes
Year Indicators	Yes	Yes	Yes	Yes	Yes
Observations	77,101	77,101	77,101	122,399	122,399
Positions	5,945	5,945	5,945	9,059	9,059
Mean of Dependent Variable (%)	2.878	2.878	2.878	2.544	2.544
Pseudo R2	0.014	0.030	0.040	0.038	0.053

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. Asymptotic standard errors in parentheses. Standard errors corrected for individual cluster effects. Marginal effects (in percentage) reported.

Table 6: Fast Tracks and Monthly Promotion Rates

Sample	All Except First Job	All Except First Job - Stayers	All Except First Job - Stayers - 3 or More Years of Tenure	Second Job - Stayers - 3 or More Years of Tenure
Model	(1)	(2)	(3)	(4)
Men	0.347***	0.389***	0.394**	0.328
	(0.116)	(0.133)	(0.165)	(0.226)
Married	0.125	0.125	0.234*	0.440**
	(0.103)	(0.114)	(0.141)	(0.192)
White	-0.123	-0.183	-0.310	-0.186
	(0.134)	(0.154)	(0.213)	(0.269)
Age (entry)	-0.109	-0.125	-0.214**	-0.279**
	(0.067)	(0.076)	(0.092)	(0.130)
Age Squared (entry)	0.001	0.001	0.002*	0.003
	(0.001)	(0.001)	(0.001)	(0.002)
College	0.625***	0.545***	0.671***	0.572*
	(0.155)	(0.173)	(0.221)	(0.294)
Post-Degree	1.106***	0.882***	1.073**	0.680
	(0.330)	(0.341)	(0.478)	(0.486)
Tenure at previous position (months)	0.014	0.006	0.010	0.009
	(0.012)	(0.013)	(0.015)	(0.029)
Observations	45,037	36,903	24,254	16,324
Positions	3,114	2,528	1,323	790
Mean of Dependent Variable (%)	1.976	2.072	2.198	2.387
Pseudo R2	0.054	0.058	0.063	0.066

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. Asymptotic standard errors in parentheses. Standard errors corrected for individual cluster effects. Marginal effects (in percentage) reported. All regressions include indicator variables for tenure at the current job (in quarters), wage deciles, sector, plant unit, cohort of entry, and years.

Table 7: Logit Estimates of Monthly Promotion Rates

Estimation	Logit	Logit FE	Logit		Logit FE	Logit		Logit FE
Outcome Reported	Marginal Effects	Coeff.	Marginal Effects		Coeff.	Marginal Effects		Coeff.
Jobs	All		All Except First Job			All	All Except First Job	All
Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Men	0.208**		0.341***	0.333***		0.201**	0.333***	
	(0.093)		(0.119)	(0.117)		(0.096)	(0.117)	
Married	0.277***		0.124	0.125		0.277***	0.126	
	(0.082)		(0.106)	(0.105)		(0.084)	(0.105)	
White	0.282***		-0.112	-0.113		0.306***	-0.112	
	(0.091)		(0.137)	(0.135)		(0.093)	(0.135)	
Age (entry)	-0.002		-0.111	-0.113*		-0.018	-0.113	
	(0.042)		(0.068)	(0.067)		(0.043)	(0.067)	
Age Squared (entry)	-0.001		0.001	0.001		-0.001	-0.001	
	(0.001)		(0.001)	(0.001)		(0.001)	(0.001)	
College	0.716***		0.620***	0.620***		0.734***	0.621***	
	(0.110)		(0.158)	(0.155)		(0.113)	(0.115)	
Post-Degree	1.138***		1.056***	1.099***		1.383***	1.101***	
	(0.207)		(0.332)	(0.334)		(0.212)	(0.334)	
Previous Promotions ("Insider')	-0.771***	-4.084***						
	(0.104)	(0.097)						
More than One Previous Promotion			-0.463***	-0.369***	-5.397***			
			(0.124)	(0.133)	(0.277)			
1 Previous Promotion						-0.867***		-5.385***
						(0.080)		(0.116)
2 Previous Promotions						-1.264***	-0.354**	-9.414***
						(0.099)	(0.137)	(0.235)
3 or more Previous Promotions						-1.309***	-0.424*	-12.615***
						(0.188)	(0.247)	(0.389)
Tenure at the firm (months)				-0.089**			-0.089***	
				(0.029)			(0.029)	
Tenure at the firm squared (months)				0.001***			0.001***	
				(0.000)			(0.000)	
Observations	122,399	68,028	45,037	45,037	21,277	122,399	45,037	68,028
Positions	9,059	5,333	3,114	3,114	1,613	9,059	3,114	5,333
Mean of Dependent Variable (%)	2.544	4.578	1.976	1.976	4.206	2.544	1.976	4.578
Pseudo R2	0.038	0.279	0.055	0.055	0.339	0.037	0.056	0.326

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. Asymptotic standard errors in parentheses. Standard errors corrected for individual cluster effects. Marginal effects (in percentage) reported, except for logit fixed effect specifications. All regressions include indicator variables for tenure at the current job (in quarters), wage deciles, sector, plan unit, cohort of entry, and years.

Table 8: Selected Cases for Monthly Promotion Rates - 1989/1994

Sample	Gender		Race		Education	
	Men	Women	Whites	Non-Whites	High School	Post-Degree
	(1)	(2)	(3)	(4)	(5)	(6)
Men			0.317***	-0.193	0.331**	-0.223
			(0.113)	(0.171)	(0.163)	(0.213)
Married	0.643***	0.037	0.295***	0.232	0.245**	0.641***
	(0.126)	(0.109)	(0.098)	(0.164)	(0.125)	(0.178)
White	0.505***	0.149			0.116	0.536***
	(0.134)	(0.123)			(0.136)	(0.191)
Age (entry)	-0.017	-0.040	-0.065	0.138*	0.054	-0.158
	(0.068)	(0.051)	(0.050)	(0.083)	(0.046)	(0.135)
Age Squared (entry)	-0.001	0.000	0.000	-0.003**	-0.001**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
College	0.599***	0.753***	0.811***	0.493**		
	(0.177)	(0.144)	(0.130)	(0.225)		
Post-Degree	1.110***	1.511***	1.583***	0.788**		
	(0.277)	(0.320)	(0.259)	(0.346)		
1 Previous Promotion	-0.846***	-0.920***	-0.964***	-0.680***	-0.936***	-0.866***
	(0.118)	(0.103)	(0.091)	(0.163)	(0.114)	(0.188)
2 or more Previous Promotions	-1.243***	-1.397***	-1.367***	-1.192***	-1.401***	-1.101***
	(0.133)	(0.120)	(0.107)	(0.173)	(0.112)	(0.247)
Observations	53,562	68,850	92,930	29,505	46,499	21,966
Positions	3,852	5,207	6,908	2,151	3,528	1,523
Mean of Dependent Variable (%)	2.571	2.523	2.619	2.307	2.253	2.543
Pseudo R2	0.047	0.042	0.039	0.045	0.053	0.054
1 Prev.Prom. = 2 Prev.Prom. (p-value)	0.110	0.001	0.005	0.042	0.001	0.133

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. Asymptotic standard errors in parentheses. Standard errors corrected for individual cluster effects. Marginal Effects (in percentages) reported. All regressions include indicator variables for tenure at the current job (in quarters), wage deciles, sector, plan unit, cohort of entry, and years.

Table 9: Selected Cases for Monthly Promotion Rates - 1989/1994

Sample	Exclude Executive Dept. and 3 Top Wage Deciles	Operations and Distribution Department	Research and Development Department	Only Stayers	3 or More Years of Tenure at the Firm
	(1)	(2)	(3)	(4)	(5)
Men	0.218**	0.949***	-0.144	-0.005	0.049
	(0.107)	(0.249)	(0.203)	(0.116)	(0.134)
Married	0.217**	0.258	0.240	0.243**	0.238**
	(0.099)	(0.183)	(0.193)	(0.109)	(0.127)
White	0.389***	0.411**	0.673***	0.422***	0.305**
	(0.107)	(0.193)	(0.184)	(0.119)	(0.147)
Age (entry)	-0.078*	-0.053	0.262**	-0.075	-0.083
	(0.046)	(0.081)	(0.125)	(0.056)	(0.072)
Age Squared (entry)	0.000	0.000	-0.005**	0.000	0.000
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
College	0.567***	0.588***	1.237***	0.531***	0.878***
	(0.118)	(0.230)	(0.362)	(0.138)	(0.169)
Post-Degree	1.001***	0.580	1.970***	0.749***	1.104***
	(0.222)	(0.491)	(0.485)	(0.211)	(0.293)
1 Previous Promotion	-1.007***	-1.173***	-0.881***	-1.261***	-0.782***
	(0.093)	(0.166)	(0.171)	(0.099)	(0.137)
2 or more Previous Promotions	-1.406***	-1.532***	-0.607*	-1.624***	-1.209***
	(0.118)	(0.185)	(0.311)	(0.112)	(0.177)
Observations	96,229	25,208	14,328	87,987	54,360
Positions	7,200	1,878	990	5,999	2,721
Mean of Dependent Variable (%)	2.669	2.391	2.104	2.873	2.739
Pseudo R2	0.034	0.038	0.066	0.036	0.042
1 Prev.Prom = 2 Prev.Prom (p-value)	0.058	0.059	0.536	0.004	0.005

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. Asymptotic standard errors in parentheses. Standard errors corrected for individual cluster effects. Marginal effects (in percentages) reported. All regressions include indicator variables for tenure at the current job (in quarters), wage deciles, sector, plan unit, cohort of entry, and years.

Table 10: Multinomial Logit Estimates of Monthly Promotions and Lateral Transfers Hazards Rates

Sample	All						Only Stayers, 3 or More Years of Tenure at the Firm	
Outcome	Promotion	Lateral Transfer	Promotion	Lateral Transfer	Promotion	Lateral Transfer	Promotion	Lateral Transfer
Model	(1)		(2)		(3)		(4)	
Men	0.094**	-0.034*	0.094**	-0.030*	0.096**	-0.033*	-0.012	-0.088***
	(0.040)	(0.018)	(0.040)	(0.018)	(0.043)	(0.020)	(0.066)	(0.030)
Married	0.141***	-0.003	0.142***	-0.004	0.150***	-0.008	0.080	-0.069***
	(0.037)	(0.017)	(0.037)	(0.017)	(0.039)	(0.019)	(0.059)	(0.026)
White	0.122***	-0.008	0.124***	-0.005	0.123***	-0.007	0.155**	-0.011
	(0.042)	(0.019)	(0.043)	(0.019)	(0.045)	(0.021)	(0.073)	(0.031)
Age (entry)	0.003	0.014*	0.003	0.016**	-0.006	0.022***	-0.001	0.024**
	(0.019)	(0.008)	(0.019)	(0.008)	(0.020)	(0.008)	(0.038)	(0.011)
Age Squared (entry)	0.000*	0.000*	0.000*	0.000**	0.000	0.000**	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
College	0.339***	0.051**	0.339***	0.050**	0.339***	0.050**	0.442***	0.020
	(0.046)	(0.021)	(0.046)	(0.021)	(0.049)	(0.024)	(0.082)	(0.035)
Post-Degree	0.544***	0.005	0.542***	0.009	0.538***	0.004	0.519***	-0.052
	(0.064)	(0.029)	(0.064)	(0.029)	(0.068)	(0.031)	(0.111)	(0.047)
Previous Jobs ("Insider')	-0.641***	0.431***						
	(0.054)	(0.028)						
1 Previous Job			-0.683***	0.476***				
			(0.057)	(0.028)				
2 Previous Jobs			-0.657***	0.589***				
			(0.084)	(0.037)				
3 or more Previous Jobs			-0.858***	0.828***				
			(0.116)	(0.048)				
1 Previous Promotion					-0.820***	0.575***	-0.972***	0.491***
					(0.070)	(0.029)	(0.113)	(0.049)
2 Previous Promotions					-0.960***	0.542***	-0.914***	0.497***
					(0.168)	(0.064)	(0.240)	(0.088)
3 or more Previous Promotions					-1.366***	0.562***	-0.962***	0.389***
					(0.426)	(0.127)	(0.397)	(0.116)
1 Previous Lat. Transfer					-0.303***	0.138***	-0.201*	0.175***
					(0.066)	(0.032)	(0.115)	(0.051)
2 Previous Lat. Transfers					-0.092	0.134***	-0.090	0.143**
					(0.106)	(0.048)	(0.152)	(0.063)
3 or more Previous Lat. Transfers					0.087	0.013	0.109	-0.026
					(0.159)	(0.083)	(0.196)	(0.095)
Observations	122,399		122,399		122,399		41,926	
Positions	15,325		15,325		15,325		4,789	
Pseudo R2	0.030		0.030		0.033		0.032	

Notes: * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level. Asymptotic standard errors in parentheses. Standard errors corrected for individual cluster effects. All regressions include indicator variables for tenure at the current job (in quarters), wage deciles, sector, plant unit, cohort of entry, and years.