



# Promotion dynamics the Peter Principle: Incumbents vs. external hires

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## ABSTRACT

The “Peter Principle” (Peter and Hull, 1969; Fairburn and Malcomson, 2001; Lazear, 2004) suggests that individuals are “promoted to their level of incompetence”. A corollary of the “Peter Principle” prediction is that external hires should have an advantage when competing with incumbents for a higher position. Using five years of personnel records from a single large U.S. corporation, this paper contributes to the literature on internal labor markets and intra-firm job mobility by testing this prediction for career advancement. Results support the idea of differences in promotion dynamics among incumbents and external hires, since past career advancement within the firm result in a lower probability of subsequent promotion, even after controlling for workers’ heterogeneity and tenure on the current job. The advantage for external hires does not hold once other job changes (lateral transfers, task reorganizations) are considered, highlighting that promotions are a very different job placement mechanism than transfers. Overall, the evidence points out towards declining performance following promotion, as opposed to alternative competing hypothesis of probation placement or “handicapping” external candidates.

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## 1. Introduction

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 Peter 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. Thus, there is the potential for the promoted worker to appear less competent compared to her/his pool of new co-workers. According to Fairburn and Malcomson (2001), if a firm provides incentives by promoting those who have performed well in a job to a higher hierarchical level, it may simply transfer them to a job to which they are not well suited. This would not be the case for transfers across jobs/tasks with similar responsibilities or difficulty level.

As previous literature on internal labor markets has shown, employees face strong external competition for climbing the corporate ladder. The choice between external recruitment and internal promotion is an important managerial decision, with implications for career advancement. A natural corollary from the “Peter Principle” prediction is

that a worker who has been promoted from lower levels of the corporate hierarchy (“incumbent”) would be less likely to achieve further career advancement when competing with co-workers that have been externally hired (i.e., with no previous job position in the firm). While this last observation has been recently documented in the literature of personnel economics (Baker et al., 1994; Chan, 2006), it has never been linked to the Peter Principle prediction, nor tested with respect to non-merit job changes. This observation challenges the conventional view that if promotion is an outcome reflecting the higher productivity or superior ability of a certain worker, it is reasonable to expect that workers with previous promotions and high “firm-specific” human capital should be more likely to be promoted again, as they have already proved to be valuable to the firm.

Alternative theories can also account for an advantage of external hires versus incumbent workers (i.e., workers promoted from lower positions) when competing for promotion slots. For instance, workers’ incentives after promotion may play a significant role. If incumbent 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 compared with externally hired workers (Rosen, 1986). An example frequently cited is the view that tenure may reduce productivity in academic job markets. Although the firm can set up incentives so that motivation stays the same, the fact that performance is usually imperfectly observed by employers, the presence of downward rigidities in compensation and high severance payments

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<sup>1</sup> 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.

<sup>2</sup> Rosen (1986) argues that unless top-ranking prizes are sufficient large between jobs at different levels, contestants who succeed in winning a promotion “rest on their laurels” in attempting to climb higher.

costs, and the low frequency of demotions and performance-pay could make this workers' differential behavior possible, in particular if termination costs are higher for workers with more seniority.<sup>3</sup>

In contrast, Chan (1996, 2006) and Agrawal et al. (2006) relate the negative relationship between previous promotions and further career advancement to the “handicapping” theory. In their formulation, as the pool of external competitors is wide enough to reduce the chance of winning a promotion tournament to barely zero, external applicants are “handicapped” when competing with internal candidates so as to provide promotion incentives to existing employees. This implies that a successful external candidate who manages to enter the firm should be superior in ability relative to internally promoted colleagues, thus facing a higher probability of success in achieving career advancement. A similar observation (although with different testable implications) can emerge in presence of probation practices, when a risk-averse employer decides to place the external hire in a position inferior according to his/her expected productivity.<sup>4</sup> Or the employer may be more willing to hire promising but risky external workers, as opposed to relying in predictable incumbent ones, because they can keep (or promote) better-than-expected workers and fire worse-than-expected ones (Lazear, 1998).

The main purpose of this paper is to provide evidence for the “Peter Principle” and other hypotheses of career advancement, by distinguishing promotion opportunities for those with previous promotions at the firm as opposed to those externally hired. To this end, the paper uses a unique dataset of employment records from a single large U.S. corporation over a five-year period. A novel approach taken in the paper is to control for both unobserved fixed heterogeneity and state dependence by looking at the worker's history at the firm.<sup>5</sup> Unobserved fixed heterogeneity is accounted for by the inclusion of worker's fixed effects. In effect, some workers are naturally more talented, able, sociable, or otherwise different in the eyes of their employers, and it would be advisable to control for such permanent differences.

The “state dependence” component is accounted for by adding controls for career dynamics and advancement (past promotions). The approach to control for unmeasured quality of the worker by looking at her history at the firm was introduced by Chiappori et al. (1999). While fixed effects would allow controlling for permanent components of productivity, past promotion history (“state dependence”) would contribute to identify any other transitory driver of career advancement (productivity, effort, or just employer's bias) observed by the employer but not by the econometrician.

Ideally, the use of personnel records that include performance measures immediate before and after a promotion for different groups of workers (for instance, those coming from lower ranks in the firm vs. those hired from outside) would help identify whether output tends to fall after promotion, as predicted by the “Peter Principle”. Unfortunately, the data used in this paper (already used in Gibbs and Hendricks, 2004, for exploring salary systems and personnel policies) lacks of periodical performance ratings to follow workers output/productivity over time. It therefore prevents the testing regression-to-the-mean theory in performance after promotion (i.e., those employees who are not promoted should have on average a higher productivity after the promotion decisions have been made), an important prediction in

Lazear (2004).<sup>6</sup> But even that work effort and performance measures are absent in the empirical analysis, the exercise still allows discriminating among competing theories. For instance, any remaining difference in promotion prospect after controlling for fixed heterogeneity could be at least partially related to certain groups exerting higher work effort towards promotion and not to permanent differences. Differences in career advancement following promotions versus lateral transfers (non-merit job changes) can also help determining whether results can be associated to hypotheses related to performance outcomes after a particular job change.

The main results of the paper are summarized as follows: (a) future promotion is strongly negatively related to the frequency of prior promotions, even after controlling for fixed heterogeneity and tenure on the current job; (b) external hires seem to have an advantage when competing with equivalent incumbents for a higher position; (c) previous job changes (promotions or lateral transfers) increase the likelihood of a new lateral transfer in the future, and previous lateral transfers do not affect the probability of being promoted in the future; and d) without ruling out that several theoretical mechanisms could be working simultaneously, the Peter Principle prediction seems to be the most suitable theory to rationalize these findings. Overall, the evidence contradicts the hypothesis of “firm-specific” human capital as the main driving force in promotion decisions. The evidence presented for this firm also contradicts the “handicapping” theory as a main explanation for the promotion advantage for external hires, since results hold even after accounting for unobserved fixed heterogeneity.

The rest of the paper is organized as follows. Section 2 introduces competing hypothesis, including the “Peter Principle” prediction, which can explain differences in career advancement between incumbent workers and external hires, and pose testable implications to discriminate among them. Section 3 presents the personnel data used in the study and some descriptive statistics on career advancement. Section 4 shows differences in promotion prospects among incumbent and external hire workers, and analyzes the results in light of the hypothesis specified in Section 2. The paper concludes with brief comments in Section 5.

## 2. Incumbents vs. external hires, and promotions

### 2.1. Competing theories

It is possible to partially infer how individuals will differ in their future careers in a firm by examining their history at the firm. Seniority could certainly play a significant role in achieving promotion, since “firm-specific” human capital can only 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. Timing to promotion is also important, since as pointed out by Lazear (1992), individuals who remain longer on the previous job usually do worse than co-workers who were promoted early. Previous promotions can also influence subsequent chances of career advancement. If employers decide promotions according to productivity, 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 expect that those who were promoted in the past will be more likely to ascend the hierarchy again in a short period.

On the other hand, several theories 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, and regression-to-the-mean implies that future productivity should

<sup>3</sup> Lemieux et al. (2007) state that just 37% of jobs in the U.S. Panel Study of Income Dynamics (PSID) data (1976–1998) can be classified as performance-pay.

<sup>4</sup> An alternative interpretation of the “probation” hypothesis is that the firm systematically downgrades the external hires and progressively promotes them to give these employees additional incentives at the beginning of their career.

<sup>5</sup> Heckman (1981) distinguishes 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.”

<sup>6</sup> However, even if performance ratings were obtained from personnel records, these ratings could be subjective (on supervisor's opinion) and not necessarily a reflection of the true worker's productivity.

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 if the firm cannot fully implement contracts with the right incentives (Rosen, 1986).

As corollary of the above stated predictions, several hypotheses could be mentioned related to the promotion prospect for external hires. If external 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 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.

On the contrary, a corollary of both the “Peter Principle” and the “motivation” prediction is that external hires, since they have not been internally promoted, would have higher prospects in achieving career advancement. Uncertainty and employer’s risk aversion may also explain promotion advantages for external hires. For instance, the practice of probation placement could lead to a rapid promotion for recent hires, without implying future success in their careers. Similarly, if the firm needs substantial time to learn the quality of the job-worker match and, if as a consequence, the company only decides to hire “super-productive” workers (people with really outstanding prospects), promotions could be biased towards employees recently incorporated into the firm. “Handicapping” external hires to create work incentives for insiders also shields similar predictions (Chan, 1996, 2006; Agrawal et al., 2006). Finally, promotion advantages for external hire workers could even be found in a context of a risk lover or neutral employer, with a firm hiring “risky promising” outsiders, keeping or promoting better-than-expected (with respect to incumbents) workers, and firing worse-than-expected ones, provided that differences in termination costs between workers with different seniority in the firm justify such strategy (Lazear, 1998).

## 2.2. The “Peter Principle” prediction for promotion of incumbents vs. external hires

A simple model derived from Lazear (2004) on the “Peter Principle” prediction can be extended to predict promotion prospects of incumbents and external hires. Let’s assume that worker’s performance has both a time invariant or “ability” component ( $a$ ) and a transitory or “effort” component ( $e$ ). Only the sum of both is actually observed by the firm. Ability has a distribution  $f(a)$ , and the corresponding distribution of the transitory component or “effort” is given by  $g(e)$ . Assume for simplicity that  $E(e) = 0$ ,  $E(a, e) = 0$ , and  $E(e, e_{t+1}) = 0$ , and that only after two periods the firm can observe with certainty the permanent component  $a$ .<sup>7</sup>

There are three possible positions: worker, supervisor, and director. 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 effort component in the first period ( $e_1$ ), given that they were promoted, is given by,

$$\begin{aligned} E(e_1 | a + e_1 > A^*) &= \int_{-\infty}^{\infty} \int_{A^* - a}^{\infty} \frac{1}{1 - G(A^* - a)} eg(e)f(a) de da \\ &= \int_{-\infty}^{\infty} E(e | e > A^* - a)f(a) da > 0 \end{aligned}$$

<sup>7</sup> While the simple characterization of work effort as a random variable may seem unrealistic, Lazear (2004) shows that similar conclusions can be reached when effort is chosen by strategic behavior of the workers and they are paid piece rates.

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. If the firm is risk-averse or neutral, it will do so if the prospective worker has an expected permanent ability  $a$  greater or equal than the existing supervisors (i.e., the firm will only hire someone who has an overall expected performance greater or equal than the existing employee).<sup>8</sup> If so,

$$\begin{aligned} E(a_N + e_N) &= E(a_N) \geq E(a + e_1 | a + e_1 > A^*) \\ &= E(a | a + e_1 > A^*) + E(e_1 | a + e_1 > A^*) \end{aligned}$$

which implies that,

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

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 “director” position between the external 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  $E(e_2 | a + e_1 > A^*) = 0$ , as  $e_2$  is both independent of  $a$  and  $e_1$ . As  $E(a | a + e_1 > A^*) + E(e_1 | a + e_1 > A^*) > E(a | a + e_1 > A^*) + E(e_2 | a + e_1 > A^*)$ , we can conclude that the expected performance for incumbents will fall from period 1 to period 2. Therefore,

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

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

## 3. Descriptive statistics on career advancement

### 3.1. Personnel records

Most of the literature on job mobility has typically used longitudinal workers’ surveys as sources of information, as long as they have detailed data on both worker and job characteristics. However, to study job mobility within a firm (intra-firm mobility), these surveys do not consider the interaction of the workers with their co-workers.<sup>9</sup> Tournament models predict that co-workers’ mobility usually matters for particular individual careers at a firm. In contrast, personnel records usually contain much better and comparable employment history than 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. Nevertheless, Gibbs and Hendricks (2004) argue that the firm used in this and their study is representative of the universe

<sup>8</sup> The model does not assume any difference in termination costs. In case that termination costs are lower for recent external hires than incumbent ones, the employer could be willing to a high-risk external worker with lower expected ability than an incumbent depending on its risk aversion degree. This situation could be associated with the “hiring risky candidates” hypothesis of Lazear (1998).

<sup>9</sup> Examples of intra-firm job mobility studies using longitudinal surveys are McCue (1996), with PSID data, and Belzil et al. (2004), with a survey of American executives.

of U.S. large firms across several indicators, which would provide certain external validity to the results.<sup>10</sup>

The data used in this paper come from computerized personnel records of a large U.S. firm, with several vertically-integrated businesses (organizational units), for the period January 1989 to August 1994.<sup>11</sup> The firm is based in the U.S. Midwest, but has nearly 50,000 employees throughout the country and abroad. 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 were not recorded). Therefore, with precision, one can determine the length of each job at the firm.

Unfortunately, due to the existence of over 3000 different job titles, it was impossible to present a hierarchy chart. But, as pointed out by Lazear (1992), wage levels can fully describe the “job ladder” in the firm without the need to look at specific job titles, and this is the approach taken in this paper. The definition of job transition is also different from previous studies that infer transition by looking at the movement between job titles (such as in Baker et al., 1994). However, an advantage for this case is that the Department of Human Resources of the firm has itself classified job changes as a merit promotion (changes in responsibility and hierarchical level), 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.<sup>12</sup> The dataset also includes some information on compensations and performance ratings; however, both are only available at job transition dates (i.e., only when a worker is hired, transferred, promoted or demoted), and not periodically thought out the longitudinal sample.

The available data records only contain compensations and detailed movements along a career path since 1989. This implies that previous history for those already working prior to 1989 is not fully observed. Due to this limitation, the paper will only analyze job transitions for those hired since 1989. Between January 1, 1989 and August 31, 1994 (right-censored date), of a total of 20,698 job changes, 37% (7691) of them implied hiring external applicants, 19% internal promotions, and 44% lateral transfers. Out of the 7691 hired workers, 1332 have missing demographic information (gender, race, marital status, or education). Of the remaining 6359 individuals, a total of 411 have salary missing for at least one of the occupations at the firm and therefore were dropped from the sample (since it is not possible to determine the job level). Finally, three workers were dropped due to missing information on sector or plant unit in at least one of their jobs at the firm. The final sample for the analysis is comprised by 5945 individuals.<sup>13</sup> Selection from working with a reduced sample seems less of a concern, since the average numbers of promotions for workers included and excluded from the final sample (0.53 and 0.51 respectively) are not statistically significantly different from zero.

### 3.2. Descriptive statistics

Table 1 presents department/sector of placement for employees working on December 31, 1993 that were included in the final sample, as well as quartiles for annual compensation within each occupational category, and the proportion of females within sector. For this subset of 5470 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 compensations, suggesting that several job levels are present in each department.<sup>14</sup>

Table 2 shows “promotion ports” for these workers, considering their relative position in the wage distribution within department (including workers hired prior to 1989). 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 prior to promotion, 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. Entry and exit “ports” are clearly identified, since workers seem to mostly enter and exit at lower levels of the hierarchy.<sup>15</sup> 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 subsample of those with two or more previous positions at 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 not to promotions, he or she would be classified as a worker with a single “position.” The total number of “positions” is 9059 for these 5945 individuals. Table 3 also 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 more likely to climb the corporate ladder (83% of individuals with three or more promotions were whites, while whites were 75% of total employees). Regarding education, those with college and post-graduate degrees were more likely to achieve career advancement.

The chances of being promoted also increase with tenure at the firm, and younger workers (classified by the age of entry into the firm) were more successful in achieving promotion at the firm. If only tenure at the first position is considered, Table 3 shows that those workers with multiple promotions spent less time at their entry assigned position.<sup>16</sup> 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. 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

<sup>10</sup> 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. They also compared yearly salary increases to those from private sector workers and those in the same industry, and the firm also seems representative.

<sup>11</sup> The identity of the corporation must be kept confidential.

<sup>12</sup> In this study, “job levels” are defined not by job titles but by wage levels within a particular sector/department/plant unit in the firm. A change in wage levels is not recorded as a “promotion” if it does not involve a change in responsibility or hierarchy according to the Department of Human Resources.

<sup>13</sup> Due to these data restrictions, the final sample differs from that used in Gibbs and Hendricks (2004).

<sup>14</sup> 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.

<sup>15</sup> In contrast, Lazear (1992), Baker et al. (1994a) and Ariga et al. (1999) find no clear evidence on the existence of entry and exit ports in their respective firms.

<sup>16</sup> 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.



**Table 1**

Full-time job categories at December 31st, 1993.

Job categories	Number	%	Wages			%
			Q 1	Median	Q 3	Females
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	1060	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	5470	100.0	22,932	32,782	47,400	57.0

Note: Workers hired after January 1st, 1989.

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).

It is also interesting to examine the probability of being promoted conditional on the time spent at the current position. Fig. 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  $f(t)/[1 - F(t)]$ , 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  $t$ ).

Fig. 1 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, declining thereafter. The increase with tenure of the probability of promotion during the first year is consistent with learning and job matching theories that emphasizes that both firms and workers need time to learn whether they are a good match (Jovanovic, 1979). However, after a year, the probability of promotion starts to decline until the twenty-fourth month, when there is another peak. Fig. 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 evidence suggests that most evaluations seem to take place at a yearly basis (after the worker completes a year of tenure), as a sort of administrative rule.

Such behavior in promotion rates is also consistent with Baker et al. (1994), who show that, as job tenure rises, wage raises and promotions rates can fall, and Lazear (1992), who suggests 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. Medoff and Abraham (1980) also indicate that workers' performance evaluations can be worse the longer they remained on the job. Finally, Gibbs and Hendricks (2004) find that wage raises and bonuses fell with seniority in their study using the same dataset as is here. In this case, two years of experience at the current job seem to be a sufficiently large period for evaluating whether the worker deserves a higher position. Thereafter, if the employee has not been promoted yet, the probability of ascending in rank decreases and approaches zero.

The overall evidence shows that promotion probabilities change substantially with time spent at the current job. However, the estimated hazard functions in Figs. 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 perspectives for their careers. Moreover, it is easy to dismiss the possibility that promotions only depend on “fixed” worker heterogeneity since the empirical hazard rates show that the probability of ascending the hierarchy of the firm changes with tenure at the current job. Ignoring worker's history 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. 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.

## 4. Empirical evidence

### 4.1. Estimation strategy

To explore how state dependence can influence the probability of being promoted, a model for a binary dependent variable related to

**Table 2**

Entry, promotion and exit ports in each wage decile—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	5945	3114	2474

Note: The table shows the distribution of entry, promotion and exit episodes from each wage decile (prior to the event considered).

**Table 3**  
Employee's characteristics—1989/1994.

Positions in the firm	Number of employees	Males %	Whites %	Married %	Some college %	College %	Post-degree %
1	5945	41.63	75.26	54.16	41.72	42.07	16.22
2	2219	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 Years	Avg. tenure at firm Months	Avg. tenure at first pos. Months	Avg. starting salary Dollars	Salary increase %	Changing sector %	
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 5829 and their characteristics are reflected in the first row. The second row corresponds to the subsample of those workers who have been promoted at least once; the characteristics are reflected in the first row. The second row corresponds to the subsample of those workers who have 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.

the promotion outcome of worker  $i$  at time  $t$  is estimated. The dependent variable  $y_{it}$  equals one if worker  $i$  is promoted in month  $t$ , and zero otherwise. The estimation strategy adopted is that of an unobserved effects binary response model of the form:

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

where  $i = 1, \dots, N$  denotes the set of workers, and  $t = 1, \dots, T$  the time index (in months),  $x_{it}$  is the set of demographic and job characteristics for each individual,  $\delta_t$  is a time component common to all workers,  $\mu_i$  represents the individual effects,  $\varepsilon_{it}$  is the individual/time error term, and  $G$  is the cumulative distribution function. One of the issues that need 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. Unlike a probit specification, which cannot escape from the incidental parameter problem, a logistic specification can consistently estimate  $\beta$  by conditional MLE fixed effect specification that maximizes the log likelihood over  $\beta$  and the individual parameters  $\mu_i$ .

An alternative is to treat the problem as a random effects model (i.e., as in Chan, 2006). However, for estimating this model, it is necessary to make a restrictive assumption regarding the relationship

between  $x$  and  $\mu_i$ : they should be independent and  $\mu_i$  should have a normal distribution. Under this assumption, a conditional maximum likelihood approach is available for estimating  $\beta$ . 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.

#### 4.2. Determinants of career advancement

Table 4 shows 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 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 5495 workers). Reported coefficients are 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 (for instance, a massive layoff or firm restructuring that would affect promotion prospects of every employee). Results show that there appears to be

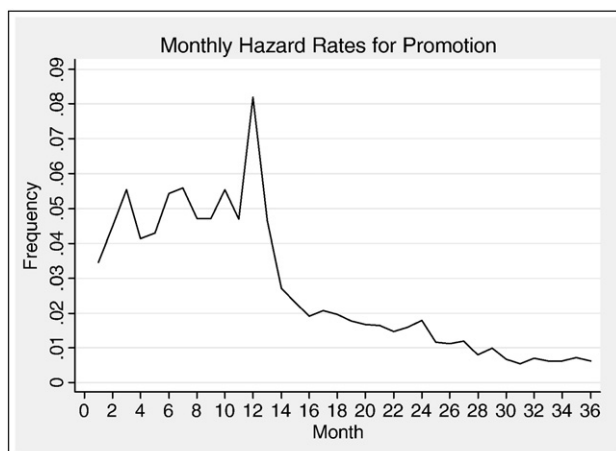


Fig. 1. Monthly hazard rates for promotion.

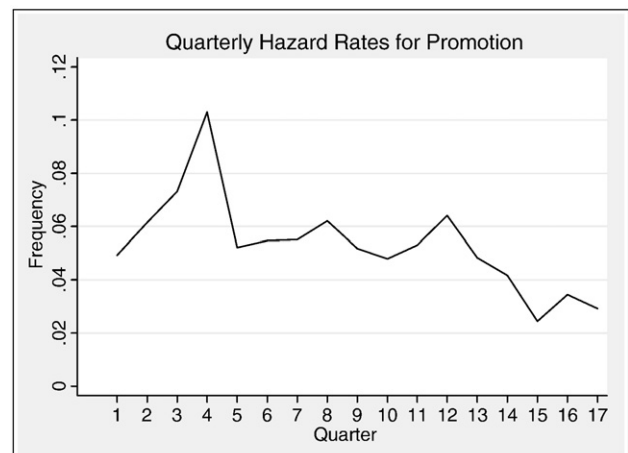


Fig. 2. Quarterly hazard rates for promotion.

**Table 4**

Logit estimates of monthly promotion rates.

Jobs	First			All	All except top level
Model	(1)	(2)	(3)	(4)	(5)
Male	−0.024 (0.123)	0.143 (0.128)	0.138 (0.123)	0.252*** (0.088)	0.263*** (0.092)
Married	0.331*** (0.122)	0.415*** (0.116)	0.393*** (0.112)	0.231*** (0.077)	0.258*** (0.081)
White	0.487*** (0.128)	0.427*** (0.123)	0.406*** (0.118)	0.281*** (0.086)	0.295*** (0.090)
Age (entry)	−0.165*** (0.056)	0.013 (0.056)	0.012 (0.054)	0.023 (0.041)	0.043 (0.042)
Age squared (entry)	0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)	−0.001** (0.001)	0.000 (0.001)
College	0.290** (0.141)	0.748*** (0.152)	0.702*** (0.147)	0.835*** (0.105)	0.744*** (0.108)
Post-degree	0.409** (0.192)	1.555*** (0.273)	1.467*** (0.261)	1.653*** (0.205)	1.496*** (0.214)
Avg. wage diff. next vs. current wage decile					0.048** (0.019)
Tenure at current job (bw 1 and 2 quarters)			0.913*** (0.209)	1.000*** (0.181)	0.992*** (0.182)
Tenure at current job (bw 2 and 3 quarters)			1.288*** (0.246)	1.395*** (0.210)	1.417*** (0.212)
Tenure at current job (bw 3 and 4 quarters)			3.110*** (0.340)	3.136*** (0.286)	3.179*** (0.293)
Tenure at current job (bw 4 and 5 quarters)			0.334 (0.266)	0.932*** (0.235)	1.031*** (0.243)
Tenure at current job (bw 5 and 6 quarters)			−0.137 (0.269)	0.975*** (0.260)	0.979*** (0.263)
Tenure at current job (bw 6 and 7 quarters)			0.068 (0.308)	0.776*** (0.277)	0.862*** (0.285)
Tenure at current job (bw 7 and 8 quarters)			0.668** (0.370)	1.566*** (0.344)	1.594*** (0.350)
Tenure at current job (more than 8 quarters)			0.358 (0.241)	0.814*** (0.209)	0.912*** (0.215)
Wage deciles	No	Yes	Yes	Yes	Yes
Entry 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	117,385
Positions	5945	5945	5945	9059	8673
Mean of dependent variable (%)	2.878	2.878	2.878	2.544	2.579

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.

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 non-whites in any particular month (around 0.5 percentage points more). Married workers also seem to have an advantage compared to single or divorced workers, a fact that could be explained by perceptions that married employees are less mobile and less likely to leave the company in the future. 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” (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 (Gibbons and Waldman, 1999), or promotions being 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 occupational category.<sup>17</sup> By adding indicators for job categories and wage deciles, one is more accurately controlling for job levels at the firm.

Column (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) to control for tenure at the firm. 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.

Column (3) adds the first component of state dependent: tenure at the current job. Results for different demographic groups remain. More interestingly, the tenure coefficients show the same pattern as that reported in Fig. 2: the probabilities of promotion are greater at

<sup>17</sup> The wage deciles are assigned according to the distribution of wages in each sector.

**Table 5**  
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	
Model	(1)	(2)	(3)	(4)	(5)	(6)
Male	0.208** (0.093)		0.341*** (0.119)		0.201** (0.096)	
Married	0.277*** (0.082)		0.124 (0.106)		0.277*** (0.084)	
White	0.282*** (0.091)		−0.112 (0.137)		0.306*** (0.093)	
Age (entry)	−0.002 (0.042)		−0.111 (0.068)		−0.018 (0.043)	
Age squared (entry)	−0.001 (0.001)		0.001 (0.001)		−0.001 (0.001)	
College	0.716*** (0.110)		0.620*** (0.158)		0.734*** (0.113)	
Post-degree	1.138*** (0.207)		1.056*** (0.332)		1.383*** (0.212)	
Previous promotions ("Insider")	−0.771*** (0.104)	−4.084*** (0.097)				
More than one previous promotion			−0.463*** (0.124)	−5.397*** (0.277)		
1 previous promotion					−0.867*** (0.080)	−5.385*** (0.116)
2 previous promotions					−1.264*** (0.099)	−9.414*** (0.235)
3 or more previous promotions					−1.309*** (0.188)	−12.615*** (0.389)
Tenure at current job (in quarters)	Yes	Yes	Yes	Yes	Yes	Yes
Wage deciles	Yes	Yes	Yes	Yes	Yes	Yes
Entry cohort indicators	Yes	Yes	Yes	Yes	Yes	Yes
Sector indicators	Yes	Yes	Yes	Yes	Yes	Yes
Plant unit indicators	Yes	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes	Yes
Observations	122,399	68,028	45,037	21,277	122,399	68,028
Positions	9059	5333	3114	1613	9059	5333
Mean of dependent variable (%)	2.544	4.578	1.976	4.206	2.544	4.578

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.

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. 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 5495 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.

These regression specifications just control for job levels but do not explore the different incentives that workers may have to climb the job ladder in terms of compensation differentials. One way to include incentive effects in reaching a higher level job is including proxies for how quickly the hierarchy narrows at a particular job level (or wage decile). To test for incentive effects, Column (5) adds as a control variable the difference in average wages between the next wage decile and the worker's current decile (excluding workers already at the top level). The results indeed show the presence of incentive effects, since for each \$10,000 difference in annual salaries between the current level and the next one, the probability of being promoted in a given month increase in 0.5 percentage points.

#### 4.3. Incumbents vs. external hires and previous promotions

This subsection shows differences in career path prospects for external hires compared to incumbents, i.e., workers with previous job experience at the firm. To this end, Table 5 compares outcomes for external hires versus incumbents by adding controls for previous promotions. The comparison reflects differences 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.<sup>18</sup> Being an insider (i.e., having a previous promotion at the firm) appears to substantially reduce the probability of a subsequent promotion (0.8 percentage points less in a given month, a 30% decrease compared to the mean probability of 2.5% of being promoted in a given month). As noted before, Baker et al. (1994) and Chan (2006) also found that external hires are initially promoted more quickly than are incumbents in their respective analyzed firms.

This result is consistent with the hypotheses already mentioned on Section 2.1 concerning both ability and performance. 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 external 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

<sup>18</sup> Since it is not possible to identify the set of applicants competing for a particular slot, the comparison could not be accurate. The implicit assumption is that all co-workers at a particular job level are competing in the tournament. On the other hand, 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.



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 given worker.<sup>19</sup> Controlling for unobserved fixed individual heterogeneity removes the permanent individual component in promotion dynamics. Thus, identification in this 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 the theory that suggests that the firm may be “handicapping” external candidates cannot explain the evidence found in the current case.<sup>20</sup>

The existence of probation practices or a practice of hiring “risky workers”, in contrast, would predict a rapid initial promotion for external hires, but thereafter, there should be no differences between external hires and other incumbents in subsequent promotion competitions. Therefore, a test for these hypotheses 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. Baker et al. (1994) found evidence of “probation” practices, as in their firm (without controlling for individual characteristics) external 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. In this case, 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 impact of previous promotions is lower compared to that found when looking at differences among external 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. Column (4) contains the results of a logit fixed effect regression for this subsample in order to control for fixed heterogeneity, with the main results left unchanged.

Without ruling out that several theoretical mechanisms could be working simultaneously, the evidence seems to point toward hypotheses more related to promotion rules and performance differences for promoted workers than to permanent differences in ability. Both Lazear’s “Peter Principle” idea of “promotion to level of incompetence” and behavioral theories of individuals “outperforming” before a promotion and “relaxing” or returning to their natural productivity levels thereafter seem suitable to explain this phenomenon.

The “Peter Principle” formulation would also predict 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 validate these predictions, Column (5) 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 external 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 ( $p = 0.008$ ). Column (6) presents the results of a fixed effects logit estimation taking into account any fixed heterogeneity component. The results in Column (5) are robust to the inclusion of individual fixed effects. The evidence therefore supports the “Peter Principle” corollary of declining performance, as well as any argument of disincentive effects after achieving promotion.<sup>21</sup>

#### 4.4. 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 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 6 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 an external hire remains: these 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% significance level.

Even across sectors promotion rules could be different. Departments certainly differ in the characteristics of the type of work performed. As an example, it would be interesting 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”). 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 external 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 external

<sup>19</sup> Marginal effects are not available in a conditional logit specification, as the individual effects are not actually estimated. Demeaned variables are used instead in this type of estimation procedure.

<sup>20</sup> Sample selection problems may arise from the fact that the estimation (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 (as in Column 1) was performed using only “successful” workers, yielding similar results in terms of the negative relationship between past and future promotions. Thus, sample restriction does not seem to be driving the main result in Column (2).

<sup>21</sup> Surprisingly, in all these empirical specifications, gender, race, and education remain significant factors in determining career advancement, even after controlling for past promotions and unobserved fixed workers’ characteristics like ability. Without being conclusive, the fact that gender and race remain significant in these regression specifications could be associated with evidence of “discrimination” in promotion decisions. And interestingly, the positive statistical significant of the higher education coefficient in these regression settings can only be associated with one of the two hypotheses described in Section 4.2. Since educational degree as a credential or signal of higher ability would only be relevant for getting a job position but not for subsequent ones within the same firm (the employer would have already observed the performance of the worker), the finding seems to be more associated with the hypothesis that additional education should improve the rate at which workers acquire human capital, and hence boost their labor productivity (Gibbons and Waldman, 1999).

**Table 6**  
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)
Male	0.218** (0.107)	0.949*** (0.249)	−0.144 (0.203)	−0.005 (0.116)	0.049 (0.134)
Married	0.217** (0.099)	0.258 (0.183)	0.240 (0.193)	0.243** (0.109)	0.238** (0.127)
White	0.389*** (0.107)	0.411** (0.193)	0.673*** (0.184)	0.422*** (0.119)	0.305** (0.147)
Age (entry)	−0.078* (0.046)	−0.053 (0.081)	0.262** (0.125)	−0.075 (0.056)	−0.083 (0.072)
Age squared (entry)	0.000 (0.001)	0.000 (0.001)	−0.005** (0.002)	0.000 (0.001)	0.000 (0.001)
College	0.567*** (0.118)	0.588*** (0.230)	1.237*** (0.362)	0.531*** (0.138)	0.878*** (0.169)
Post-degree	1.001*** (0.222)	0.580 (0.491)	1.970*** (0.485)	0.749*** (0.211)	1.104*** (0.293)
1 previous promotion	−1.007*** (0.093)	−1.173*** (0.166)	−0.881*** (0.171)	−1.261*** (0.099)	−0.782*** (0.137)
2 or more previous promotions	−1.406*** (0.118)	−1.532*** (0.185)	−0.607* (0.311)	−1.624*** (0.112)	−1.209*** (0.177)
Tenure at current job (in quarters)	Yes	Yes	Yes	Yes	Yes
Wage deciles	Yes	Yes	Yes	Yes	Yes
Entry cohort indicators	Yes	Yes	Yes	Yes	Yes
Sector indicators	Yes	Yes	Yes	Yes	Yes
Plant unit indicators	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes
Observations	96,229	25,208	14,328	87,987	54,360
Positions	7200	1878	990	5999	2721
Mean of dependent variable (%)	2.669	2.391	2.104	2.873	2.739
1 prev. prom = 2 prev. prom ( <i>p</i> -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.

hires, there are no further differences after achieving the first promotion.

Personnel records include “leavers,” i.e., those who quit to work outside the company, retired, died, or were laid-off. They could 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 or lower their wages; instead of doing that, employers usually prefer to fire the worker.<sup>22</sup> 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 this case, it is not simple to predict the sign of the potential sample selection bias.<sup>23</sup>

Unfortunately, the data do not contain the reasons for leaving the company. Sample sensitivity analysis by excluding workers that voluntary quitted or were laid-off workers, in turn, cannot be performed in this case. But it is possible at least to measure the strength of the potential bias by excluding all the observations for those who left the firm before August 1994. This reduces the sample size from 5945 employees to 3471, the total number of positions from 9059 to 5999, 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), arising similar conclusions to the base scenario: previous promotions exhibit a declining pattern with regards to future promotion probabilities.

However, the “stayers” in the analysis also contain individuals 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 conclusions regarding the differences among workers with different work histories at the firm remain. Columns (4) and (5) show that, in any case, sample selectivity issues do not seem to be substantially biasing the results.

#### 4.5. 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 transfer”, such as scheduled non-merit upgrades, task reorganizations or job reclassifications. In principle, any explanation related to declining performance or behavioral motives should not apply to the 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. Also, a lateral transfer could be interpreted as an opportunity given to a worker with a regular performance, but placed in the “wrong” job.

Lateral transfers and changes in positions other than promotions are more common in the firm. For instance, 10.7% of the employees in the sample had three or more lateral transfers, but only 2.5% of them had three or more promotions. The average monthly probability of any change in job (lateral transfer or promotion) is 5.4%, compared to 2.5% of obtaining an effective promotion.

To highlight differences in promotion and lateral transfer rates, Table 7 presents a multinomial logit analysis analog to the previous evidence concerning promotions, but this time the dependent

<sup>22</sup> Only 0.43% of the changes in job positions within the firm were demotions.

<sup>23</sup> Still, as noted earlier (Section 3.2), exits are relatively abundant at lower wage levels, and 81% of the “leavers” were never promoted, suggesting that a positive promotion bias toward “stayers” could be present.

**Table 7**

Multinomial logit estimates of monthly promotions and lateral transfers hazards rates.

Sample	All						Only stayers, 3 or more years of tenure at the firm	
	Promotion	Lateral transfer	Promotion	Lateral transfer	Promotion	Lateral transfer	Promotion	Lateral transfer
Model	(1)		(2)		(3)		(4)	
Male	0.094** (0.040)	−0.034* (0.018)	0.094** (0.040)	−0.030* (0.018)	0.096** (0.043)	−0.033* (0.020)	−0.012 (0.066)	−0.088*** (0.030)
Married	0.141*** (0.037)	−0.003 (0.017)	0.142*** (0.037)	−0.004 (0.017)	0.150*** (0.039)	−0.008 (0.019)	0.080 (0.059)	−0.069*** (0.026)
White	0.122*** (0.042)	−0.008 (0.019)	0.124*** (0.043)	−0.005 (0.019)	0.123*** (0.045)	−0.007 (0.021)	0.155** (0.073)	−0.011 (0.031)
Age (entry)	0.003 (0.019)	0.014* (0.008)	0.003 (0.019)	0.016** (0.008)	−0.006 (0.020)	0.022*** (0.008)	−0.001 (0.038)	0.024** (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* (0.001)	0.000* (0.000)
College	0.339*** (0.046)	0.051** (0.021)	0.339*** (0.046)	0.050** (0.021)	0.339*** (0.049)	0.050** (0.024)	0.442*** (0.082)	0.020 (0.035)
Post-degree	0.544*** (0.064)	0.005 (0.029)	0.542*** (0.064)	0.009 (0.029)	0.538*** (0.068)	0.004 (0.031)	0.519*** (0.111)	−0.052 (0.047)
Previous jobs (“Insider”)	−0.641*** (0.054)	0.431*** (0.028)						
1 previous job			−0.683*** (0.057)	0.476*** (0.028)				
2 previous jobs			−0.657*** (0.084)	0.589*** (0.037)				
3 or more previous jobs			−0.858*** (0.116)	0.828*** (0.048)				
1 previous promotion					−0.820*** (0.070)	0.575*** (0.029)	−0.972*** (0.113)	0.491*** (0.049)
2 previous promotions					−0.960*** (0.168)	0.542*** (0.064)	−0.914*** (0.240)	0.497*** (0.088)
3 or more previous promotions					−1.366*** (0.426)	0.562*** (0.127)	−0.962*** (0.397)	0.389*** (0.116)
1 previous lat. transfer					−0.303*** (0.066)	0.138*** (0.032)	−0.201* (0.115)	0.175*** (0.051)
2 previous lat. transfers					−0.092 (0.106)	0.134*** (0.048)	−0.090 (0.152)	0.143** (0.063)
3 or more previous lat. transfers					0.087 (0.159)	0.013 (0.083)	0.109 (0.196)	−0.026 (0.095)
Observations	122,399	122,399	122,399	122,399	122,399	122,399	41,926	41,926
Positions	15,325	15,325	15,325	15,325	15,325	15,325	4,789	4,789
Pseudo R <sup>2</sup>	0.030	0.030	0.030	0.030	0.033	0.033	0.032	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, entry cohort, and years.

variable  $y_{it}$  can take three potential outcomes depending on whether worker  $i$  is laterally transferred at month  $t$ , is promoted, or stays at the current position (base category). The estimation of the set of relative coefficients with respect to the base category can be estimated by conditional maximum likelihood techniques.

Model 1 includes as a main control an indicator of being an “incumbent” or having a previous job at the firm. The first column presents the results for the case promotions, and the second one for lateral transfers. There are remarkable differences in the explanatory 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 not necessarily lateral transfers. Whether education is a proxy for ability or just signals ability to the employer, in either case it does not seem 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.

Differences are also present among incumbents and external hires depending on whether the analysis focuses on promotions or lateral transfers. External hires have an advantage in obtaining a subsequent promotion, but are less likely to change occupations for other reasons rather than a promotion when compared to incumbents at the same job level and tenure at the current position. This finding once again suggests differences in performance or motivation after achieving

promotion for incumbents, since a case of superior ability of external hires would not be consistent with the relative disadvantage they experiment for the case of non-merit job changes. Also, lateral transfers could be relatively more abundant among incumbents if the firm prefers 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. 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. It seems there are certain employees with a higher propensity to move from position to position inside the firm 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. Moreover, both previous promotions and previous lateral transfers seem to substantially positively affect the future chances of moving laterally across jobs. 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

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 et al. (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 introduces some 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 supports the “Peter Principle” prediction, suggesting that incentives and strategic behavior play a significant role in determining pre- and post-promotion performance, while for lateral transfers, these forces are absent.

## 5. Conclusions and directions for further research

This paper shows estimates of the probability of ascending the hierarchy of a firm (promotion) using data from personnel records. The main findings indicate that previous promotions do not imply a higher probability of subsequent promotion, and that external hires seem to have an advantage when competing with incumbents for a higher position. This evidence appears to be consistent with the “Peter Principle” prediction 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. Unfortunately, the evidence available in this paper cannot discriminate among these competing theories with different implications for the design of promotion schemes for principals and managers.

These forces seem to be absent once other “administrative” or “scheduled” job changes and lateral transfers are considered, a topic that merits further research on its own. A valid concern is the relatively short time span (five years) of the data used in this paper. Lazear (2004) mentions that firms can limit the extent of the “Peter Principle” by extending the length of observation of their employees in order to reduce the importance of transitory ability in promotion decisions. Whenever available, these predictions should be better tested on a longer period.

On the other hand, if the firm has rational expectations and understands the Peter Principle, it should probably take that into

account when deciding between promoting internally and hiring an outsider. For that reason, other alternative explanations that do not allude to promotions tied to performance can still be suggested to explain differences in promotions across groups of workers. For instance, promotions could not solely be based 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. Unfortunately, it is difficult to evaluate the merit of these promotion practices not related to performance with the information available, but it is a high promising area for further research.

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