Lateral Moves, Promotions, and Task-specific Human Capital: Theory and Evidence

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Abstract

In this paper, I study the role of lateral moves on individuals' career progressions. I extend the theoretical literature by incorporating lateral moves in a standard job assignment model with task-specific human capital accumulation. The main intuition is that, when upper level jobs require a wider set of task skills compared to lower level jobs, firms use lateral moves to develop their employees' task-specific human capital before promoting them. Consequently, lateral moves are positively correlated with individuals' career progressions. My model predicts that the individuals who are laterally moved are more likely to be promoted and to experience larger wage growth compared to individuals who do not move. Further, the individuals with very high levels of education are less likely to be laterally moved compared to individuals with lower education levels. I test the model's predictions using a large employer-employee linked panel on over 30,000 senior managers in more than 500 of the largest U.S. firms during the period of 1981-1985. The empirical evidence supports the theoretical predictions and shows the importance of lateral mobility in individuals' career and wage dynamics.

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1 Introduction

Most of the studies on career and wage dynamics inside firms focus on individuals' vertical career movements (Rosen, 1982; Bernhardt, 1995; Gibbons and Waldman, 1999a). However, empirical and anecdotal evidence indicates that horizontal movements are prevalent, and are important to individuals' career dynamics. For example, Saari et al. (1988) survey 1,000 randomly selected firms in the United States and find that over 40% of the organizations use horizontal moves in their human resource practices. Internationally, Frederiksen and Kato (2011) show that over 60% of the appointed CEOs in Denmark worked in at least two broadly defined occupations before their CEO appointments. Studies also show that horizontal moves are effective in developing management skills (Saari et al., 1988; London, 1985). A more prominent example comes from General Electric's most recent succession saga. By the time Mr. Jack Welch left the office in 2001, the GE Empire had 12 line departments under the Corporate Executive Office. The current Chairman and CEO, Mr. Jeffrey Immelt, served leadership roles in GE Medical, Plastics, and Appliances before becoming Mr. Welch's successor.

These examples point to an important link between horizontal and vertical career mobility. To understand why and how lateral moves affect an individual's career progression, I incorporate lateral moves into a job assignment model with task-specific human capital accumulation. My model generates several new predictions about the effects of lateral moves on an individual's career outcome, and I find empirical support for these predictions in a large employer-employee linked panel of top U.S. managers.

To model horizontal movements, I consider the common setting of a hierarchical firm where workers can move between jobs at the same level. I assume that upper level jobs (e.g., COO) require a wider set of task-skills than lower level jobs (e.g., division managers), and those task-skills can be acquired through working in different jobs on the lower level.[1] I also assume that individuals differ

[1]Surveys and studies that support this assumption are numerous. For example, according to the Occupational Information Network (O*NET), one of the most comprehensive surveys of occupation and job characteristics in the United States, there are 17 core tasks for Chief Executives while there are only five core tasks for Financial Managers at the branch or department level. Mintzberg (1973) in an earlier study shows that managers are presumed to perform a variety of different

in terms of their innate abilities and their education. An individual's education has two components: a general education level (i.e., years of schooling) and an education type (i.e., majors). When an individual enters the labor market, firms (as well as the workers) observe her education level and type but not her innate ability. Firms gradually learn about the individual's innate ability by observing her outputs, where I assume the output realization is public observable. I further assume that, in the production process, ability and human capital are complementary while education and employment are substitutable.[2]

The main intuition behind the model is that lateral moves facilitate an individual's human capital development so that they are positively correlated with the individual's career outcome. For example, an upper level job, such as the COO position, uses the knowledge and skills of several lower level jobs but does not need extensive knowledge in one of the lower level jobs. For an individual who has some experience in one of the lower jobs, an additional year in her incumbent position does not increase her human capital level much for the COO position. Instead, if she spends this additional year in another job that she has no previous experience with, she can reach a higher human capital level for the COO position. That is, lateral moves facilitate human capital development by diversifying the individual's skill sets, which make the individual more productive in upper level jobs that need a wider (but not necessarily deep) set of skills. Furthermore, since education and employment are substitutable, when the individual has enough education, she does not need to be laterally moved to diversify her skill sets because she already has all the skills she needs for the COO position.

I derive three testable predictions from my model. First, laterally moved individuals are more likely to be promoted compared to individuals who do not move. Second, laterally moved individuals

tasks, while London (1985) argues that horizontal movements are effective to develop managers into "generalists". Ferreira and Sah (2012) provide a rationale for a wider skill set on the upper level. They argue that, because "generalists" can facilitate communication among "specialists", an increasing breadth of expertise with ranks minimizes communication costs.

[2]Numerous empirical studies find complementarity between ability and human capital. For example, Bartel and Sicherman (1998) report a positive relationship between training and AFQT scores using the National Longitudinal Survey of Youth. Acemoglu and Pischke (1998) find a similar pattern in German data. In addition, all of my results hold if ability and human capital are not complementary. The assumption that education and employment are substitutes simplifies the model, but none of the results rely on this assumption.

experience larger wage growth after the moves compared to non-movers because laterally moved individuals have higher innate ability and achieve higher human capital levels. Third, the individuals with very high levels of education are less likely to be laterally moved compared to individuals with lower education levels.

To test the model's predictions, I use a large confidential employer-employee linked panel of over 30,000 senior managers in more than 500 of the largest U.S. firms from 1981 to 1985. Since the seminal work of Baker, Gibbs and Holmstrom (1994a;b), most of the empirical studies on career and wage dynamics, especially the studies that focus on U.S. firms, use a single firm's personnel records.[3] Multi-firm analyses in this area primarily rely on European data (e.g., Devereux and Hart, 2013; Frederiksen and Kato, 2011). My study uses a multi-firm dataset from the U.S. and generates empirical findings that support my model's predictions. I find positive relationships between lateral moves and promotions and wage growth, especially two years after the move, and a negative relationship between lateral moves and years of schooling for high education levels.

This study contributes to the literature in multiple ways. First, it extends the theoretical literature on career and wage dynamics inside firms by considering horizontal moves. Second, this study contributes to the human capital literature by exploring the role of task-specific human capital on individuals' career progressions. It also adds to the discussion on the extent to which formal education and employment are substitutes in individuals' human capital development. Furthermore, this study enriches the empirical literature on career and wage dynamics by providing empirical evidence on a set of new testable implications using a multi-firm dataset on senior managers in large U.S. corporations.

The outline of the paper is as follows. In Section 2, I review the related literature. Section 3 contains the analysis of a three-period model under full information and a model with symmetric learning. In Section 4, I test the model's predictions and discuss the empirical findings. I discuss alternative explanations in Section 5. Section 6 provides concluding remarks.

[3] See Hendricks and Gibbs (2004) for an excellent survey.

2 Related Literature

In this paper, I study individuals' career movements inside firms. Most of the theoretical literature on this topic focuses on how individuals move along the job ladder vertically. Two of the building-block theoretical models concerning (vertical) career movements are the tournament model (e.g., Lazear and Rosen, 1981; Rosen, 1986) and the job assignment model (e.g., Gibbons and Waldman, 1999a). Both types of models assume only one job at each level, and lateral moves are not considered. Another standard building block model of hierarchical firms is the chain-of-command model (Rosen, 1982; Demougin and Siow, 1994; Garicano, 2000; Smeets et al., 2013). In this type of model, multiple jobs exist at a given level but horizontal moves within the same level are not considered.

A few studies have considered two specific types of horizontal movements: job rotations and horizontal transfers. Both types of horizontal movements differ from the lateral moves investigated in my model. The first type of horizontal move is job rotation where each trainee in the job rotation program follows a predetermined career path (e.g., medical or management trainees in their training period usually rotate around different departments). Ortega (2001) considers a model where job rotation facilitates the firms' learning about their workers' abilities. Building on Ortega's idea, Li and Tian (2013) investigate a directed search model where job rotation improves the match between workers and jobs and thus leads to higher wages and lower turnover rates in larger firms. However, neither of these two models makes predictions regarding the relationship between horizontal moves and individuals' career progressions.

One difference between job rotation as studied in earlier papers and lateral moves in my model is how the horizontal moves are determined. With job rotation, workers engage in horizontal moves mechanically regardless of performance. With lateral moves, horizontal move decisions are performance-based: only relatively more productive workers are moved. Furthermore, with job rotation, employment decisions (e.g., promotions, turnovers, and wage adjustments) are not made until the workers complete the rotation; in my model, employment decisions are made each time firms receive new information regarding the workers' productivity.

The other type of horizontal movement investigated in the literature is horizontal transfers (Kusunoki and Numagami, 1998; Ariga, 2006; Sasaki et. al., 2012). The main prediction from the horizontal transfer literature is that a current period transfer is more likely to happen with a current period promotion, i.e., workers are transferred when they are promoted (Sasaki et. al., 2012). However, these models do not make predictions about current transfers and subsequent promotions as my model does.

To incorporate lateral moves, I adopt the task-specific human capital approach (Gibbons and Waldman, 2004; 2006) rather than the traditional Beckerian dichotomy of general and firm-specific human capital (Becker, 1962;1964).[4] If general or firm-specific human capital is used, a worker accumulates the same type of human capital with firm tenure even when she changes jobs or tasks. In contrast, when task-specific human capital is considered, a worker's human capital is associated with her jobs or tasks. Each time the worker changes jobs, she acquires a new type of human capital that is task-specific. Thus, lateral moves affect the worker's human capital accumulation by changing the composition of the human capital she acquires from employment.[5]

My paper also improves the empirical studies on lateral moves by providing a theoretical framework and a richer set of empirical results. Gittings (2012) uses the same data set as I use and shows that individuals who are laterally moved have higher wages in the period of the lateral move. However, the underlying mechanism behind this empirical finding is unclear. Clemens (2012) uses a single firm's personnel records and finds that transfers from fast to slow jobs, and vice versa, are positively

[4]There is substantial evidence that supports the task-specific human capital approach. Using German data, Gathmann and Schonberg (2010) empirically quantify the significant contribution of task-specific human capital to wage growth. They find that task-specific human capital accounts for 22% to 52% of individuals' overall wage growth. Using a sample of 1% of the British workforce, Devereux and Hart (2013) find that a large proportion of the return-to-tenure arises with job-level tenure within firms rather than firm-level tenure. Using data from 76 firms in the U.S. Information Technology industry, Schulz et al. (2013) show that task-specific human capital (measured as job-tenure) is positively associated with employee compensation. Other studies using Gibbons and Waldman's (2004;2006) framework concerning task-specific human capital accumulation include Balmaceda (2006) and Clemens (2012). Balmaceda (2006) applies the task-framework to consider optimal job designs. Clemens' (2012) analysis is closely related to my paper and is discussed below.

[5]The idea that human capital is attached to jobs is also closely related to the occupational-specific human capital (Kambourov, et al., 2009) and industry-specific human capital (Parent, 2000) approaches. Both approaches find supporting evidence that human capital does not accumulate homogeneously and occupational and industry-specific human capital are more pertinent to wage profiles rather than firm-specific human capital.

correlated with subsequent promotions.[6] Since his focus is not on lateral moves, Clemens does not look at the relationship between lateral moves, wages changes, and education levels theoretically or empirically.[7]

3 Theoretical Analysis

In this section, I set up a three-period two-level model to capture lateral moves and career progression. The production technology is closely related to those analyzed in Gibbons and Waldman (2006). I first consider a model with full information and derive some preliminary results. I then develop a model with symmetric learning and derive additional testable implications.

3.1 The modeling environment

There is free entry into production. All firms are identical and labor is the only input. Workers and firms are risk-neutral and they do not discount the future. Workers bear no cost to change firms and firms bear no cost to hire or fire workers. Workers and firms enter into the employment relation through spot-market contracting.

Each firm consists of two hierarchical levels. There are two jobs on level 1, denoted by $j,\ j \in \{A, B\}$, and only one job on level 2. Workers' careers last for three periods, denoted by $t \in \{1, 2, 3\}$. Workers can move laterally between lower level jobs and vertically across job levels. Workers in period t have $t-1$ periods of labor market experience, which is equal to the sum of job tenure in each

[6]Empirical studies that provide indirect evidence for the positive relationship between horizontal moves and promotions include Dohmen et al. (1998) and Frederiksen and Kato (2011). Both of the studies find that the probability of a promotion increases with the number of jobs held at the same level. Empirical studies that document a positive relationship between job rotations and promotions include (not exhaustive) Campion et al. (1994), Seltzer and Merrett (2000) and Dohmen et. al. (2004). The data used for those three analyses are personnel records from a large U.S. pharmaceutical company, the Bank of Australia, and a Dutch manufacturing company.

[7]Clemens also considers a theoretical model with two jobs on the lower level and one job on the upper level to capture the "fast-job effect" on promotiom. The idea is that certain promotion paths are more likely than others. A fast job is a position out of which a promotion is more likely to occur. However, his empirical implementation does not find support for his hypothesis that transferring from slow jobs to fast jobs predicts a higher probability of subsequent promotions than transferring from fast to slow jobs. In addition, his model does not make predictions about the relationship between lateral moves and wage changes or between lateral moves and education.

job at each level.

Workers differ by their innate abilities, general education levels, and education types. A worker has high innate ability θ_H with probability p, and low innate ability θ_L with probability $1-p$. Worker i enters the labor market in period 1 with a general education level s_i, where s_i takes integer values from 1 through N, i.e. $s_i \in \{1, \dots N\}$. Workers also differ by their education types. There are two education types: type A and type B. A particular education type gives a worker α units of match quality in the corresponding job type. Let α_{ij} denote worker i's match with job j. If worker i has type-A education, then $\alpha_{iA} = \alpha, \alpha_{iB} = 0$. If worker i has type-B education, then $\alpha_{iA} = 0, \alpha_{iB} = \alpha$.[8] The education type can be understood as a worker's major or curriculum focus in school that makes her a better fit with one job or the other. A worker with type-j education is referred to as a type-j worker. Job j is referred to as type-j workers' matched job. Like education levels, individuals' education types are fully observable to all labor market participants. I further assume that if a worker is not assigned to her matched job in her first employment period, the match quality depreciates and only $\lambda\alpha(\lambda \in [0,1])$ is applicable in the next period. In addition, this match quality is not directly applicable to the level-2 job. If a worker has never worked in her matched job on the lower level, she cannot apply this match on the upper level job.

Let $\tilde{x}_{ijt} = x_{ijt} + \alpha_{ij}$ denote worker i's *effective* job-specific task-tenure in job j (level 1) in period t, where x_{ijt} is worker i's tenure in job j (level 1) prior to t and α_{ij} is worker i's match with job j. x_{i2t} is worker i's tenure on level 2 prior to t. The job experience, education level and match quality add to workers' stock of human capital. Greater experience, greater education level, and the match of job to education type make a worker more productive. I consider the set-up where schooling and job experience are substitutes (Mincer, 1958;1962) while ability and human capital are complements (Acemoglu and Pischke, 1998). The production technology in job j (level 1) is

[8] To keep the model tractable, I assume a perfect match between education types and job types. I also assume a constant match quality. By doing so, I abstract away the effect of lateral moves on improving workers' matches with jobs and focus on the human capital development effects of lateral moves.

$$y_{ijt} = d_1 + c_1[\theta_i f(\tilde{x}_{ijt} + s_i) + \varepsilon_{ijt}],\ j \in \{A, B\}. \quad (1)$$

$f(\cdot)$ captures individuals' human capital accumulation. $\theta_i f'(\cdot)$ is the speed with which human capital grows in period t. Following Acemoglu and Pischke (1998), I assume that $f(\cdot)$ is twice continuously differentiable, strictly increasing and concave with $f(0) > 0$. I also assume that $lim_{\tau \to \bar{\tau}} f'(\tau) = 0$ for some $0 < \bar{\tau} < N$, where N is the highest level of general schooling. This restriction says that a worker cannot learn more from work after she spends sufficient amount of time on the job or if she has a very high level of general schooling (such as a Ph.D).

In my model, human capital acquisition is task-specific in two ways. First, task-skills acquired in one of the lower level jobs are not applicable to the other job. Second, a proportion $(1-\gamma,\ 0 \leq \gamma \leq 1)$ of the task-skills are lost when a worker is promoted from the lower level jobs to the upper level job. Formally, for workers with $\tilde{x}_{iAt}$ effective task-tenure from job A, $\tilde{x}_{iBt}$ effective task-tenure from job B, and x_{i2t} task-tenure from level 2, her output in the level-2 job in period t is

$$y_{i2t} = d_2 + c_2\left\{\theta_i[f(x_{i2t} + \gamma\tilde{x}_{iAt} + s_i) + f(x_{i2t} + \gamma\tilde{x}_{iBt} + s_i)] + \varepsilon_{i2t}\right\}, \gamma \in [0, 1]. \quad (2)$$

Equation (2) shows that the upper level job uses task-skills from both of the jobs on the lower level (and the task-skill from the upper level job). I assume the general education level is fully applicable to all jobs across levels (as opposed to the special component of a worker's education, α_{ij}, which is only applicable to the matched job). I further assume that none of the task-tenure on the upper level job can be applied to the lower level jobs. When a worker is demoted, she loses all the task-tenure on level 2.

d_L and $c_L,\ L \in \{1, 2\}$ are production constants known to all labor-market participants. I assume that $d_1 > d_2$ and $c_1 < c_2$, which means output increases faster with ability in the upper level job (Rosen,1982 ; Waldman, 1984a). ε_{ijt} and ε_{i2t} are noise terms drawn from a normal distribution with mean 0 and variance σ_ε^2.

I focus on the Bayes-Nash Equilibria. The timing of the events in the economy is the following. At the beginning of period 1, nature randomly assigns an ability type to each individual. Firms perfectly observe an individual's education level and education type but not the ability type. Firms make job assignment decisions and wage offers based on individuals' expected abilities, education levels and education types. Individuals then choose the firm that offers the highest wage to work at. At the end of period 1, all firms observe each worker's output and update beliefs about workers' abilities. At the beginning of period 2, firms make job assignment decisions and wage offers based on workers' expected abilities, education levels and education types. Firms can either promote a worker to level 2, move a worker to a different job, or let her stay in the same position. Workers then choose the firm that offers the highest wage to work at. If multiple firms offer the same highest wage, a worker randomly chooses among those firms but stays with her period-1 employer if the period-1 employer is one of the highest-wage-offer firms. This process is repeated in period 3.

3.2 Analysis and Testable Implications

In this subsection I start by describing equilibrium behavior in a benchmark model where individuals' abilities are fully observable. I then consider a model with symmetric learning.

When task-specific human capital accumulation is assumed, strategic firms do not simply maximize the current productivity since current job assignment decisions (i.e., promotions and lateral moves) affect future human capital development. Instead, firms choose the optimal career development path in a given period that maximizes workers' total expected productivity for all future periods. In addition, firms make zero profit in equilibrium due to free entry and the absence of firm-specific human capital. Since there is no firm-specific human capital, workers' wages are equal to their expected productivity in each period.

3.2.1 Equilibrium with Full Information

I start the analysis by considering all possible career paths under full information. To reduce the number of cases, I focus on the equilibrium where the most able worker with the highest education level is not assigned to level-2 in period 1.[9] Furthermore, I focus on the parameterization such that if a worker is not assigned to her matched job in the first period, a substantial amount of the match quality is lost.[10] Under these two restrictions, a worker is always assigned to the job that matches with her education type (or major) when she first enters the labor market. In period 2, a worker can be promoted, laterally moved or held in the same position. In period 3, since a demoted worker loses all her task-tenure on the upper level, it is not efficient to first promote then demote a worker. Also, under full information, firms have no incentive to move a worker in period 2 but not promote her in period 3.

Based on the above analysis, there are four potential equilibrium paths: starting in their matched job in period 1, workers can be (i) promoted in period 2 and stay on level 2 in period 3; (ii) held in their matched jobs in period 2 and promoted in period 3; (iii) laterally moved in period 2 and promoted in period 3; (iv) stay in their matched jobs for all three periods. Since all workers are assigned to their matched jobs in period 1, I only need to consider the optimal output from period 2's perspective. It can be shown that for all positive values of ability types, either career path (ii) dominates career path (iii) or verse visa. When stay-promote (career path (ii)) dominates lateral-move-promote (career path (iii)), there are no lateral moves in equilibrium. I refer to parameterizations that yield this equilibrium outcome as the non-lateral-move regime. Similarly, when lateral-move-promote (career path (iii)) dominates stay-promote (career path (ii)), lateral moves exist in equilibrium. I refer to parameterizations that yield this equilibrium outcome as the lateral-move regime. The parameterizations that

[9] The parameter restriction that guarantees this is given in the Appendix.

[10] Recall that if a type-j worker is not assigned to job-j in her first employment period, only $\lambda\alpha$ of the match quality is applicable in the next period. Here I focus on the equilibrium where λ is sufficiently small.

sustain the lateral-move regime satisfy equation (3).

$$c_2[f(\gamma+\gamma\alpha+s)+f(\gamma+s)-f(2\gamma+\gamma\alpha+s)-f(s)] > c_1[f(1+\alpha+s)-f(s)],\ \forall s \tag{3}$$

Condition (3) guarantees that, given education level s, lateral moves lead to a larger gain in human capital upon promotion (LHS) than what is lost upon moving (RHS).

In the lateral-move regime, the very high ability workers are promoted in period 2. If a worker is not good enough for an immediate promotion, she is laterally moved in preparation for a promotion in period 3. Proposition 1 summarizes the equilibrium behaviors in the lateral-move regime. Let w_{it} denote the wage paid to worker i in period t. All proofs are given in the Appendix.

Proposition 1. *(full-information model) If each worker's innate ability is fully observable and equation (3) is satisfied, then there exist two critical values, $\tilde{\theta}^*$ and θ^* ($\tilde{\theta}^* < \theta^*$), such that job assignment rules and wages are given by (i) through (iv):*

(i) If $\theta_i > \theta^*$, then worker i is promoted to level 2 in period 2 and $w_{i2} = d_2 + c_2\theta_i[f(\gamma+\gamma\alpha+s)+f(s)]$. This worker remains on level 2 in period 3 and $w_{i3} = d_2 + c_2\theta_i[f(1+\gamma+\gamma\alpha+s)+f(1+s)]$.

(ii) If $\tilde{\theta}^*(s) < \theta_i \leq \theta^*(s)$, then worker i is laterally moved in period 2 and $w_{i2} = d_1 + c_1\theta_i f(s)$. This worker will be assigned to level 2 in period 3 and $w_{i3} = d_2 + c_2\theta_i[f(\gamma+\gamma\alpha+s)+f(\gamma+s)]$.

(iii) If $\theta_i \leq \tilde{\theta}^*$, then worker i remains in her matched job in periods 2 and 3 with $w_{i2} = d_1 + c_1\theta_i f(1+\alpha+s)$ and $w_{i3} = d_1 + c_1\theta_i f(2+\alpha+s)$.

(iv) In period 1, all workers are assigned to their matched jobs on level 1 and $w_{i1} = d_1 + c_1\theta_i f(\alpha+s)$.

Now consider how lateral moves are related to promotions and wage changes in the lateral-move regime. Proposition 1 indicates that, under full information, a worker is promoted in period 3 if and only if she is laterally moved in period 2 (given she is not promoted in period 2). The reason is that, with perfect information, firms have no incentive to incur the cost to move a worker if they do not expect to promote this worker, since the gain of a lateral move is only realized upon promotion. Thus, under full information, lateral moves in period 2 predict promotion in period 3 with probability 1.

With regard to wage changes, workers who are laterally moved have larger wage growth in period 3 relative to workers who are not moved (and are not promoted in period 2). Two forces lead to this result. First, laterally moved workers have higher innate abilities than non-movers. Second, lateral moves lead to a larger increase in human capital upon promotion. To understand the logic, note that the increase in human capital for the non-movers comes from one additional period of tenure in her matched job on level 1. The increase in human capital for the movers comes from the difference between the human capital level she achieves on level 2 and the human capital level in her non-matched job on level 1. Since the movers achieve a higher human capital level after the move but their human capital level in the period of lateral moves is lower than the non-movers, the movers have a larger human capital growth compared to the non-movers. Consequently, laterally moved workers experience a larger wage growth than non-movers in periods after the move.[11]

The investment aspect of lateral moves is now clear: although lateral moves are associated with current period's human capital loss, a higher human capital level can be achieved in the next period.[12] The investment aspect of job assignments is discussed in Gibbons and Waldman (2006). The difference is that, in their model, human capital investment is through vertical assignment only, while in my model the investment is through both vertical and horizontal job assignments as lateral moves are incorporated.

Now consider how education affects the equilibrium. Let us first consider the equilibrium when the general education level is sufficiently high, in particular when $s_i \geq \bar{\tau}$ (recall that $lim_{\tau \rightarrow \bar{\tau}} f^{'}(\tau) = 0$

[11]In the current set up, laterally moved workers have a wage decrease upon moving under full information. This is because I only consider on-the-job task-specific human capital accumulation in the model. If general human capital is included and is complementary to innate ability, when a mover's innate ability is substantially higher than a non-mover, we might see a wage increase.

[12]The literature on the human capital investment problem inside firms focuses on how firms' job assignment decisions affect workers' investment decisions in firm-specific human capital development (e.g., Carmichael, 1983; Kahn and Huberman, 1988; Zabojnik and Bernhardt, 2001). However, in my model, firms' job assignment decisions do not affect the workers' investment decisions. Instead, firms' job assignment decisions are their human capital investment decisions.

for some $0 < \bar{\tau} < \infty$). In this case, a worker is almost equally competent in both jobs and she can learn very little from the other job through a lateral move. Thus, the worker enters into the non-lateral move regime, i.e., equation (3) is not satisfied. In period 2, she is either promoted or stays in her incumbent jobs for one more period before promotion in period 3. Compared to a worker whose general education is not that high (i.e., $s_i < \bar{\tau}$) such that she can reach a higher human capital level from a lateral move (i.e., equation (3) is satisfied), the worker with a high education level is less likely to be laterally moved.

Next, consider the equilibrium when the general education level is not high enough to fully substitute for the human capital gain from lateral moves (i.e. $s < \bar{\tau}$) and the return to lateral moves is high upon promotion (i.e. equation (3) is satisfied). In this regime, the net benefit of lateral move increases with general education level when the upper level job is substantially different from the lower level jobs (i.e. $c_2 \gg c_1$). The reason is that the reward of moving (then to promote) a higher-education worker is larger than the cost of moving her than to move a relatively lower education worker. However, when the upper level job is not substantially different from the lower level jobs, even in the lateral move regime, individuals with more education can be less likely to be laterally moved due to the substitution between education and task-tenure.

3.2.2 Equilibrium with Symmetric Learning

The full-information model carries most of the insights regarding how lateral moves affect promotion probabilities, but the prediction that lateral moves predict promotions perfectly is not realistic. In this subsection, I consider equilibrium behavior with symmetric learning. For tractability, I focus on parameterizations that satisfy (3) in the main part of the analysis and relax this restriction when I consider the relationship between education and lateral moves.

With symmetric learning, all firms have the same information about a worker's innate ability. Define the information that each firm gets in period t as $z_{it} = (y_{ijt} - d_l)/c_l$. Let θ_{it}^e denote the expected ability in period t conditional on the information. That is, $\theta_{it}^e = E(\theta|z^t)$ where $z^t = \{z_{t-1}, z_{t-2}, \ldots, z_1\}$

is the full history of information.

I consider the job assignment problem with symmetric learning by backward induction. In period 3, since it is the last period, if a worker is not promoted, it is optimal to assign her to her matched job. That is, if workers are not promoted in period 3, a type-A worker will be assigned to job A while a type-B worker will be assigned to job B, regardless of their assignments in period 2. Also, since period 3 is the last period, job assignments in period 3 are free of investment concerns. Thus, the equilibrium job assignments maximize period 3's productivity. Let θ_3^{jk} and θ_3^{jj} denote, respectively, the cutoff ability levels for promotions in period 3 for a period-2 mover and a period-2 non-mover (a non-mover is not promoted or moved). θ_3^{jk} solves $d_1 + c_1\theta_3^{jk} f(1+\alpha+s) = d_2 + c_2\theta_3^{jk}[f(\gamma+\gamma\alpha+s)+f(\gamma+1+s)]$, while θ_3^{jj} solves $d_1 + c_1\theta_3^{jj} f(2+\alpha+s) = d_2 + c_2\theta_3^{jj}[f(2\gamma+\gamma\alpha+s)+f(s)]$. Let θ_3^{j2} denote the cutoff ability level for a period-2 promotee to stay on level 2 in period 3. θ_3^{j2} solves $d_1 + c_1\theta_3^{j2} f(1+\alpha+s) = d_2 + c_2\theta_3^{j2}[f(1+\gamma+\gamma\alpha+s)+f(1+s)]$.

In period 2, job assignment rules are chosen to maximize the total expected output in periods 2 and 3. Let θ_2^j denote the cutoff ability level for promotions in period 2. θ_2^j solves $d_1 + c_1\theta_2^j f(s) + E(y_{i3}|\theta_{i2}^e \le \theta_2^j) = d_2 + c_2\theta_2^j[f(\gamma+\gamma\alpha+s)+f(s)] + E(y_{i3}|\theta_{i2}^e > \theta_2^j)$. $E(y_{i3}|\cdot)$ is the expected output in the next period given this period's expected ability and job assignment. Let $\tilde{\theta}_2^j$ denote the cutoff ability level for lateral moves in period 2. $\tilde{\theta}_2^j$ solves $d_1 + c_1\tilde{\theta}_2^j f(1+\alpha+s) + E(y_{i3}|\theta_{i2}^e \le \tilde{\theta}_2^j) = d_1 + c_1\tilde{\theta}_2^j f(s) + E(y_{i3}|\theta_{i2}^e > \tilde{\theta}_2^j)$. We can see that the task-tenure in the incumbent job and the match quality are unutilized when a worker is moved to a new job.

Similar to the full-information case, the optimal job assignment rules under symmetric learning are also characterized by cutoff ability levels. The difference is that, with production uncertainties, firms sometimes "make mistakes". In the full-information case, only period-2 lateral movers are promoted in period 3. Under symmetric learning, if a non-mover gets a good draw in period 3, she might still be promoted. Therefore, there are two types of workers at the beginning of period 3: those who were laterally moved in period 2 and those who were not laterally moved, and both of them can be considered for promotions.

Proposition 2 summarizes the above discussion.

Proposition 2. *(symmetric learning) Suppose that learning is symmetric and the prior belief about a worker's type is that a worker is of innate ability* θ_H *with probability* p_0 *and of innate ability* θ_L *with probability* $(1-p_0)$*. The job assignment rules and wages are given by (i) through (iii):*

(i) In period 3, if worker i's expected ability $\theta_{i3}^e > \theta_3^{j2}, j \in \{A,B\}$ *and she was promoted in period 2, then she remains on level 2. If worker i's expected ability* $\theta_{i3}^e > \theta_3^{jj}($ *or* $\theta_3^{jk})$ *and she was not (or was) laterally moved in period 2, then she is assigned to level 2. All non-promoted workers in period 3 are assigned to their matched jobs on level 1.*

(ii) In period 2, if worker i's expected ability $\theta_{i2}^e > \theta_2^j, j \in \{A,B\}$*, then she is promoted to level 2; if* $\tilde{\theta}_2^j < \theta_{i2}^e \leq \theta_2^j$*, then she is laterally moved; if* $\theta_{i2}^e \leq \tilde{\theta}_2^j$*, then she remains in job-j on level 1.*

(iii) $\theta_3^{jk} < \theta_3^{jj}$*. The cutoff ability for promotions in period 3 is lower for lateral movers.*

I now derive two testable implications from the equilibrium described in Proposition 2. The first implication considers the relationship between lateral moves and expected promotion probabilities. As discussed above, lateral moves incur a loss in human capital in period 2. However, if a period-2 lateral mover is promoted in period 3, she can achieve a higher human capital level than a non-mover. Since the lateral-move decisions are endogenous, firms would want to choose a cutoff level such that the expected probability that a laterally moved worker is promoted in the next period is high enough to make sure that the expected return from each lateral move exceeds the expected loss in task-specific human capital upon moving. Thus, from period 2's perspective, the probability that a laterally moved worker is promoted in period 3 will be higher than the probability that a non-mover is promoted. Formally, let $X = prob.(\theta_{i3}^e > \theta_3^{jk} | \tilde{\theta}_2^j < \theta_{i2}^e \leq \theta_2^j)$ denote the probability that a laterally moved worker is promoted in period 3 from period 2's perspective. It is the probability that worker i's expected ability in period 3 conditional on her output history $\{z_{i1}, z_{i2}\}$ is greater than the promotion threshold for movers (θ_3^{jk}), given that worker i is laterally moved in period 2 ($\tilde{\theta}_2^j < \theta_{i2}^e \leq \theta_2^j$). Similarly,

$Y = prob.(\theta^e_{i3} > \theta^{jj}_3 | \theta^e_{i2} < \tilde{\theta}^j_2)$ is the probability that a non-mover is promoted in period 3.

Corollary 1. *Under symmetric learning, the probability that a period-2 laterally moved worker is promoted in period 3 is larger than the probability that a period-2 non-laterally moved worker is promoted in period 3 (given she is not laterally moved and not promoted in period 2), i.e.* $X > Y$.

The second testable implication concerns the size of the wage changes in periods after lateral moves. The symmetric learning model generates similar predictions regarding wages as those in the full-information model, i.e., laterally moved workers are expected to have a larger wage growth in period 3. Let Δw^L and Δw^S denote wage changes (in levels) for lateral movers and non-movers from period 2 to period 3.

Corollary 2. *Conditional on prior beliefs about workers' abilities, laterally moved workers on average experience a larger wage growth in the period after the move, i.e.* $\Delta w^L > \Delta w^S$.

As in the full information model, the positive relationship between wage growth and lateral move comes from positive learning about a laterally moved worker's innate ability and the effect of a lateral move on human capital accumulation. The positive learning on lateral moves follows exactly the same logic as in the full information model. The relationship between lateral moves and the expected human capital level is the following. As stated in Corollary 1, lateral moves are associated with a higher promotion probability. In addition, a laterally moved worker can achieve a higher human capital level upon promotion. Thus the expected human capital level for a mover is higher than a non-mover. Since in equilibrium workers' wages are equal to their expected productivity, laterally moved workers are expected to have a larger wage growth. This positive relationship between lateral moves and wage growth exists even when ability types are controlled for since lateral moves have a permanent effect on human capital accumulation.

We can also consider wage growth in the period of a lateral move. Under the current set up, the model makes an ambiguous prediction. The reason is that although lateral movers incur a loss in current human capital, they are also those who are learned to be high ability individuals. If the positive learning on lateral movers' innate ability outweighs the loss in human capital, movers will experience a larger wage growth in the period of lateral moves. Otherwise, movers will have a smaller wage growth in the period of lateral moves compared to non-movers.

The third prediction is not from Proposition 2 directly. It considers the relationship between lateral moves and general education levels. As discussed in the full information case, when the general education level is sufficiently high, workers enter the non-lateral move regime.[13] However, for workers with lower education levels such that the lateral-move regime is sustained, the probability of lateral move is positive in equilibrium. Therefore, workers with very high education are less likely to be laterally moved.I summarize this argument in Corollary 3.

Corollary 3. *In period 2, among those who are not promoted in the current period, the probability of being laterally moved decreases with the general education when the schooling level is sufficiently high.*

Now consider the relationship between lateral moves and education levels in the lateral move regime. It can be shown that if the upper level job is sufficiently different from the lower level jobs (i.e., $c_2 \gg c_1$), individuals with higher education levels are more likely to be laterally moved. However, since I cannot measure the difference between two jobs levels, the empirical prediction regarding the probability of lateral moves and education levels is ambiguous for workers with medium education levels.

In this section, I incorporated lateral moves into a model with job assignment, human capital development, and symmetric learning. Since lateral moves put workers in an advantageous position in terms of human capital accumulation upon promotion, relatively higher ability workers are selected into this more efficient career path for human capital development. Consequently, lateral moves are associated with positive career outcomes in terms of promotion probabilities and wage growth in periods after the move. Furthermore, due to the substitution between education and employment,

[13] This suggests that there are no lateral moves with every high education. I observe this pattern in the data. I will return to this point in the empirical section.

workers with very high levels of education are less likely to be laterally moved.

4 Data and Tests

In this section, I test my model's predictions using a large employer-employee linked panel on top American executives. The theoretical model describes the executives' career dynamics better than lower rank employees' for two reasons. First, the assumption of the theoretical model matches the nature of the management level jobs better than that of the non-management jobs. High-level management jobs often need a wider set of task-skills than their immediate subordinate jobs, whereas non-management jobs might not. For example, it is important for a top-level executive (such as a Chief Operation Officer) to be familiar with business operations in different lower-level line departments, but a research associate in the R&D department might not need task-skills from the Finance department. Second, lateral moves (as opposed to job rotation) are more likely to exist among senior managers. Campion et al. (1994) find that young workers are more likely to be involved in job rotation, while horizontal movements among upper level managers bring "broader perspective on other business functions" to the managers.

In the following subsections, I first describe the data used for this study and how the sample and measures are constructed. I then test the three predictions derived in the previous section.

4.1 Data

The data is a large employer-employee linked panel that contains information on over 30,000 executives in over 500 of the largest U.S. firms during the period 1981-1985.[14] A unique identifier is assigned to each firm. However, the same individual may have different identifiers in different firms,

[14]The dataset was constructed by a large consulting firm through annual surveys of those firms. Firms are paid to participate in the survey. Each firm reports data on about 80 executives per year. The dataset contains rich information on individual, job and firm characteristics, including: age, years of education, hiring date, job title, reporting level, functional area, base pay, bonus pay, pay midgrade, firms' industry, profits, sales, span of control, and employment size. See Abowd (1990), Bognanno(2001), Belzil and Bognanno (2008), Gittings (2012) and Belzil, Bognanno, Poinas (2012) for more details about the data and the data collection procedure.

which means I cannot track individuals across firms.

There are three compensation-related variables (in nominal terms): base pay, bonus pay, and pay midgrade. I deflate them using the Consumer Price Index in 1982 US dollars provided by the Bureau of Labor Statistics. I construct the measure of total pay as the sum of base pay and bonus pay.

Three variables in this dataset define an executive's position in the firm: reporting level, organizational unit level and job code. The reporting level counts the number of levels away from the Board of Director (the BOD). CEO directly reports to the BOD and thus is reporting-level 1, all executives directly reporting to the CEO are reporting-level 2, and all executives directly reporting to level-2 executives are reporting-level 3, etc. The organizational unit level counts the major organizational units between the Board of Directors and the incumbent's organizational unit. An organizational unit is a company, group, division, sales region, or manufacturing facility that the company accounts for as a separate profit center. In a hypothetical organization where a division manager reports to a group executive who reports to a corporate executive, the division manager is at Unit Level 3, the group executive is Unit Level 2, and the corporate executive is Unit Level 1. Job code defines workers' functional areas. Functional areas are major occupation groups. There are 11 reporting levels, 8 unit levels, 18 major functional areas, and 165 job codes (i.e. job titles).

To define job transitions, I use the reporting level as a basic measure. I define promotion as an upward movement in the reporting level (e.g., from level 4 to level 3). Since executives in different unit levels can share the same job title, I do not restrict promotions to upward movements with a job title change.[15] However, I define demotion as a downward movement in the reporting level with a job title change. As Belzil et al. (2012) point out, there is organizational re-structuring through the sampling year where a COO position is added between CEO and lower level executives.[16] This organizational change causes a universal downward movement of reporting levels without actual demotions or job

[15]For example, a transition from the Top Personnel Executive in a profit center to the Top Corporate Personnel Executive comes with no job title change but is clearly a promotion.

[16]In a recent study, Caliendo et al. (2013) find in a comprehensive dataset of French manufacturing firms that firms expand by adding layers (levels).

title changes. Therefore, to qualify for a demotion in the data, an individual has to move down the reporting level with a job title change.

Defining lateral moves requires more careful work. Conceptually, a lateral move entails a change of job content without a change in hierarchical position within a firm. Therefore, I define lateral moves as movements within the same reporting level with a job title change or a unit-level change. These types of lateral moves provide executives with the opportunities to acquire different types of task-specific skills in another job or another business unit. These movements enable the executive to be exposed to a wider set of business operations or to acquire more managerial skills.

Table 1 summarizes different types of lateral moves and subsequent promotions one year and two years after the move. Overall, non-promoted executives with any kind of lateral moves are more likely to have a promotion one year or two years after the move than non-promoted executives without lateral moves. For example, among those who are laterally moved, 13.9% are promoted one year after the move, while only 12.5% of the non-movers are promoted one year from the period of lateral moves. The gap in the promotion probability becomes even larger two years after the lateral-move period. In the second year after the moves, 14.1% of the movers are promoted while 12.3% of the non-movers are promoted. Due to data constraints, I cannot identify lateral moves between different divisions within the same unit level (e.g., from Division A to Division B on unit-level 4). Thus, in the following analysis, I consider lateral moves within the same reporting level either with a job-title change or with a unit-level change (the set of executives with job-title change contains the set of executives with functional-area change). I further restrict the sample to executives who appear in the sample for at least 3 consecutive years. This results in a sample of 290 firms, 19,149 executives, and 74,153 executive-year observations.

Table 2 provides summary statistics for the sample to be used in the empirical tests. Panel A shows the individual characteristics of the 1981 cohort. The median age of the executives is 48, which is higher than the median age of the general working population.[17] The executives have, on

[17] The median age of the workforce is 42.1 in 2011 according to the Bureau of Labor Statistics. The median working age

average, 4.2 years of job tenure on the current position, 15.2 years of firm tenure since the first hire and 14.9 years of firm tenure since the most recent hire. The average years-of-education is 16.4. Most of the executives are in reporting levels 1 through 8. The average firm tenure for a CEO position (reporting level 1) is 23 years. Panel B summarizes different compensation measures for executives from 1981 to 1985. The total number of executives in the sample varies across years. Their average annual real total earnings grew from $103,962 in 1981 (which equals to $251,560.03 in 2013-dollar) to $120,743 (or $292,165.53 in 2013-dollar) in 1985. Bonuses count for approximately 25% of their total pay in each year. From Panel C, in each year, about 12% -14% of the executives are promoted, 10% -12% are laterally moved, and 2.0% -2.8% are demoted.[18] We can see that in this dataset lateral moves are as prevalent as promotions. In addition, 42% of the executives have no lateral moves or promotions across the sample years. About 3.3% of them have more than one promotion within the five years of the sample; while about 7.7% of them have more than one lateral move. In the following analysis, I only consider the last in-sample promotion and the first in-sample lateral move for individuals with multiple promotions and lateral moves. In addition, among executives who have a promotion following a lateral move within the sample years, a promotion is earned 1.5 years, on average, after a lateral move.

4.2 Empirical Tests

In this subsection, I test the theoretical predictions regarding lateral moves, promotions, wage changes and education. I first present the empirical evidence regarding lateral moves and promotion probabilities (Corollary 1). Then I discuss lateral moves and wage changes (Corollary 2). The relationship between education and lateral moves (Corollary 3) is investigated last.

should be lower in the 1980s given an aging workforce in the US.

[18] The lateral move rate is 23.5% from 1984 to 1985. This is because I define a lateral move as a within reporting level move with a unit level or job title change and there are an increasing number of unit level changes from 1984 to 1985. In the following analysis, only the effect of lateral moves in 1982 and 1983 are considered. So the spike in the 1985 lateral move rate is not a concern.

4.2.1 Lateral moves and future promotion probabilities

Corollary 1 states that lateral moves in the current period are associated with a higher probability of promotion in the next period. In practice, it is possible that promotion is not immediate after an initial move since it may take several periods to develop the task-specific human capital for the upper level job and different individual needs different amount of time to develop human capital. Therefore, a more realistic interpretation of Corollary 1 is that a lateral move is positively correlated with promotion probabilities in periods after the move (not necessarily the first period after the move). In addition, the theoretical model considers workers who enter the job market and the lower level jobs at the same time. This translates into controls for age and tenure empirically. I also control for individuals' years of schooling and initial functional area to match the general education level and the education type in the theoretical model. Furthermore, I control for individuals' expected output and their outputs at the initial level.

One discrepancy between the theoretical model and the empirical specification is that theoretically no individuals with the same expected output levels would have different job assignments (such as one is laterally moved but the other is not). Empirically, however, other unobserved factors (such as disutility of effort from lateral moves) might be correlated with lateral moves and promotions. Thus, I control for individuals' expected output to avoid the omitted variable bias. The empirical challenge here is to find an appropriate measure for expected output. In a symmetric learning set up, the best predictor of an individual's expected output is her past output. Since output is not directly observable, I use an individual's total pay in the previous period as a proxy for her expected output.[19]

Table 3 looks at lateral moves in different years and their impact on future promotions. After the initial move, 12.4% of the 1982-lateral-movers are promoted in 1983 while a slightly higher

[19] Previous studies have used performance measure (when it's available) as a control for expected output (DeVaro and Waldman, 2012). In more recent studies, Gittings (2012) and DeVaro (2012) have used bonus as a measure of expected output. My data does not contain information on this measure. In addition, it is a well-established stylized fact that past wages or wage changes predict promotion (Baker et. al., 1994b; Gibbs and Hendricks, 2004). Thus, I use past total compensation as a measure of expected output. I also use other compensation variables as measures of expected output and the results are robust. See the tables in the Appendix for detail.

proportion (12.8%) of the executives who stayed in the same position in 1982 are promoted in 1983. However, two years after the lateral move in 1982, among those who have not been promoted yet, 16.7% of the 1982-lateral-movers are promoted in 1984 while only 15.2% of the 1982-non-movers are promoted. This difference is even larger in 1985 - three years after the lateral move in 1982, 16.5% of the movers are promoted while only 12.3% of the non-movers are promoted. This pattern repeats for the lateral move in 1983.

To explore the effect of lateral moves on subsequent promotions, I estimate a reduced form model of promotion in which the probability of promotion is a function of individual and firm characteristics and is affected by a previous lateral move. Rather than pooling all lateral moves together, I consider lateral moves in different years separately.[20] The probability that executive i in firm m is promoted in period t is defined by the following equation:

$$Prob(Promotion_{imt} = 1) = \tag{4}$$
$$F(\delta Lateral_{im\tau} + \beta_r rtotal_{imt-1} + \beta_p Level_{imt-1} + \beta_F F_{mt-1} + \beta_U Unemp_{t-1} + C_{im}).$$

$F(\cdot)$ is a cumulative distribution function. $Lateral_{im\tau}$ is a dummy variable that equals one if an executive has been laterally moved in period $\tau(\tau < t)$ and zero otherwise. $rtotal_{imt-1}$ is the total compensation in the previous period, which is the measure of expected ability. $Level_{imt-1}$ is a set of dummies indicating the executives reporting level in $t-1$ (I exclude CEO (level 1) positions in the lateral-move year since CEO is the highest position for promotion). F_{mt-1} is a set of firm-specific variables, including promotion opportunities, profits, sales and firm's total employment in period $t-1$. Promotion opportunities are defined as the percentage of executives hired from outside into positions above a given individual. I also include changes of those firm characteristics from period $t-1$ to period t. $Unemp_{t-1}$ is the unemployment rate in period $t-1$, which captures the overall

[20] If a pooled regression is considered, I need to control for the time since observed to the point of the first in-sample lateral move. This gives the same subsamples as I estimate separately. In addition, since there is no the third-year after the move for lateral moves in 1983 (because the sample ends in 1985), all the third-year effect of lateral moves on promotions comes from lateral moves in 1982.

labor market conditions. C_{im} captures other individual characteristics. It consists of an observable component and an orthogonal unobserved component. The specification takes the following form:

$$C_{im} = c_X X_{im0} + c_r rtotal_{im0} + c_U Unemp_{imh} + c_A FA_{im0} + u_{im}. \quad (5)$$

X_{im0} is a set of human capital measures, including age, education, job tenure, and firm tenure all measured at the point of time when individuals first enter into the sample. $rtotal_{im0}$ is the real total pay when an executive first enters into the sample. This measure controls for the pre-in-sample individual heterogeneity in expected productivity. $Unemp_{imh}$ is the unemployment rate when an executive is hired, which captures potential cohort effects upon hiring that might affect executives' later career development. FA_{im0} represents executives' initial functional area at the time when they are observed. It captures the initial matching effect (α_{ij}) as specified in the theoretical analysis. u_{im} denotes the orthogonal unobserved component.

Table 5 presents results from estimating equation (4) using a Linear Probability Model (LPM). Column (1) fits a pooled-OLS model. As we can see, a lateral move in 1982 increases the average probability of promotion in years after the move by 1.7%. To further control for unobserved individual heterogeneity, in column (2), I fit a LPM with Random Effect. The effect of lateral moves is still positive but not statistically significant.

While lateral moves exhibit positive effects on future promotions in the full sample, the results might be biased since the 1982 and 1983 entry cohorts are not "at risk" to lateral moves in 1982. For example, when we consider the effect of lateral moves in 1982 on 1983's promotions, only individuals who enter the sample in 1981 are subject to a lateral move in 1982. Individuals who enter the sample in 1982 and 1983 are automatically counted as non-lateral-movers. These entrants may increase the probability that a non-mover is not promoted (if those new entrants in 1982 are not promoted in 1983) and thus exaggerate the effect of lateral moves on promotions. To make sure we measure the effect of lateral moves on individuals who are subject to lateral moves, in columns (3) and (4) I restrict the sample to individuals who enter the sample in 1981 such that they are subject to lateral moves in 1982. Similarly, in column (7) and (8) I restrict the observations to individuals who enter the sample in either 1981 or 1982 such that they are subject to lateral moves in 1983. I further restrict the sample to levels 2 to 6 in the period when the lateral moves occur.[21]

In the restricted sample, lateral moves continue to exhibit positive impact on future promotions but the magnitude is much smaller than that in the full sample for the 1982 moves.[22] For example, column (3) tells us that a laterally moved worker in 1982 is 0.7% more likely to earn a promotion in periods after 1982. However, this effect is not statistically significant. As I argued in the previous section, the effect of lateral moves on promotions might not be immediate after the move. Therefore, in column (4) I allow the effect of lateral moves to vary over time. To be specific, I include interaction terms of lateral move status by year-after-the-move. We can see that lateral moves exhibit strong positive correlation with promotion probabilities two years after the move. In particular, a lateral move in 1982 increases the probability of promotion in 1984 - two years after the move - by 5.3%. It increases the probability of promotion in 1985 - three years after the move - by 9.2%. However, there is a negative effect of lateral moves on promotions one year after the move. One explanation is that it may take several years for a moved individual to develop sufficient human capital in the new position to warrant promotion. Given that the average length of a lateral-move-promotion spell in this sample is 1.5 years, it is reasonable that we do not see a positive effect of lateral moves on promotions one year after the move. The same pattern repeats with the 1983-lateral-moves. The results in column (4) and (8) suggest that we need to allow the effect of the move to differ over time because the average results across years cannot fully capture the effect of lateral moves on promotion.[23]

The LPM provides some support for the prediction that lateral moves are positively associated

[21] Table 4 summarizes lateral moves in each year by level. We can see that there is a sudden drop in the number of lateral moves beyond level 6.

[22] The coefficient for the 1983 moves in the restricted sample is not smaller than that in the full sample. This may due to the fact that the full sample and the restricted sample for the 1983 moves are not very different since fewer individuals enter the sample in 1983 compared to the cohorts who enter in 1981 and 1982.

[23] The results are very similar to those in columns (3), (4), (7) and (8) if I estimate a pooled OLS Model instead of a Random Effect Model. The tables are available up on request.

with promotions. In Table 6, I estimate equation (4) with a non-linear model (applying to the restricted sample only). To keep the estimation strategy straightforward, I assume the orthogonal component in the individual heterogeneity (i.e. u_{im} in equation(5)) following a normal distribution and thus I implement a Random Effect Probit model using Butler and Moffitt's (1982) method. I first fit a pooled Probit model. The effect of lateral moves is positive but insignificant. In model (3) and (6), I estimate the full expression that controls for individual heterogeneity and allowing the effect of lateral moves to vary over time. The results are consistent with those in the LPM. Lateral moves are associated with a 3.1% - 3.4% increase in the marginal probability of promotion two years after the move. There is a small negative effect associated with the 1982-moves one year from the move. Note that the effects of lateral moves might be underestimated since we do not observe the full employment history. For example, when we consider the effect of a 1982-lateral-move on 1983-promotion-probability, a promoted worker in 1983 who is not moved in 1982 but is moved in 1981 will add to the probability of observing a non-mover in 1982 being promoted in 1983, but in fact the 1983-promotion is due to an unobserved 1981-move. Since I do not observe the whole employment history of a worker after they enter the firm, I cannot eliminate this bias.[24]

Overall, lateral moves are positively correlated with subsequent promotions. The positive effect is strong two years after the move. This result suggests that it may take an executive more than one year after a lateral move to acquire enough task-skills to warrant promotion.

4.2.2 Lateral moves and future wage growth

In this subsection, I investigate the relationship between lateral moves and wage changes (Corollary 2). Figure 2 plots the raw compensation data against years by lateral-move status in 1982 and 1983. The top two graphs compare the wage profiles of the 1982-lateral-movers and the 1982-non-movers. Without controlling for other covariates, the average total pay and the real pay of the 1982-lateral-

[24]I also cluster standard errors in the non-linear model at both individual and firm levels. The results are consistent with what I find in Table 5 and 6. See Appendix for details.

movers are below those of the 1982-non-movers. There is no obvious difference in the rates of wage growth between the 1982-movers and the 1982-non-movers from 1981 to 1982. However, lateral movers' wages start to grow faster in years after the move. The bottom two graphs plot the total pay and the real pay of the 1983-movers and the 1983-non-movers. In 1983, there is not much difference in terms of base pay and total compensation between the movers and the non-movers, but the movers' wages grow much faster than the non-movers' after 1983. These raw plots are consistent with Corollary 2 that wage growth for movers is larger in the post-move periods.

Since the effect of lateral moves on wage growth is realized upon promotion and the effect of lateral moves on promotion probabilities might not be immediate, we would expect the effect of lateral moves on wages to differ over time in practice. Therefore, I allow for different effects of lateral moves on wage changes in different periods after a lateral move.[25] Since wage changes are considered, I only control for changes in firms' characteristics rather than base levels. I estimate the wage change by the following specification:

$$
\begin{aligned}
& w_{imt} - w_{im\tau} && (6)\\
&= \eta Lateral_{im\tau} + \psi_p Level_{imt} + \psi_F \Delta F_{mt} + \psi_U \Delta Unemp_t + \tilde{C}_{im}.
\end{aligned}
$$

$Lateral_{im\tau}$ is a vector of dummies indicating lateral move status by year-after-the-move. For lateral moves in 1982, this vector includes interaction terms of the lateral-move dummy in 1982 with year dummies for 1983, 1984, and 1985. For lateral moves in 1983, this vector includes interaction terms of the lateral-move dummy in 1983 with year dummies for 1984 and 1985. The individual characteristic, $\tilde{C}_{im}$, is defined similarly as in equation (4). The only difference is that I include an age-squared term to capture the non-monotonic wage-age profile. Since the theory does not distinguish

[25]Note that the wage difference is calculated as the wage growth from the period of the lateral moves to the current period. This is to match the theoretical model. In the theoretical model, lateral moves affect the expected wage growth from the period of lateral moves to the period of promotion.

between the base pay and the total pay, I estimate equation (6) using OLS with clustered (on firm-individual level) standard errors for changes in total compensation, base pay, as well as bonus pay. I consider wage levels rather than log wages because the theoretical model only generates results concerning wage levels.[26] The results are shown in Table 7. Column (1) says that the total compensation change of a 1982-mover from 1982 to 1984 is \$3,838 larger than that of a 1982-non-mover. Similarly, the total compensation change of a 1982-mover from 1982 to 1985 is \$8,475 larger than that of a 1982-non-mover. However, a mover has a smaller total compensation change than a non-mover from 1982 to 1983. This suggests that the wage changes are mainly associated with promotions. To see this, the movers have a smaller wage change one year after the move. From Tables 5 and 6, we know that a mover is less likely to be promoted than a non-mover one year after the move (recall that there is a negative effect of laberal moves on promotions one year after the moves). In contrast, the movers have a larger wage change two years after the move when they are more likely to be promoted relative to the movers. This pattern repeats for different measures of compensation and for lateral moves in 1983.[27]

In Table 8, I examine the wage changes from the pre-lateral-move period to the lateral-move period. As discussed in the previous section, while lateral moves are associated with current task-specific human capital losses, it is also associated with positive learning about individuals' innate ability. The net effect of lateral moves on wage growth upon moving depends on which effect dominates. I estimate a specification similar to equation (6) except that the wage changes are backward looking. The equation I estimate takes the following form:

---

[26]Note that in the wage equation, I do not include a variable to control for the expected productivity because by taking the difference in wages, the expected ability term cancels out.

[27]Rather than treating the panel data as a pooled dataset where each observation is independent of each other, I allow correlations between different observations of a same individual by considering Random Effect estimators for the specification in equation (6) and cluster stand errors at both firm and individual level. As shown in the Appendix, the results are consistent with the estimates in the pooled OLS model that movers have a larger wage changes two years after the move.

$$
\begin{aligned}
& w_{im\tau} - w_{im\tau-1} && (7) \\
& \quad = \kappa Lateral_{im\tau} + \gamma_p Level_{im\tau} + \gamma_F \Delta F_{m\tau} + \gamma_U \Delta Unemp_\tau + \tilde{C}_{im} + \varepsilon_{im\tau}.
\end{aligned}
$$

As shown in Table 8, lateral movers in either 1982 or 1983 have larger pay increase in all measures of compensation despite that we lose some significance in the bonus measure. The positive relationship between lateral moves and wage growth in the period of lateral moves suggests that the positive learning associated with lateral move dominates the potential human capital losses.

4.2.3 Education and lateral moves

I now examine the relationship between education and lateral moves. As discussed in Corollary 3, there is a negative relationship between the probability of a lateral moves and education level.[28] To test this, I estimate a model that is very similar to equation (4) except that the dependent variable now is a dummy variable that equals one if an individual has an in-sample lateral move in year τ and zero otherwise. I include a full set of dummies for years of schooling. The reference group is years of schooling below 16 years. To be specific, for the executives who are not promoted in period τ, the probability that executive i in firm m is laterally moved is defined by the following equation:

$$
\begin{aligned}
& Prob(Lateral_{im\tau} = 1) = && (8) \\
& \quad F(\pi_{e_1} educ_{im\tau} + \pi_p Level_{im\tau-1} + \pi_F F_{m\tau-1} + \pi_U Unemp_{\tau-1} + \hat{C}_{im}).
\end{aligned}
$$

$educ_{im\tau}$ is a set of education dummies. The covariates in $\hat{C}_{im}$ are similar to those specified in equation (5) except that the education term is not included. Table 9 presents the results from estimating

[28] In the data, no individuals with years of schooling higher than 21 are laterally moved, which matches the theoretical prediction. However, since only a small number of individuals have more than 21 years of schooling in my sample, there is positive possibility that individuals with more than 21 years of schooling are laterally moved in a larger sample than mine.

equation (8) using both a Random Effect LPM and a Random Effect Probit Model. As shown in column (1) and (2), there is a strong negative relationship between lateral moves and years of schooling after 19 years, however, the positive relationship between lateral moves and years of schooling is not statistically significant for schooling years before 19. As discussed previously, when the upper level job is not sufficiently different from the lower level job, the reward to laterally move a high education individual may not exceed its cost. Thus, we may not observe a positive relationship between lateral moves and years of schooling in the data.

5 Alternative Explanations

In this section, I discuss several potential alternative explanations for the empirical findings in Section 4. I consider three alternatives: (i) contracted job rotation, (ii) worker-job match through lateral moves, and (iii) employer learning (without human capital accumulation) through lateral moves. As I will show, although these mechanisms may exist in the real world, none of them can fully account for the findings in the data. The human-capital argument proposed in my model, on the other hand, is a more convincing argument to explain the patterns we observed in the U.S. top managers' career and wage dynamics.

Lateral moves are closely related to job rotations: both types of career movements involve a change in work content without changes in hierarchical levels. As I discussed in the literature review, none of the job-rotation models such as Ortega (2001) and Li and Tian (2013) make predictions about how horizontal mobility affects vertical mobility.

A natural extension of their model is to consider the relationship between job rotation and promotions. Since job rotations are the prerequisites for promotions, all promoted individuals should have been horizontally moved under the job rotation scheme. However, in my data, only less than one fifth of the individuals who are promoted have engaged in horizontal moves. This fact rules out the case that job rotation is the only contract arrangement among the managers.

Now consider the situation where some of the managers engage in job rotations while others go through the lateral move process as defined in my model. In order to show that job-rotation is not the dominant contract arrangement in my data, I conduct the following test. With job rotation, horizontal moves are pre-determined and thus are independent of performance. On the contrary, with lateral moves, horizontal moves are performance based. Since I do not have performance data, I use an indivdiual's bonus pay in the previous period as a proxy for her performance (Gittings,2012; DeVaro et. al, 2012). I first regress bonus on firms' profits and individuals' job levels with firm fixed-effect. I then use the residuals as a measure of performance. The argument is that after separating out the part of the bonus pay that is determined by firms' profits and individuals' job levels, the remaining part represents pay-for-performance. I include this constructed measure as an additional explanatory variable in equation (8). I find that the probability of a lateral move is strongly correlated with past period's performance conditioning on individuals' initial performance, which suggests that the dominant mechanism in my data is performance-based lateral moves instead of pre-determined job rotations. This is consistent with Campion et al.'s (1994) finding that young workers are more likely to engage in job rotations, upper level managers are more likely to engage in lateral moves.

This paper takes a human-capital perspective to explain how lateral moves affect individuals' career progression. Another theoretical perspective is that it is worker-job matching that drives the results. Consider a modeling environment without human capital accumulation but lateral moves improve worker-job match. Suppose individuals enter the lower level jobs randomly. There is a worker who matches badly with job A so that she moves to job B. Suppose she does not match well with job B. It is less intuitive why this worker is a better fit for the upper level job. Even if she matches well with job B, it is not clear why she would do better at the upper level job compared to someone who matches with job A at the first place. This thought-experiment suggests that without human capital accumulation, it is hard to provide an intuitive explanation for why lateral moves are positively correlated with individuals' career progression. In reality, lateral moves might improve worker-job match. However, this is likely not the mechanism that drives the results we find in the data.

In my model, lateral-move decisions are made based on firms' learning about individuals' ability types. Lateral moves certainly improve firms' learning. However, the existing learning models such as Ortega (2001) do not predict the positive correlation between lateral moves and promotions as well as wages, or the non-monotonic relationship between lateral moves and schooling. An extension of the learning model to multi-dimensional ability can possibly generate the results derived using the human-capital accumulation argument. The idea follows Rosen's (1982) set-up that individuals are endowed with a vector of latent abilities/skills. Each lower level job uses one of the abilities and the upper level job can use multiple abilities that have been acquired from the lower level jobs. All the abilities that are not used in a job remain latent and unutilized. This set-up may generate the predictions from my model. However, this set-up is in essence the same as the set-up used in my model. In addition, without general human capital accumulation, after the promotion, individuals' wage profile becomes flat, which is inconsistent with an upward-sloping wage-tenure profile.

In addition to the above alternative explanations, I also check other definitions of lateral moves. In particular, I exclude those lateral moves (without reporting level changes) with a unit level up since this type of movements can be considered as promotions. The results are consistent with what I find with the definition of lateral move used in the main part of the analysis. It is possible that an upper level organizational unit (within the same reporting level) exposes an individual to a wider set of tasks that are helpful for upper level jobs. The key point is that an individual can acquire different set of skills from her incumbent position.

6 Conclusion

Lateral moves play an important role in individuals' career progression since they facilitate human capital development. Yet, the studies in the career and wage dynamics inside firms focus almost exclusively on promotions and vertical movements.

In this paper I extend the theory by incorporating lateral moves in a job assignment model with learning and task-specific human capital accumulation. I also look at what happens when individuals differ by publicly observable education levels. This model generates a set of new testable predictions concerning the relationship between lateral moves and promotion probability, wage changes, as well as education.

I test the model's predictions using a large employer-employee linked panel in the United States. My empirical results support the theoretical model to a large extent. I find that, controlling for tenure and unobserved heterogeneity, laterally moved workers are more likely to be promoted in periods after the move compared to workers who stayed in the same position. I also find that laterally moved workers experience a larger wage growth compared to workers who stayed in the same position. In addition, the probability of a lateral move among those who are not promoted decreases with years of schooling.

There are a number of ways in which the analysis can be extended. Theoretically, I can incorporate turnover into the model by allowing the match between education types and job types to be imperfect. The idea is that lateral moves provide additional match opportunities inside firms so that individuals can find a better fit without changing employers. Consequently, I expect a negative relationship between lateral moves and turnover. Second, I can introduce asymmetry into the human capital accumulation process such that the task-tenure in one job on the lower level is more important than that in the other job. This asymmetry can be used to analyze different promotion probabilities in different jobs or functional areas (Clemens, 2012; Sasaki et al., 2012; Bezil et al., 2012). Empirically, this analysis can be extended to analyze the relationship between MBA training and lateral moves. Murphy and Zabojnik (2006) show that there are an increasing number of newly appointed CEOs with an MBA degree. If MBA training can substitute for task-skills (especially general management skills) acquired on the job, I expect a decrease in the number of lateral moves before promoting to the

CEO position over the years.

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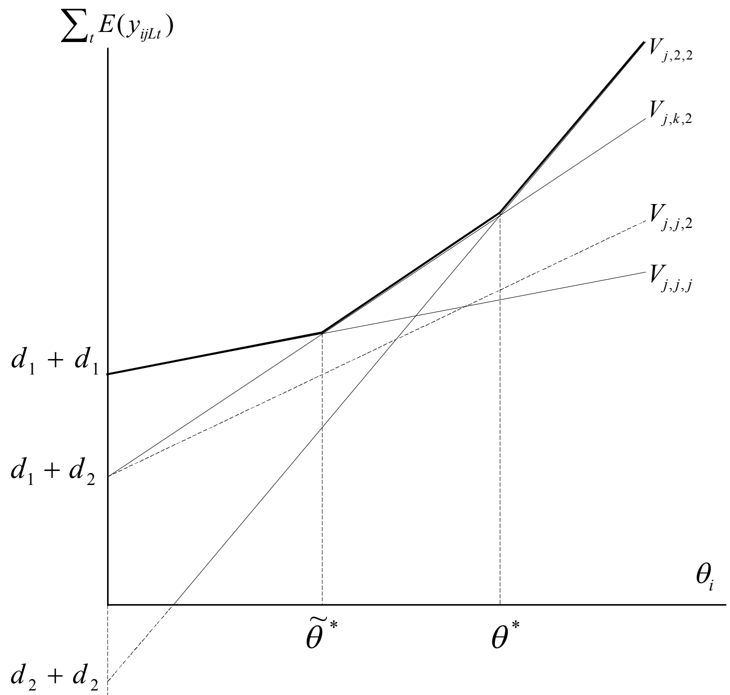

Figure 1: Expected total output from period 2's perspective for employees with education level S under different career paths in the lateral-move regime under full information

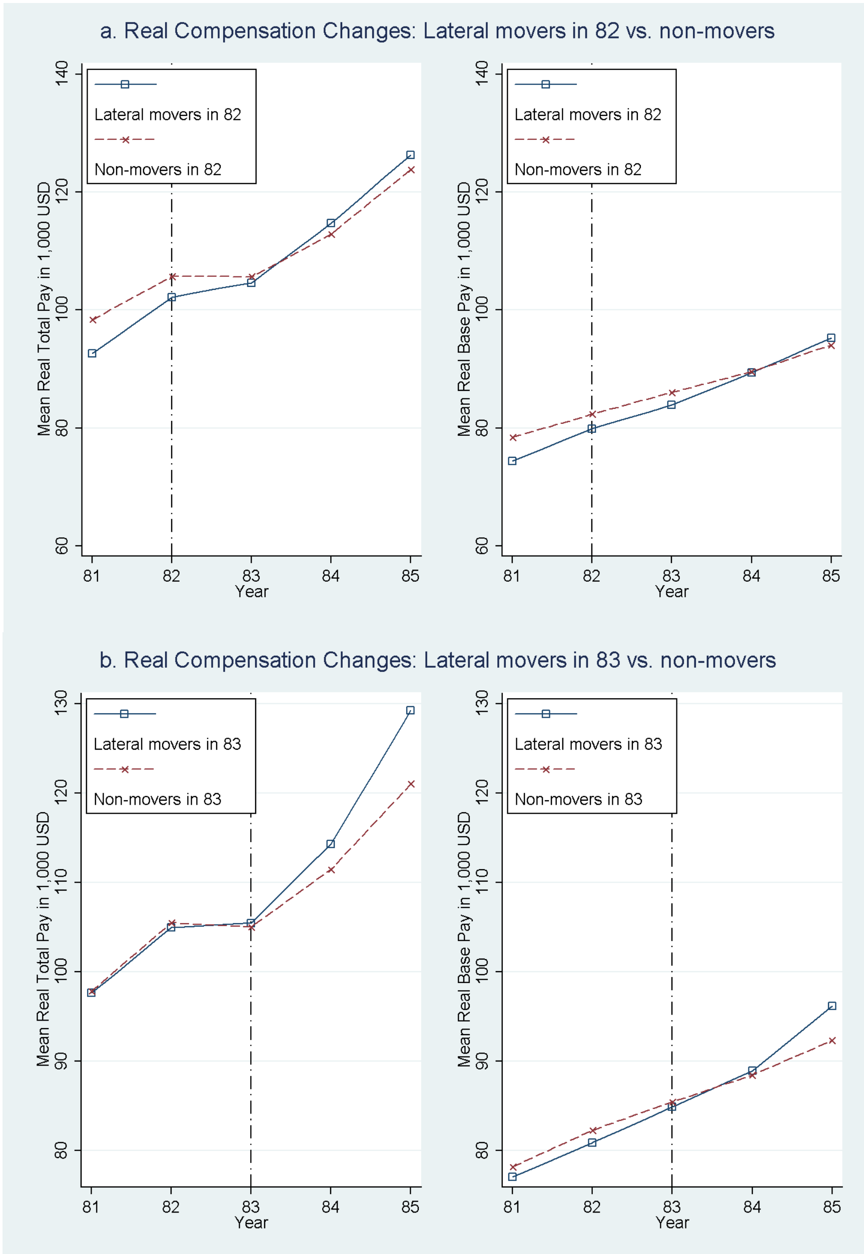

Figure 2: Real Compensation changes and lateral move status in 1982 and 1983

Table 1. Lateral Moves and Subsequent Promotions by Type of Moves

	Promotion in One Year			*Promotion in Two Years*		
	No	Yes	Total	No	Yes	Total
Lateral Move						
Mover	3,314	533	3,847	1,524	250	1,774
	86.2%	13.9%	100.0%	85.9%	14.1%	100.0%
Non-mover	25,681	3,675	29,356	12,471	1,752	14,223
	87.5%	12.5%	100.0%	87.7%	12.3%	100.0%
Lateral Move with Fn. Area Change						
Mover	699	94	793	338	31	369
	88.2%	11.9%	100.0%	91.6%	8.4%	100.0%
Non-mover	28,296	4,114	32,410	13,657	1,971	15,628
	87.3%	12.7%	100.0%	87.4%	12.6%	100.0%
Lateral Move with Unit-level Up						
Mover	1,051	151	1,202	415	87	502
	87.4%	12.6%	100.0%	82.7%	17.3%	100.0%
Non-mover	27,944	4,057	32,001	13,580	1,915	15,495
	87.3%	12.7%	100.0%	87.6%	12.4%	100.0%
Lateral Move with Unit-level Down						
Mover	888	185	1,073	398	81	479
	82.8%	17.2%	100.0%	83.1%	16.9%	100.0%
Non-mover	28,107	4,023	32,130	13,597	1,921	15,518
	87.5%	12.5%	100.0%	87.6%	12.4%	100.0%
Lateral Move with Unit-level Same						
Mover	1,375	197	1,572	711	82	793
	87.5%	12.5%	100.0%	89.7%	10.3%	100.0%
Non-mover	27,620	4,011	31,631	13,284	1,920	15,204
	87.3%	12.7%	100.0%	87.4%	12.6%	100.0%

[1] Sample restricted to executives who are not promoted in the current period

Table 2. Summary Statistics

A. Excecutive Characteristics in 1981

No. of Executives in 1981: 12,023

Level	Firm Tenure	Job Tenure	Age (median)	Education
all	**15.2 (year)**	**4.2 (year)**	**48.0 (year)**	**16.4 (year)**
1	22.7	6.8	57.0	17.0
2	16.0	4.3	51.0	17.0
3	14.6	4.1	49.0	16.8
4	14.6	4.1	47.0	16.4
5	15.1	4.0	47.0	16.2
6	16.0	4.1	6.5	15.8
7	18.2	4.5	47.0	15.2
8	17.1	4.3	6.5	15.0
9	20.0	3.8	49.0	15.2
10	16.3	3.0	39.0	13.1
11	22.8	4.0	50.0	14.0

B. Compensation Measures by Sampling Year: 1981-85

Year	1981	1982	1983	1984	1985
No. of Executives	12,023	15,749	18,578	15,611	12,190
Mean Total Pay (real)[a]	$103,962	$105,680	$104,333	$110,854	$120,743
Mean Base Pay (real)	$82,016	$82,982	$85,218	$88,314	$92,626
Mean Bonus (real)	$21,945	$22,698	$19,110	$22,540	$28,118

C. Changes in Firm Characteristics and Job Transition Status by Sampling Year

Year	1981-1982	1982-1983	1983-1984	1984-1985
pct. Change in sales	12.6%	3.9%	3.0%	18.5%
pct. Change in profits	15.2%	24.8%	-12.3%	27.6%
pct. Change in firmsizes	2.1%	-0.3%	0.9%	7.8%
Promotion	12.4%	13.4%	14.4%	13.8%
Lateral move	10.6%	12.2%	12.1%	23.5%
Demotion	2.4%	2.1%	2.3%	3.4%

[a] Real total pay, base pay and bonus pay are in 1982 US dollars

Table 3. Lateral Moves and Subsequent Promotions by Year

		Year of Promotion								
		1983			1984			1985		
Year of Lateral		No	Yes	Total	No	Yes	Total	No	Yes	Total
		one year after the move			*two years after the move*			*three years after the move*		
1982	Mover	1,078	153	1,231	657	132	789	411	81	492
		87.6%	12.4%	100.0%	83.3%	16.7%	100.0%	83.5%	16.5%	100.0%
	Non-mover	7,830	1147	8977	5050	906	5956	3286	462	3748
		87.2%	12.8%	100.0%	84.8%	15.2%	100.0%	87.7%	12.3%	100.0%
					one year after the move			*two years after the move*		
1983	Mover				1011	192	1203	547	108	655
					84.0%	16.0%	100.0%	83.5%	16.5%	100.0%
	Non-mover				6918	1238	8156	6785	978	7763
					84.8%	15.2%	100.0%	87.4%	12.6%	100.0%
								one year after the move		
1984	Mover							825	117	942
								87.6%	12.4%	100.0%
	Non-mover							5960	861	6821
								87.4%	12.6%	100.0%

[1] Sample restricted to executives who are not promoted in the current period

Table 4. Lateral Moves by Years and Reporting Level

Level (t)	Lateral Move (t) *t = 1982*		*t = 1983*		*t = 1984*	
	Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
1	4	2.0%	8	3.3%	5	2.0%
2	101	10.2%	123	10.0%	114	9.1%
3	262	9.7%	406	11.9%	360	10.2%
4	439	12.1%	706	14.8%	693	14.1%
5	308	12.1%	482	13.6%	498	14.3%
6	115	10.6%	194	12.5%	231	15.8%
7	28	7.3%	53	10.2%	77	15.7%
8	5	4.8%	10	6.1%	3	1.9%
9	0	0.0%	3	4.8%	0	0.0%
10	0	0.0%	1	4.6%	0	0.0%
11	0	0.0%	0	0.0%	0	0.0%
Total	1,262	10.8%	1,986	12.8%	1,981	12.7%

Table 5. Lateral Moves and Promotion Probability After the Moves: Linear Probility Model

Dependent Variable:	Lateral Moves in 82				Lateral Moves in 83			
Promotion (t)=1 if Yes	τ=82; t=83,84,85				*τ=83; t=84,85*			
	Full-sample		Restricted-sample		Full-sample		Restricted-sample	
Executives' Entry Year	*81,82,83*		*81*		*81,82,83*		*81,82*	
	(1) OLS	(2) RE	(3) RE	(4) RE	(5) OLS	(6) RE	(7) RE	(8) RE
Lateral (τ)	0.017**	0.014	0.007	-	0.013*	0.008	0.017	-
	(0.007)	(0.010)	(0.010)	-	(0.008)	(0.010)	(0.010)	-
Lateral move effect by year								
Lateral (τ)*Year 1	-	-	-	-0.041***	-	-	-	-0.004
	-	-	-	(0.011)	-	-	-	(0.011)
Lateral (τ)*Year 2	-	-	-	0.053***	-	-	-	0.064***
	-	-	-	(0.013)	-	-	-	(0.014)
Latearl (τ)*Year 3	-	-	-	0.092***	-	-	-	-
	-	-	-	(0.015)	-	-	-	-
Past in-sample observables								
Total pay in 10k (t-1)	0.004***	0.007***	0.004***	0.004***	0.005***	0.009***	0.008***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Levels (t-1)								
Level 2	-0.428***	-0.568***	-0.486***	-0.481***	-0.412***	-0.513***	-0.472***	-0.469***
	(0.013)	(0.017)	(0.017)	(0.017)	(0.016)	(0.020)	(0.020)	(0.020)
Level 3	-0.314***	-0.427***	-0.351***	-0.346***	-0.309***	-0.389***	-0.340***	-0.337***
	(0.011)	(0.013)	(0.012)	(0.012)	(0.013)	(0.016)	(0.014)	(0.014)
Level 4	-0.227***	-0.315***	-0.244***	-0.240***	-0.210***	-0.270***	-0.219***	-0.217***
	(0.010)	(0.012)	(0.011)	(0.011)	(0.012)	(0.014)	(0.012)	(0.012)
Level 5	-0.131***	-0.193***	-0.134***	-0.132***	-0.114***	-0.154***	-0.102***	-0.102***
	(0.010)	(0.012)	(0.011)	(0.011)	(0.012)	(0.014)	(0.012)	(0.012)
Level 6	-0.036***	-0.067***	*Ref.*	*Ref.*	-0.017	-0.034**	*Ref.*	*Ref.*
	(0.011)	(0.012)	-	-	(0.013)	(0.015)	-	-
Level 7+	*Ref.*	*Ref.*	-	-	*Ref.*	*Ref.*	-	-
Unemp. Rate (t-1)	0.014	0.017**	0.012	0.012	-0.004	-0.003	-0.002	-0.001
	(0.007)	(0.007)	(0.009)	(0.009)	(0.008)	(0.009)	(0.011)	(0.011)
Firm Characteristics (t-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Individual Initial Characteristics								
Education	0.007***	0.010***	0.008***	0.008***	0.008***	0.010***	0.009***	0.009***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)
Age	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Job Tenure	-0.002***	-0.002***	-0.002**	-0.002**	-0.003***	-0.004***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Employer Tenure	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.001*	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemp Rate at hiring	-0.015**	-0.015**	-0.012	-0.012	0.002	0.001	-0.001	-0.002
	(0.007)	(0.007)	(0.009)	(0.009)	(0.008)	(0.009)	(0.011)	(0.011)
Total pay in 10k (initial)	0.003***	0.003***	0.004***	0.005***	0.002***	0.000	0.001	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	0.271***	0.328***	0.326***	0.326***	0.294***	0.347***	0.358***	0.358***
	(0.026)	(0.035)	(0.042)	(0.042)	(0.032)	(0.041)	(0.047)	(0.047)
σ_u	-	0.258	0.249	0.248	-	0.278	0.267	0.266
σ_e	-	0.269	0.265	0.263	-	0.245	0.237	0.236
ρ	-	0.479	0.469	0.471	-	0.564	0.560	0.560
Observations	29,503	29,503	19,261	19,261	19,765	19,765	13,451	13,451
Number of firm-individual	-	14,097	9,586	9,586	-	12,144	8,644	8,644

Note - Standard errors are in parentheses.

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table 6. Lateral Moves and Promotion Probability After the Moves: Probit Model

Dependent Variable:	Lateral Move in 82			Lateral Moves in 83		
Promotion (t)=1 if Yes	τ=82;t=83,84,85;Exec's Entry Year : 81			τ=83;t=84,85; Exec.'s Entry Year : 81, 82		
	(1) Probit	(2) Probit-RE	(3) Probit-RE	(4) Probit	(5) Probit-RE	(6) Probit-RE
Lateral (τ)	0.009	0.009	-	0.016*	0.016*	-
	(0.007)	(0.007)	-	(0.009)	(0.009)	-
Lateral move effect by year						
Lateral (τ)*Year1	-	-	-0.016*	-	-	0.009
	-	-	(0.009)	-	-	(0.010)
Lateral (τ)*Year2	-	-	0.034***	-	-	0.031**
	-	-	(0.013)	-	-	(0.015)
Latearl (τ)*Year3	-	-	0.032*	-	-	-
	-	-	(0.017)	-	-	-
Past in-sample observables						
Total pay in 10k (t-1)	0.004***	0.004***	0.004***	0.007***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Levels (t-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Unemp. Rate (t-1)	0.009	0.009	0.009	-0.001	-0.002	-0.002
	(0.008)	(0.008)	(0.008)	(0.011)	(0.011)	(0.011)
Firm Characteristics (t-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Individual Initial Characteristics						
Education	0.005***	0.005***	0.005***	0.007***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Age	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Job Tenure	-0.002***	-0.002***	-0.002***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Employer Tenure	-0.000	-0.000	-0.000	-0.001**	-0.001**	-0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemp Rate at hiring	-0.010	-0.010	-0.010	-0.002	-0.002	-0.002
	(0.008)	(0.008)	(0.008)	(0.011)	(0.011)	(0.011)
Total pay in 10k (initial)	0.004***	0.004***	0.004***	0.003***	0.003***	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
σ_u	-	0.00165	0.00379	-	0.423	0.480
ρ	-	2.71e-06	1.44e-05	-	0.152	0.187
Number of Observations	19,261	19,261	19,261	13,451	13,451	13,451
Number of firm-individuals	-	9,586	9,586	-	8,644	8,644
Number of quardrature points	-	12	12	-	12	12
Log likelihood	-6596	-6596	-6589	-4603	-4602	-4601

Note - Standard errors are in parentheses. Average Marginal Effects are reported. Marginal effects for dummies are the differences in predicted probabilities when the dummy equals 1 and when it equals 0.

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table 7. Lateral Moves and Real Compensation Changes After the Moves (in 1982 dollar): Pooled OLS

	Lateral Moves in 82 τ=82; t=83,84,85			Lateral Moves in 83 τ=83; t=84,85		
Real Comp. Change from the Year of the Moves:	(1) Total(t)-Total(τ)	(2) Base(t)-Base(τ)	(3) Bonus(t)-Bonus(τ)	(4) Total(t)-Total(τ)	(5) Base(t)-Base(τ)	(6) Bonus(t)-Bonus(τ)
Lateral move effect by year						
Lateral (τ)*Year1	-2,502.459***	-2,056.176***	-446.284	335.122	-980.802***	1,315.923**
	(661.544)	(247.700)	(573.534)	(673.116)	(316.055)	(551.503)
Lateral (τ)*Year2	3,837.632***	1,730.142***	2,107.490***	6,021.859***	2,622.199***	3,399.660***
	(953.559)	(412.555)	(790.310)	(1,276.022)	(505.214)	(1,040.359)
Latearl (τ)*Year3	8,474.815***	4,626.428***	3,848.386***	-	-	-
	(1,703.592)	(741.077)	(1,272.435)	-	-	-
Levels (t)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Firm Characteristics (t)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Unemp. Rate (t)	-3,834.026**	-1,785.783*	-2,048.244***	-1,419.205	-4.683	-1,414.522*
	(1,656.140)	(1,073.113)	(737.909)	(1,456.334)	(841.954)	(831.854)
Individual Initial Characteristics						
Education	662.852***	310.176***	352.676***	692.459***	95.369	597.090***
	(153.075)	(70.628)	(122.883)	(150.562)	(63.788)	(123.954)
Age	-48.118	272.531**	-320.649	376.652	33.044	343.607
	(288.446)	(129.620)	(235.109)	(258.250)	(107.021)	(214.077)
Age^2	-1.442	-4.766***	3.325	-6.337**	-1.935	-4.402*
	(3.127)	(1.393)	(2.579)	(2.910)	(1.187)	(2.428)
Job tenure	-418.610***	-102.993***	-315.618***	-324.451***	-140.216***	-184.234***
	(72.640)	(33.129)	(61.845)	(73.171)	(30.100)	(59.821)
Emp. tenure	101.401***	5.264	96.137***	112.343***	35.909***	76.434**
	(35.777)	(15.328)	(29.058)	(35.067)	(12.934)	(29.764)
Total pay in 10k (initial)	-54.720	321.543***	-376.263***	735.116***	326.326***	408.790***
	(144.413)	(52.777)	(119.173)	(123.495)	(38.370)	(112.262)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-1,948.069	-6,153.693*	4,205.623	-15,398.538**	1,640.460	-17,038.995***
	(7,073.403)	(3,233.428)	(5,690.923)	(6,402.642)	(2,665.871)	(5,309.873)
Observations	19,416	19,416	19,416	13,512	13,512	13,512
R-squared	0.068	0.172	0.046	0.170	0.197	0.105

Note - Robust standard errors are in parentheses; clusted at firm-individual level

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table 8. Lateral Moves and Real Compensation Changes Upon Moving(in 1982 dollar): OLS

	Lateral Moves in 82: τ=82			Lateral Moves in 83 τ=83		
Real Compensation Differences	(1)	(2)	(3)	(4)	(5)	(6)
from the Year Before the Moves:	Total(τ)-Total(τ-1)	Base(τ)-Base(τ-1)	Bonus(τ)-Bonus(τ-1)	Total(τ)-Total(τ-1)	Base(τ)-Base(τ-1)	Bonus(τ)-Bonus(τ-1)
Lateral (τ)	2,506.603***	1,917.978***	588.625	1,931.442**	1,410.541***	520.902
	(730.801)	(291.309)	(642.485)	(787.682)	(390.864)	(588.377)
Levels (τ-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Firm Characteristics (t)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Unemp. Rate (t)	10,104.750	7,015.898	3,088.852	-9,866.078**	-5,476.332*	-4,389.746**
	(7,283.072)	(4,678.745)	(2,648.075)	(4,862.081)	(2,931.993)	(2,042.549)
Individual Initial Characteristics						
Education	348.916**	59.503	289.412**	349.788**	262.283***	87.505
	(148.657)	(57.301)	(127.628)	(142.882)	(57.422)	(116.379)
Age	-386.511	-169.746	-216.765	560.803	465.434**	95.369
	(272.987)	(124.591)	(251.450)	(427.062)	(201.372)	(275.457)
Age^2	4.444	1.064	3.380	-6.141	-5.634***	-0.507
	(3.009)	(1.335)	(2.793)	(4.420)	(2.060)	(2.939)
Job tenure	-216.701***	-99.290***	-117.411**	-436.089***	-85.885*	-350.203***
	(65.729)	(26.152)	(54.666)	(95.364)	(45.391)	(64.532)
Emp. tenure	-61.170*	25.145*	-86.315***	-20.454	-7.459	-12.994
	(36.245)	(13.386)	(31.398)	(34.141)	(15.033)	(27.815)
Total pay in 10k (initial)	88.624	257.855***	-169.230*	-586.908***	12.040	-598.948***
	(121.557)	(60.921)	(99.947)	(169.016)	(79.302)	(112.688)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	8,656.362	5,993.681**	2,662.680	-10,280.161	-11,015.194**	735.032
	(6,599.523)	(2,996.623)	(6,018.779)	(10,266.710)	(4,844.186)	(6,585.610)
Observations	8,640	8,640	8,640	9,169	9,169	9,169
R-squared	0.058	0.122	0.032	0.066	0.064	0.069

Note - Robust standard errors are in parentheses; clusted at firm-individual level

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table 9. Education and Lateral Moves

Dependent Variable:	(1)	(2)	
Lateral move (t)=1 if yes	LPM-RE	Probit-RE	Margins
Years of Education (t) =			
<16	*Ref.*	*Ref.*	*Ref.*
16	0.004	0.018	0.004
	(0.006)	(0.026)	(0.006)
17	0.007	0.032	0.008
	(0.008)	(0.034)	(0.008)
18	0.008	0.030	0.007
	(0.008)	(0.033)	(0.008)
19	-0.025**	-0.152***	-0.032***
	(0.011)	(0.049)	(0.010)
20	-0.022*	-0.109**	-0.024**
	(0.011)	(0.049)	(0.010)
21	-0.153	-4.859	-0.157***
	(0.152)	(367.046)	(0.006)
22	-0.138	-4.582	-0.157***
	(0.214)	(540.805)	(0.006)
Past in-sample observables			
Total pay in 10k (t-1)	0.006***	0.030***	0.007***
	(0.001)	(0.004)	(0.001)
Levels (τ-1)	*Yes*	*Yes*	*Yes*
Unemp. Rate (τ-1)	0.016***	0.074***	0.017***
	(0.005)	(0.021)	(0.005)
Firm Characteristics (τ-1)	*Yes*	*Yes*	*Yes*
Individual Initial Characteristics	*Yes*	*Yes*	*Yes*
Functional Areas	*Yes*	*Yes*	*Yes*
Constant	0.357***	-0.238***	-
	(0.017)	(0.074)	-
σ_u	0.116	0.411	-
σ_e	0.354	-	-
ρ	0.0972	0.145	-
Number of Observations	45,212	45,212	
Number of firm-individuals	18,139	18,139	
Number of quardrature points	-	12	
Log likelihood	-	-19883	

Note - Standard errors are in parentheses.

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Appendix A Robustness Checks

Table A.1. Lateral Moves and Promotion Probability: Different Measures of Expected Productivity

Dependent Variable:	Lateral Moves in 82			Lateral Moves in 83		
Promotion (t)=1 if Yes	τ=82;t=83,84,85; Exec.'s Entry Year : 81			τ=83;t=84,85; Exec..'s Entry Year : 81, 82		
	(1)	(2)	(3)	(4)	(5)	(6)
Exp. Productivity Measure:Pay in 10k	Real Base Pay	Real Pay Midgrade	Midgrade / Age	Real Base Pay	Real Pay Midgrade	Midgrade/ Age
Lateral move effect by year						
Lateral (τ)*Year1	-0.015*	-0.008	-0.009	0.008	0.004	0.003
	(0.009)	(0.011)	(0.011)	(0.010)	(0.012)	(0.011)
Lateral (τ)*Year2	0.031**	0.036**	0.035**	0.035**	0.039**	0.039**
	(0.013)	(0.015)	(0.015)	(0.015)	(0.018)	(0.018)
Latearl (τ)*Year3	0.029*	0.028	0.029	-	-	-
	(0.016)	(0.019)	(0.019)	-	-	-
Past in-sample observables						
Exp. Productivity (t-1)	0.010***	0.005***	0.275***	0.014***	0.012***	0.554***
	(0.002)	(0.002)	(0.099)	(0.002)	(0.002)	(0.114)
Levels (t-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Unemp. Rate (t-1)	0.008	0.009	0.009	-0.004	-0.009	-0.008
	(0.008)	(0.009)	(0.009)	(0.011)	(0.015)	(0.014)
Firm Char. (t-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Individual Initial Characteristics						
Education	0.004***	0.005***	0.004***	0.006***	0.006***	0.005***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	-0.002***	-0.001***	0.001**	-0.003***	-0.003***	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)
Job Tenure	-0.002**	-0.001*	-0.001*	-0.003***	-0.002*	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Employer Tenure	-0.001	-0.001**	-0.001*	-0.001**	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Unemp Rate at hiring	-0.009	-0.010	-0.010	-0.000	0.003	0.003
	(0.008)	(0.009)	(0.009)	(0.011)	(0.015)	(0.014)
Exp. Productivity	0.003	0.009***	0.483***	0.002	0.005**	0.314***
(initial)	(0.002)	(0.002)	(0.102)	(0.002)	(0.002)	(0.113)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
σ_u	0.00494	0.00372	0.00330	0.544	0.557	0.509
ρ	2.44e-05	1.38e-05	1.09e-05	0.228	0.237	0.206
Number of Observations	19,261	15,899	15,899	13,451	11,073	11,073
Number of firm-individuals	9,586	8,010	8,010	8,644	7,150	7,150
Number of quardrature points	12	12	12	12	12	12
Log likelihood	-6575	-5645	-5639	-4593	-3946	-3948

Note - Standard errors are in parentheses. Average Marginal Effects are reported. Marginal effects for dummies are the differences in predicted probabilities when the dummy equals 1 and when it equals 0.

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table A.2. Lateral Moves and Promotion Probability After the Moves: Probit Model with Clustered Standard Errors

Dependent Variable:	Lateral Move in 82				Lateral Moves in 83			
Promotion (t)=1 if Yes	τ=82;t=83,84,85;Exec's Entry Year : 81				τ=83;t=84,85; Exec.'s Entry Year : 81, 82			
	(1) cluster S.E. by ind.		(2) cluster S.E. by firm		(3) cluster S.E. by ind.		(4) cluster S.E. by firm	
	Coef.	Margins	Coef.	Margins	Coef.	Margins	Coef.	Margins
Lateral move effect by year								
Lateral (τ)*Year1	-0.264***	-0.034***	-0.264**	-0.034***	-0.061	-0.007	-0.061	-0.007
	(0.096)	(0.011)	(0.111)	(0.013)	(0.137)	(0.016)	(0.142)	(0.017)
Lateral (τ)*Year2	0.257***	0.043**	0.257**	0.043**	0.315**	0.046**	0.315*	0.046
	(0.092)	(0.017)	(0.114)	(0.021)	(0.143)	(0.023)	(0.189)	(0.034)
Latearl (τ)*Year3	0.412***	0.074***	0.412***	0.074**	-	-	-	-
	(0.113)	(0.023)	(0.142)	(0.030)	-	-	-	-
Past in-sample observables								
Total pay in 10k	0.034***	0.005***	0.034**	0.005**	0.063***	0.008***	0.063***	0.008***
(t-1)	(0.010)	(0.001)	(0.014)	(0.002)	(0.021)	(0.002)	(0.018)	(0.002)
Levels (t-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Unemp. Rate (t-1)	0.058	0.009	0.058	0.009	-0.003	-0.000	-0.003	-0.000
	(0.069)	(0.010)	(0.097)	(0.014)	(0.135)	(0.017)	(0.137)	(0.017)
Firm Char. (t-1)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Individual Initial Characteristics								
Education	0.046***	0.007***	0.046***	0.007***	0.066***	0.008***	0.066***	0.008***
	(0.014)	(0.002)	(0.015)	(0.002)	(0.024)	(0.003)	(0.023)	(0.003)
Age	-0.014***	-0.002***	-0.014***	-0.002***	-0.016**	-0.002**	-0.016***	-0.002***
	(0.004)	(0.001)	(0.004)	(0.001)	(0.006)	(0.001)	(0.006)	(0.001)
Job Tenure	-0.012*	-0.002*	-0.012	-0.002	-0.021*	-0.003*	-0.021	-0.003
	(0.007)	(0.001)	(0.008)	(0.001)	(0.012)	(0.002)	(0.013)	(0.002)
Employer Tenure	-0.001	-0.000	-0.001	-0.000	-0.006	-0.001	-0.006	-0.001
	(0.004)	(0.001)	(0.004)	(0.001)	(0.006)	(0.001)	(0.005)	(0.001)
Unemp Rate	-0.068	-0.010	-0.068	-0.010	-0.028	-0.003	-0.028	-0.003
at hiring	(0.068)	(0.010)	(0.097)	(0.014)	(0.136)	(0.017)	(0.139)	(0.017)
Total pay in 10k	0.029***	0.004***	0.029*	0.004*	0.019	0.002	0.019	0.002
(initial)	(0.011)	(0.002)	(0.016)	(0.002)	(0.020)	(0.003)	(0.019)	(0.002)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-0.528*		-0.528*		-0.640		-0.293	
	(0.311)		(0.317)		(0.535)		(1.451)	
σ_u	0.894		0.894		1.138		1.138	
ρ	0.444		0.444		0.564		0.564	
Number of Observations	19,261		19,261		13,451		13,451	
Number of firm-individual:	4,666		4,666		4,669		4,669	
Number of quardrature poi	12		12		12		12	
Log likelihood	-6254		-6254		-4340		-4601	

Note - Robust standard errors are calculated using Bootstrap. Average Marginal Effects are reported. Marginal effects for dummies are the differences in predicted probabilities when the dummy equals 1 and when it equals 0.

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table A.3. Lateral Moves and Real Compensation Changes After the Moves (in 1982 dollar): RE Model with Clustered S.E. by Firm

	Lateral Moves in 82			Lateral Moves in 83		
	τ=82; t=83,84,85			τ=83; t=84,85		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Var:	Total(t)-Total(τ)	Base(t)-Base(τ)	Bonus(t)-Bonus(τ)	Total(t)-Total(τ)	Base(t)-Base(τ)	Bonus(t)-Bonus(τ)
Lateral move effect by year						
Lateral (τ)*Year1	-2,202.934**	-1,866.735***	-320.140	492.100	-836.602**	1,359.234*
	(996.547)	(387.435)	(865.267)	(812.230)	(376.499)	(707.299)
Lateral (τ)*Year2	4,785.421***	1,989.888***	2,769.327**	6,198.885***	2,796.888***	3,434.932***
	(1,380.115)	(554.903)	(1,212.391)	(1,327.990)	(583.884)	(1,228.157)
Latearl (τ)*Year3	10,530.765***	5,591.137***	5,006.637***	-	-	-
	(2,080.090)	(910.563)	(1,674.502)	-	-	-
Levels (t)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Firm Char. (t)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Unemp. Rate (t)	-3,306.002*	-1,208.606	-1,921.926**	-1,388.081	279.164	-1,517.386
	(1,978.257)	(1,131.027)	(906.875)	(1,845.631)	(1,001.465)	(1,045.782)
Individual Initial Characteristics						
Education	678.526***	321.536***	363.996**	679.296***	84.290	592.853***
	(203.365)	(88.985)	(170.465)	(183.627)	(79.957)	(167.826)
Age	184.906	395.443**	-204.658	387.254	67.554	326.922
	(360.993)	(161.653)	(278.874)	(292.378)	(138.755)	(223.257)
Age2	-3.977	-6.046***	2.017	-6.404*	-2.325	-4.166
	(3.775)	(1.694)	(2.991)	(3.323)	(1.519)	(2.652)
Job tenure	-391.863***	-86.170	-303.887***	-296.599***	-129.549***	-165.858**
	(101.135)	(53.875)	(82.098)	(83.690)	(37.007)	(68.460)
Emp. tenure	115.003**	19.283	98.495**	109.303*	38.480**	71.874
	(57.644)	(24.866)	(48.087)	(57.160)	(17.779)	(50.405)
Total pay in 10k	-206.397	204.052*	-429.507*	694.777***	320.929***	373.940**
(initial)	(284.662)	(120.577)	(225.675)	(185.244)	(56.356)	(177.605)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-8,032.538	-9,736.175**	1,360.725	-15,504.109*	807.118	-16,507.244**
	(8,645.608)	(4,322.859)	(6,315.330)	(7,949.427)	(3,692.365)	(6,497.921)
σ_u	19289	9781	14377	14452	6982	11921
σ_e	20113	7782	16667	16862	6108	14766
ρ	0.479	0.612	0.427	0.423	0.566	0.395
Observations	19,416	19,416	19,416	13,512	13,512	13,512
Number of Clusters	9,586	9,586	9,586	8,644	8,644	8,644

Note - Robust tandard errors are in parentheses; clustered by firm

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.

Table A.4. Lateral Moves and Real Compensation Changes After the Moves (in 1982 dollar): RE Model with Clustered S.E. by Ind.

	Lateral Moves in 82 τ=82; t=83,84,85			Lateral Moves in 83 τ=83; t=84,85		
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Var:	Total(t)-Total(τ)	Base(t)-Base(τ)	Bonus(t)-Bonus(τ)	Total(t)-Total(τ)	Base(t)-Base(τ)	Bonus(t)-Bonus(τ)
Lateral move effect by year						
Lateral (τ)*Year1	-2,202.934***	-1,866.735***	-320.140	492.100	-836.602***	1,359.234**
	(653.833)	(250.255)	(567.091)	(664.173)	(314.721)	(544.472)
Lateral (τ)*Year2	4,785.421***	1,989.888***	2,769.327***	6,198.885***	2,796.888***	3,434.932***
	(897.596)	(400.848)	(743.146)	(1,185.708)	(458.188)	(977.116)
Latearl (τ)*Year3	10,530.765***	5,591.137***	5,006.637***	-	-	-
	(1,633.164)	(680.069)	(1,221.969)	-	-	-
Levels (t)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Firm Char. (t)	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Δ Unemp. Rate (t)	-3,306.002**	-1,208.606	-1,921.926***	-1,388.081	279.164	-1,517.386*
	(1,432.897)	(841.906)	(660.902)	(1,470.216)	(838.303)	(832.575)
Individual Initial Characteristics						
Education	678.526***	321.536***	363.996***	679.296***	84.290	592.853***
	(154.360)	(74.673)	(118.397)	(148.772)	(66.445)	(121.730)
Age	184.906	395.443***	-204.658	387.254	67.554	326.922
	(290.528)	(137.959)	(229.580)	(255.261)	(111.480)	(208.287)
Age^2	-3.977	-6.046***	2.017	-6.404**	-2.325*	-4.166*
	(3.143)	(1.480)	(2.519)	(2.853)	(1.243)	(2.341)
Job tenure	-391.863***	-86.170***	-303.887***	-296.599***	-129.549***	-165.858***
	(70.658)	(33.140)	(58.306)	(73.287)	(32.232)	(58.284)
Emp. tenure	115.003***	19.283	98.495***	109.303***	38.480***	71.874**
	(35.536)	(15.923)	(27.996)	(33.733)	(12.977)	(28.632)
Total pay in 10k	-206.397	204.052***	-429.507***	694.777***	320.929***	373.940***
(initial)	(134.910)	(58.275)	(104.679)	(121.954)	(40.448)	(109.166)
Functional Areas	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Constant	-8,032.538	-9,736.175***	1,360.725	-15,504.109**	807.118	-16,507.244***
	(7,021.864)	(3,422.597)	(5,441.539)	(6,357.151)	(2,822.209)	(5,199.894)
σ_u	19289	9781	14377	14452	6982	11921
σ_e	20113	7782	16667	16862	6108	14766
ρ	0.479	0.612	0.427	0.423	0.566	0.395
Observations	19,416	19,416	19,416	13,512	13,512	13,512
Number of Clusters	9,586	9,586	9,586	8,644	8,644	8,644

Note - Robust tandard errors are in parentheses; clustered by firm-individual

[1] Sample restricted to executives who are not promoted in the current period.

* Statistically significant at the 10% level.

** Statistically significant at the 5% level.

*** Statistically significant at the 1% level.