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**OCCUPATIONAL HUMAN CAPITAL AND
CAREER DYNAMICS**

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Occupational Human Capital and Career Dynamics

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Abstract

In this paper we revisit the concept of human capital accumulated on the job to allow functionally-specific and managerial human capital to coexist in a job or person. We also consider heterogeneity in the experiences accumulated within a functional (i.e. occupational) specialty, versus measuring experience simply as time spent working. The analysis uses a unique data set with longitudinal information on a professional services firm's former employees. The results support coexistence of managerial and occupation-specific human capital. They also support a more detailed examination of the components of on-the-job experience, aside from tallies of the number of years worked.

Introduction

Labor economists' traditional approach to analyzing career dynamics focuses on life cycle earnings, employment dynamics, and the human capital earnings function. A generation of researchers has focused on understanding how human capital is accumulated and valued in the labor market, starting with the seminal works of Mincer (1958) and Becker (1993). The two main components of the human capital earnings model, formal schooling and accumulated labor market experience, have well-established empirical relationships that have been replicated in countless studies. However, formal schooling has garnered a disproportionate amount of attention from researchers over the years. Accumulated labor market experience has often been overlooked for two main reasons.

First, the heterogeneous components of formal schooling can be easily measured (e.g. types of school attended, course subjects and majors, types of degrees attained), and these components often map directly onto specific skills and occupations that are differentiated in terms of both price and quantity in the labor market. Work experience, on the other hand, has most often had to be imputed from an individual's age and education. Even with the more recent availability of longitudinal datasets, labor market experience still is measured almost exclusively as amount of time spent working with minimal differentiation of where the work occurs (e.g. type of industry).

Second, there are ample levers available to impact both the availability and price of formal schooling making it much more interesting for public policy-oriented researchers. The policy community may see less opportunity to help people by influencing the amount and type of accumulated labor market experience they have. Yet without an extensive body of research and a sufficient understanding of the role that specific types of experience play in the human capital

earnings function, we cannot know for sure whether and how there should be a role for policy in influencing accumulation of different types of labor market experience.

Human capital theory has been built on empirical foundations that first established the basic facts about how wages vary over the life cycle and with different amounts of formal schooling and general on-the-job experience. But actual labor market experience is a complicated thing, comprised of so many components that measurement of all of them is essentially impossible. As a result researchers have tended to use an overly narrow empirical definition of labor market experience as time spent working and tended to treat it as a theoretical “black-box” that ignores every aspect of work experience except its duration. This undoubtedly plays a key role in undermining a more central role for it in human capital earnings models. A more detailed analysis of on-the-job experience should produce insights that could lead to new and better theories about human capital accumulation and careers. The purpose of this paper is to develop new frameworks for identifying the components of labor market experience that matter for human capital accumulation and career advancement, and testing those frameworks through data collection and analysis approaches that deviate from the well-worn paths of previous research.

There are a handful of studies that have provided some evidence of a more nuanced relationship between labor market experience and earnings. For example, Shaw (1984) found that occupational investment measures better explain wage differentials than general experience measures. Neal (1995) and Parent (2000) showed that much or all of the returns to tenure (e.g. higher wages and longer employment durations) can be explained by industry-specific experience. Kambourov and Manovskii (2005), in contrast, found that occupation-specific experience better explains wage differences among workers than either firm- or industry-specific

experience, calling into question Neal (1995) and Parent's (2000) findings regarding the returns to industry-specific experiences.¹ Using measures defined by worker flows (Shaw, 1987) and by the similarity of a set of job tasks (Gathmann and Schönberg, 2006), researchers have also examined the extent to which occupational switching and the differences in earnings that accompany that change are related to the “distance” between occupations. Despite these advances, however, there is still much that we do not know about how the labor market values specific experiences accumulated on the job.

This paper provides new insights on human capital accumulated through on-the-job experience along three dimensions. First, we focus on a single set of occupational skills in an attempt to better understand how career dynamics impact the accumulation of human capital, and how that human capital is rewarded in the labor market. Second, unlike previous research, we do not treat managerial skills as distinct from other types of occupational skills, but instead allow for the fact that jobs may require both general managerial skills and task- or function-specific skills. Our motivation for taking this approach originates in part from the common perception that career advancement within many occupations often involves taking on managerial responsibilities. Yet in existing data sets (which use the federal occupational classification system), jobs are treated as either managerial or non-managerial, where the former is defined independent of any skills that might be functionally-related. Third, we examine the relationship between earnings and different types of experience accumulated within an occupation. Given the wide variety of on-the-job experiences in existence, it is likely that some jobs build skills that

¹ As shown by Helwege (1992) and acknowledged by Neal (1995), the concentration of relatively small numbers of occupations within industries means that there can be identification problems when looking only at industry-specific experience measures. Kambourov and Manovskii's (2005) main innovation was to include both occupation- and industry-specific experiences in the same earnings model.

have greater marketplace value than the skills built by other experiences. We test this by comparing the earnings of people with different amounts of specific types of on-the-job experience.

To address these issues, we first sketch a stylized model to generate predictions about career dynamics in a labor market with jobs that can be functionally-specific, managerial, or both. We then analyze a new data set that is well suited for the task, drawn from a sample of current and former employees of a professional services firm. The data include information on whether the former employees continue to work in organizations and occupations that are related to the functional specialty of the firm, and on the different components of on-the-job experience accumulated while working at the firm. This enables us to examine the interplay between career dynamics and human capital accumulation. To do so we draw on the theoretical perspectives of the human capital, careers and internal labor markets literatures.

Career dynamics in an occupational labor market

A main problem with the literature on human capital accumulation and career dynamics is that the standard classification system treats managerial jobs as a distinct occupation. This runs counter to common perceptions that management jobs within organizations are the higher-level positions in career ladders. Moving from an occupation classified on the basis of skill (e.g. engineer; machine operator) to one classified based on managerial responsibilities (e.g. manager of engineers; manager of machine operators) thus is treated as an occupation change in traditional longitudinal data sets, but as career progression by the people actually doing the work. This seems curious at best, given the likelihood that effective supervision of a group of workers in functionally-specific roles requires a real understanding of those roles, i.e. requires functionally-specific knowledge in addition to general managerial skills. Thus knowing whether

managerial jobs have functionally-specific requirements would appear to be important for understanding how those jobs are part of career paths. Are managerial jobs with functionally-specific requirements the natural stepping stone for workers leaving nonmanagerial jobs with the same functionally-specific requirements? How common are shifts among nonmanagerial and managerial jobs with different functional requirements and what are the labor market returns?

Whether movements into managerial positions truly represent occupation changes is an interesting question. The common perception is that that first line supervisors typically are responsible for managing people performing tasks similar to the job they last held; the manager who supervises engineers' day-to-day work most likely was promoted from the ranks of those engineers. Top performers in groups of employees doing similar tasks are prime candidates to manage those groups because they have deep functional knowledge of what it takes to get the job done. Yet successful management requires more than just functional knowledge, and it appears that the importance of general managerial skills may grow as workers ascend to higher level management positions (Kotter, 1982; Charan, Noel and Drotter, 2000). General managers and executives have to focus on broader, more cross-functional issues than the first line supervisor.

The challenge of identifying managerial responsibilities in traditional data sets is clear in Table 1, which reports information on supervisory responsibilities by occupation using data from the National Compensation Survey.² On the one hand, there are three categories of occupations that primarily define managerial jobs: public administration, executives, and administrative supervisors. All of these have first-level supervisory responsibilities, with one-third of executives responsible for managing managers (i.e. managing people who themselves have

² For a detailed description of the National Compensation Survey, see Pierce (1999).

supervisory responsibilities). If we were to examine these three categories only it might appear that managers are well-defined in the traditional occupation classification.

Yet an examination of all the other supposedly non-managerial occupations leads to a very different conclusion. First, a significant portion (ten percent or more) of jobs in many of those occupations have supervisory responsibilities, including engineers, math/computer scientists, natural scientists, health diagnosticians and health treatment, lawyers/judges, protective services, and construction. If some of these jobs have managerial responsibilities, how do they differ from those classified as “executives” or “administrative supervisors”? The most likely answer is that the division is somewhat arbitrary and that many of those classified as being in a non-management occupation but with first- or higher-level supervisory duties could just as easily be classified as executives or administrative supervisors. For example, senior executives at information technology, biotech, and environmental companies might be classified, respectively, as math/computer scientists, health diagnosticians or health treatment (if holding a medical degree and using it on the job), and natural scientists.

Second, many other occupations appear to have no jobs with supervisory responsibilities, including service sales, retail sales, computer operators, secretaries, records keeping, mail distribution, health services, machine operators, assemblers, construction laborers, and handlers. Given the prevalence of first-line supervisor jobs that require functionally-specific knowledge, however, it is hard to believe that all such supervisors in these jobs should be classified as generic “executives” or “administrative supervisors” while their counterparts in the occupations above (engineers, math/computer scientists, etc.) sometimes or mostly are classified as still working in the occupation but with supervisory responsibilities. Why should a Chief Financial

Officer with an accounting background be classified as “executive” while a Managing Partner in a large law firm is classified as “lawyer/judge” with high-level supervisory responsibilities?

Inconsistent classification of managerial responsibilities creates problems for analyzing labor markets and careers. In jobs and career paths where supervisory responsibilities go unmeasured, significant amounts of managerial human capital may be built without being revealed in early-career jobs. That means that in occupations where the arbitrary decision is made to code them by their professional occupation even though they have managerial responsibilities, true managerial transitions would be measured with error. In such cases, the “true” managerial transition would have occurred earlier in the person’s career for a subset of those observed entering jobs that are classified as managerial. In the opposite case, other career paths that use traditional occupation classifications might register a managerial transition at an early stage even though the person continues to use functionally specific skills. In this case, the managerial transition is not measured with error, but the transition away from the functionally-specific occupation is. Thus, in both cases, misclassification of some “partial” managerial jobs as entirely nonmanagerial and other “partial” managerial jobs as entirely managerial introduces errors in attribution that vary systematically across the traditional occupation classifications, as can be seen in Table 1.³

Our objective in this paper is not to build a new theory of occupational human capital; we believe that first we need a better understanding of what occupational human capital is from an empirical perspective. However, to illustrate the points we want to explore empirically, it is

³ Unfortunately, the supervisory measurements used to create Table 1 are not available in traditional data sets, so it is not possible to use them to isolate the “true” non-supervisory jobs from the supervisory jobs in the first group of occupations. Moreover, the National Compensation Survey contains none of the other information that is required to address career dynamic issues; hence the need for a different data set such as the one used here.

useful to sketch some ideas that will guide the empirical work, and which ultimately may be used as building blocks for new theory development.

Suppose there are two skills – function-specific ($S_{i,j} \geq 0$) and general managerial ($G_j \geq 0$) – that denote the range of human capital required for a job, j , where i denotes the occupation:

$$HC_j = f(S_{i,j}, G_j)$$

For the sake of simplicity, we ignore general nonmanagerial skills that are needed in multiple occupations (e.g. basic skills such as reading, math, communication, computer literacy). Thus function-specific skills in this context are unique within each occupation. Managerial skills, in contrast, span occupations. This yields three types of jobs: (a) nonmanagerial jobs, which require only function-specific skills ($S_{i,j} > 0$) and no general managerial skills ($G_j = 0$), (b) managerial jobs ($G_j > 0$) that require function-specific skills ($S_{i,j} > 0$), and (c) managerial jobs that require no function-specific skills ($G_j > 0$; $S_{i,j} = 0$).

Next we map these categories onto occupational career paths, which may exist within or across firms. Entry level jobs in an occupational career path are defined as those requiring no managerial skills and relatively low amounts of function-specific skills. Higher level jobs within the occupational career require greater amounts of either function-specific skills or greater amounts of managerial skills, but not necessarily both. People make the transition from lower-level to higher-level jobs by accumulating human capital while working on the job. On-the-job learning in the entry and lower-level nonmanagerial jobs provides the foundation of skills needed for first-level managerial jobs. Thus managerial jobs can be filled only after an initial period of working in jobs whose entry requirements include only function-specific experience.

The final two assumptions we make about jobs are that (a) function-specific skills are accumulated fastest in nonmanagerial jobs, and (b) managerial skills have no value in

nonmanagerial jobs (even though some managerial skills are learned while working in nonmanagerial jobs).⁴ These two assumptions imply that advancement along a nonmanagerial career path is best accomplished by working only in nonmanagerial jobs. Advancement in a managerial career path, in contrast, requires at least an initial period accumulating function-specific skills, and may require additional function-specific skills that are accumulated while working in managerial jobs that have a function-specific skills component.

When analyzing occupational career dynamics there are two separate but related issues to consider: (a) the quantity and type of human capital accumulated, and (b) the financial returns to that human capital. First, we assume that people make human capital accumulation decisions based on expectations of the wages paid for that human capital, but that market wages are determined by aggregate supply and demand conditions that cannot be forecast with complete certainty. Second, we assume that people search for jobs that offer the best match between their accumulated human capital and the job requirements, but that matching is not perfect. In such a setting, the wages that people receive reflect the best economic return they can find in the labor market for their human capital, but they may not be able to use some of their accumulated human capital. For example, depending on supply and demand conditions, people with large amounts of accumulated function-specific human capital may maximize their earnings by working in general managerial jobs that make little to no use of their function-specific skills. Because of these dynamics, we make our clearest predictions regarding patterns of human capital accumulation,

⁴ We implicitly assume that there is a limit to the rate at which learning happens on the job. This could be modeled formally by making the total amount of human capital accumulated on-the-job proportionate to time spent on the job and the same across all jobs. Assuming the same number of hours worked in a year, nonmanagerial jobs would then provide greater amounts of occupation-specific human capital than managerial jobs. In the latter, the learning time would be partially to fully spent on managerial skills, thereby “crowding out” learning of occupation-specific skills. Neal (1998) presents such a model to explain how workers decide to allocate their time between general skills training and specific skills training.

and less clear predictions about how compensation differences across people depend on differences in their accumulated human capital.

Taking all of the above into consideration, we make the following predictions. First, because managerial skills have no value in nonmanagerial jobs and some managerial jobs require function-specific skills, it should be more common that nonmanagerial jobs precede managerial jobs in career paths:

Prediction #1.A: Transitions from nonmanagement into management jobs should be much more likely than the reverse.

In a simple model with full information about jobs and workers maximizing only earnings, it is virtually impossible to conclude that someone would make the transition from a managerial to nonmanagerial position if doing so involved a cut in pay. However, if (a) higher-paying jobs carry more responsibility and stress (are more demanding), (b) workers' learn about their preference for such jobs partly by collecting data from workers already in such jobs, and (c) workers can predict their own match quality in such jobs only with error, then most managerial transitions will be "correct" in the sense that the workers' ex post realization of the match quality matches their a priori forecasts. Others, however, constituting a minority of managerial jobs, will learn only after taking on a managerial role that they should have remained among the ranks of nonmanagers. It is this latter group that subsequently makes the transition back to nonmanagerial roles voluntarily. Other individuals may be demoted from managerial positions to functional nonmanagerial roles. Because there is no economic return to applying managerial skills in nonmanagerial jobs, people who leave managerial jobs may face a more limited set of job alternatives:

Prediction #1.B: All else equal, people making management-to-nonmanagement transitions may fare worse financially than those making the opposite transition.

In tracking career changes, Neal (1999) found that, for young men, changes are more common at younger ages and lower levels of accumulated on-the-job experience. Unfortunately, Neal (1999) defines career change as consisting of both an industry change and an occupation change, which is too limiting for our purposes. Yet we can apply Neal's (1999) reasoning in this context to conclude that occupation changes should be less common for those with greater amounts of occupation-specific experience:

Prediction #2.A: People with greater amounts of occupational experience will be less likely to leave the occupation (to work in an unrelated occupation) than those who have lower amounts of occupational experience.

In addition to the job change prediction, there are related wage implications, specifically:

Prediction #2.B: All else equal, those who go into unrelated occupations with greater amounts of experience from the previous occupation may fare worse financially than those who entered the unrelated occupations with lower amounts of experience from the previous occupation.

In other words, among people who leave one functionally-defined occupation to work in another, those who spent more time working in the previous occupation may suffer greater negative impacts on their compensation, holding constant the total amount of general work experience.

Next are the implications of applying functionally-specific human capital in a managerial career. If managerial jobs differ in terms of functionally-specific

requirements, then people should sort into managerial jobs on the basis of their accumulated functionally-specific capital and the jobs' requirements.

Prediction #3.A: Among managers, those with more functionally-specific human capital will be more likely to have jobs requiring functionally-specific skills.

The wage implications of such sorting are less clear. One possibility is that:

Prediction #3.B: The economic return to a specific set of functional human capital may be higher in managerial jobs that require that set of functionally-specific skills than in managerial jobs that do not require those functionally-specific skills.

Alternatively, this prediction may fail to hold if managerial jobs requiring less functionally-specific skills are compensated equally or greater on the basis of their general managerial skills.

To this point we have considered only economic models of human capital accumulation and remuneration. However, the focus on managerial jobs offers the opportunity to consider evidence from the behavioral literature on managerial careers. If we apply Kotter's (1982) and Charan, Noel and Drotter's (2000) evidence on general manager responsibilities to differentiate among managerial jobs, then it is reasonable to assume that higher-level managerial jobs should require more general management skills and less functionally-specific skills. Consequently, the return to having functionally-specific skills should diminish at higher level managerial jobs:

Prediction #4: The economic return to having more functionally-specific human capital will be higher in lower-level managerial jobs than in higher-level managerial jobs.

Further, research on managerial development has shown that certain on-the-job experiences are developmental for managers (McCauley, Ruderman, Morrow, & Ohlott, 1995). Examples of self-reported developmental experiences that have been identified in groups of managers from cross-industry samples include dealing with problems inherited from others in a new role, working in a job that is very taxing in terms of time and energy, having a difficult boss, dealing with adverse business conditions, etc. The behavioral and the economic perspectives can be combined to suggest that if certain work experiences are developmental in the sense that they build marketable human capital for managers, then variation in the accumulation of such experiences should explain differences in career outcomes, including compensation. Although the behavioral literature has focused almost exclusively on managerial careers, the types of experience cited are generic enough that they likely apply to both managerial and nonmanagerial positions more generally. Thus we test:

Prediction #5.A: Differences in specific types of on-the-job experience should explain variation in compensation among people within a role or occupation.

It is worth noting that this last prediction is entirely consistent with economic models of human capital accumulation. Yet the economics literature has virtually ignored specific aspects of on-the-job experience in the human capital earnings model (most likely due to a lack of data). In drawing from the behavioral literature on developmental experiences, we hope to provide some insights that can help with future data collection and analyses of the returns to on-the-job experience.

Finally, if certain on-the-job experiences are functionally-specific, then they should explain variation in compensation among people holding similar jobs, but not

among people holding dissimilar jobs. For example, interacting with key customers in one industry may raise future productivity much more so for people whose future career paths include working with firms that sell to such customers; those who leave to work in other industries or occupations may also increase their productivity, but we expect that such an increase would be less than for those remaining in the functionally-specific jobs in which the experiences were accumulated.

Prediction #5.B: Differences in experiences accumulated in one functional specialty should better explain compensation variation among people in similar functionally-specific jobs, compared to people in dissimilar jobs.

Data

While some of these predictions can be tested with existing longitudinal data sets, we opted for using a new data set gathered specifically to measure both managerial roles and functionally-specific skills. This allows an examination of managerial roles that are part of a functionally-specific career path and managerial roles that are part of a more general managerial career path. These data provide an advantage over previous research that relies on traditional longitudinal data sets that artificially classify all supervisory jobs as a separate occupation from non-supervisory jobs. Moreover, the data contain details on different types of on-the-job experiences, which we use to test the last set of predictions.

The data were gathered in 2003-2004 to examine the career dynamics of workers at a large professional services firm. The study collected data on both current and former employees using interviews, surveys and matched archival data where available. Three offices representing markets in the northeastern, southern and western United States were selected to be representative of the regions and lines of business in which the firm operates. In the case of

former employees, they were included in the sample if their last assignment was at one of the three offices included in the study. For the former employee sample, a total of 9,238 mail and web-based surveys were administered and 1,785 were returned, for a response rate of 19.3 percent. Of those, 212 surveys were excluded from the analysis because the responses came from people who worked in a line of business that had been divested by the firm years before the study and a small number were excluded that left the firm after achieving partner status. We suspect that the career dynamics of these former employees might differ markedly from the rest of the sample. This left a final sample size of 1,573 former employees.

The survey collected information on the former employee's current or most recent job, and on the first job held after leaving the firm. Because our concern in this paper is with accumulated on-the-job experience and human capital, for most of the analysis we focus on the current or most recent job. When running earnings regressions using the compensation from the current or most recent job, we limit the sample to those who indicated that the year that they last worked in that job was 1995 or later; this drops only 30 observations with valid compensation values, and minimizes the impact of including observations for which recall bias may be more of an issue. For those earnings regressions, log real values were constructed using 2004 as the reference year. Allowing for these sample restrictions and further excluding observations with missing values for the controls used in the regressions, the base sample used for the earnings regressions had 1,186 observations.

In order to measure functionally-specific job aspects, the respondents were asked whether their jobs were in the same fields as the professional services firm. They also were asked to report job title and total compensation for those jobs, as well as for their first and last jobs at the professional services firm. We coded a job as managerial if the title was manager, director, Vice

President, or higher (CEO, COO, etc.). For some of the analyses, a distinction between managers is made based on the size of the company for which they work, using a binary indicator of \$500 million in annual revenue or assets under management. The firm size indicator was determined based on interviews with company representatives and former employees and ensures that measure of “large” firms reflects companies roughly as large as those included in the *Fortune 500*. The interviewees indicated that jobs in such large companies are both more complex and carry greater prestige value, compared to jobs in smaller companies. The indicator thus is designed to separate those in simpler managerial roles (director at a small company) from those in more complex managerial roles (director or VP at a large company), under the assumption that the latter may be more difficult jobs and require greater general managerial skills.

There always is a concern about response bias with self-reported data. We had no direct way of testing for response bias among the former employees, but we could do so for the current employees, for whom we had self-reported and archival data on current compensation. We found a very close correspondence between the survey and archival values for current employees’ compensation. While this does not guarantee the same degree of accuracy for former employees’ self-reported compensation, it does suggest that people who worked at this firm and responded to the survey did not systematically bias their responses about their compensation. Given that compensation data is among the most sensitive that was collected, we have good reason to believe that the responses to the other less sensitive survey items (such as job title, dates worked, the fields of the former employees’ subsequent jobs and firms, etc.) are relatively accurate.

We developed a profile of the typical career path of workers in the industry via interviews with firm representatives and reviews of previous writings in the academic and practitioner literatures. Workers in this particular professional services industry typically start

their careers in entry level positions immediately after graduating with bachelors degrees. A large portion of entry-level workers in the industry have undergraduate majors that are unrelated to the industry specialty. Thus firms appear to emphasize having an aptitude to learn on a par with having a specific foundation of skills that are directly related to the occupational specialty.

A minority of former employees of the firm did not start their careers with the firm, but started with another firm in the same industry. Our interviews with current employees, former employees, HR representatives, and leaders of the firm indicated that the within-firm job paths are indicative of job paths at virtually all of the large firms in the industry. While there appear to be firm-specific differences in regional and industry market shares (where industry is defined by the SIC code of the firm's client), the basic skills needed to perform the job tasks successfully do not appear to differ from one firm to the next and thus are almost completely transferable. Attainment of second- or third-level job status in the hierarchy at one firm, for example, is often viewed as a sufficient statistic for likely success at the same job level in any other firm within this professional services industry. Thus while the firms in this professional services industry have a product that is unique from all other firms in other industries, the human capital developed on the job appears to be ubiquitous with the occupations that define the professional services specialty.

Another interesting feature of this occupational labor market is the nature of signaling about accumulated human capital that job level attainment represents. A key feature of this labor market that was consistently cited by both current and former employees is that attainment of each job level is almost uniformly viewed as a better indication of accumulated human capital than years of experience alone. Some people – the faster learners – ascend through the lower level ranks relatively quickly: instead of taking three years on average to reach the second level

and six years to reach the third level, they might do so in one or two years less time, respectively. Anecdotally, what appears to matter most when transferring among the large firms within the professional services specialty is attainment of job level, not total years of experience needed to get to that level. Because of this, we use job level attainment instead of years of experience with the firm as a proxy for occupation-specific human capital accumulated while working there.

In light of all this, an interesting question is what factors drive people to leave with different levels of experience. Given the extremely low probability of becoming partner, for the vast majority of entry-level employees, the issue is not whether to leave, but when. A key part of the calculus, as related in the interviews, revolves around desire to spend one's career within the occupations defined by the professional specialty.

Results

Table 2 provides a view of the career paths that former employees of the firm take after leaving. For each of the four main levels from which former employees leave the firm, the table reports the characteristics of the first job held after leaving the firm and the most recent or current job held. The two dimensions used to differentiate the jobs are (a) whether the occupation is related or unrelated to the specialization of the professional services firm, and (b) whether the person holds a managerial or nonmanagerial position. The patterns in Table 2 provide the first set of evidence we use to test the predictions. The information on first job after leaving the firm is taken from the job held in the first year after leaving; the information on the current/most recent job is taken from the most recent year worked. Thus, for someone who has not changed jobs since the initial transition after leaving the firm, the "first" and "most recent" refer to the same job, capturing the first and latest year worked in that position.

According to Prediction 1.A, nonmanagement-to-management job transitions should be much more likely than the reverse. The bottom panel shows that this clearly is the case for former employees, comparing their first and current job after leaving: 32.1% made the transition from nonmanager to manager, compared to only 5.9% who went from manager to nonmanager.⁵

Table 3 presents the regression that we use to test Prediction 1.B: people transitioning from management into nonmanagement may fare worse than those making the opposite transition. The top three rows present the coefficients for three indicator variables for those who (a) do not start as managers and become managers, (b) start and finish as managers, and (c) start as managers and become nonmanagers; the excluded group is non-managers both initially after leaving and most recently. The results indicate strong support for the prediction as those who make the transition into management by the time of the survey earn approximately 30-40 percent more than those who do not. The premium is slightly higher for those who are managers both initially and most recently, compared to those who are managers only most recently.

According to Prediction 2.A, people with more functionally-specific human capital will be less likely to leave the occupation (to work in an unrelated occupation) than those who have fewer functionally-specific skills. The top panel of Table 2 shows that this is the case initially after leaving (adding the first and second rows together), at least when comparing those who left with only first-level job experience to those who left with greater levels of occupation-specific human capital. The pattern becomes even stronger in the current job (adding the first and third rows together). By the time of the survey, 40% of those who left at the first level had moved into unrelated occupations, compared to 32% of those who left at the second level, 29% of those who

⁵ For employees leaving the firm at the third level or higher, they arguably already had managerial positions, whereas those leaving at the first or second level did not. Thus the initial transition out of the firm also can be measured as a managerial transition, though we focus on transitions after leaving.

left at the third level, and 24% of those who left at the fourth level. Multivariate analyses that control for age and year when left the firm (results not reported) yield similar results.

Table 4 provides the test of Prediction 2.B, whether those who go into unrelated occupations with greater amounts of experience from the previous occupation fare worse financially than those who enter unrelated occupations with greater amounts of experience from the previous occupation. To test this we enter into the log compensation regression three indicators for the job level the person had when they left the professional services firm: (a) second level, (b) third level, or (c) fourth or fifth level; the excluded group is those who left in first level jobs. Each higher level represents greater amounts of occupational experience, so we test Prediction 2.B by also including an indicator for whether the person is working in an unrelated field, and interactions between that variable and the three indicators for the job level when they left the firm. According to Prediction 2.B, they should earn less when working in unrelated occupations, which means both the indicator for working in another field and the three interaction terms should be negative and statistically significant. Further, the estimated effects for those who left with more function-specific occupational experience (i.e. left the firm at a higher level) should be even more negative than those who left with less such experience.

The results in Table 4 indicate that this is not the case as none of the four coefficients is negative or statistically significant, and the interactions are not uniformly smaller (more negative) for those who left at higher levels. The conclusion must be that there is no earnings penalty for those who left the occupational specialty to work in unrelated fields. Adding a control for being a manager in the second column of Table 4 does not change the conclusion. Thus we find no evidence to support Prediction 2.B.

Table 5 provides details on the occupational field for managers for the most recent job held since leaving the firm. According to prediction 3.A, among people who choose managerial careers, those who start with greater amounts of occupation-specific human capital will be more likely to have career paths that require occupation-specific skills. Table 4 provides favorable evidence: the rate of working in unrelated occupations among those with managerial jobs is lower for those who left the firm at later career stages. Those who left at later career stages (and have greater amounts of occupation-specific experience) are more likely to work in managerial jobs that require that same occupation-specific experience.

Of those who end up working in managerial jobs in unrelated fields, their paths to those jobs are as follows: (a) 29% started as managers in related fields and made the transition into unrelated fields, (b) 32% started as nonmanagers in related fields and made the double transition into management and out of the related fields, (c) 16% started in nonmanagerial jobs in unrelated fields and made the transition into management within those occupations, and (d) the remainder, 23% started and stayed in the managerial roles in unrelated occupations. Therefore jobs in related fields after leaving the firm (both managerial and nonmanagerial) serve as a stepping stone for a majority (61%) of those who eventually become managers in unrelated fields. The converse, however, is not the case. Among those who end up as managers in related fields, the overwhelming majority (96%) start off in related fields for their first jobs after leaving the firm.

Table 6 presents the regression to test Prediction 3.B, that the economic return to a set of functionally-specific human capital may be higher in managerial jobs that require that set of skills than in managerial jobs that do not require those functionally-specific skills. The test is conducted by comparing the return to accumulated experience at the firm for managers who are still working in related fields versus managers who are working in unrelated fields, using a

similar specification as Table 4. The results in Table 6 provide no evidence in favor of the prediction: none of the four relevant coefficients are negative, and the interactions for those who left the firm at higher levels with the indicator for working in an unrelated field are not more negative than the lower level interactions.

According to Prediction 4, the economic return to having more functionally-specific experience should be higher in lower-level managerial jobs than in higher-level ones. To test this, Table 7 reports the results from a similar earnings specification as that used in Table 6. Instead of looking at differences based on whether the person works in an unrelated field (Table 6), Table 7 focuses on a different division of the sample: (a) managers who are not Vice President (VP) or higher in their current job (base group), (b) managers who are VP or higher at smaller companies (less than \$500 million in annual revenue or assets under management), and (c) managers who are VP or higher at larger companies (\$500 million or more in annual revenue or assets under management).

The results are consistent with Prediction 4: there is a fairly steep positive gradient in the return to functionally-specific experience among those who hold lower-level managerial jobs (rows one through three). Among VPs at smaller companies, those who left at the second level or higher earn more than those who left at the first level, but there is little difference among those who left at the second vs. third vs. fourth or fifth levels; comparing these results to lower-level managers shows a pattern that is also consistent with Prediction 4. Finally, each of the three interactions for VPs at large companies is not statistically significant, however the point estimates indicate a negative gradient relative to the base group. This is consistent with Prediction 4 (considered in light of the pattern for the lower level managers). Thus, the results in Table 7 are generally supportive of Prediction 4.

The final set of analyses is in Table 8, which we use to test Predictions 5.A and 5.B. According to Prediction 5.A., differences in specific types of on-the-job experience should explain variation in compensation among people within a role or occupation. This is tested by comparing the results in column one (the canonical earnings model) with the results in column two, which includes six indicators for different types of experience that are relatively common in professional services firm: (a) frequently changing type of work or client, (b) business development with clients or potential clients, (c) work with top management or committees in clients, (d) work in high profile assignments, (e) work on international assignments or teams, and (f) retool skills to work with clients in a new industry or line of service.

This list was developed by first reviewing the behavioral literature on executive development (McCauley, et al., 1994) for the types of experience that are developmental, and then refining the list with the help of human resources representatives from the firm. The objective was to identify the most relevant experiences that could explain earnings differences. These experiences (along with other more subjective experiences – such as having a difficult boss – that are harder to justify for inclusion in a human capital earnings model) were included on the survey, and the respondents indicated whether they “not at all”, “somewhat” or “definitely” were part of their experience while working at the firm. For the analyses in Table 7, indicator variables were created with a value of one if the person indicated that they definitely had the experience, zero otherwise.

The results in the second column show that these experiences explain some compensation differences, consistent with Prediction 5.A. Specifically, those who experienced frequently changing type of work/client and those who worked on international assignments/teams while at the firm earned more in their subsequent jobs after leaving. Those who experienced having to

retool their skills earned less in their subsequent jobs. Introducing the specific experience variables also causes the coefficient on the indicator for having left the firm at the fourth or fifth level job to attenuate toward zero, which indicates that these experiences likely are a cause of part of the earnings premium for those who left with more years of experience at the firm.

To test Prediction 5.B, in the third and fourth columns the sample is divided into those working in related vs. unrelated fields. The results provide some evidence in favor of Prediction 5.B. Specifically, the positive return in subsequent jobs from having had frequently changing type of work/client while at the firm exists only for those who continue to work in related fields, not for those who leave to work in unrelated fields. The positive return to international experience, in contrast, is larger and statistically significant only for those working in unrelated fields. There are two ways to view that result. On one hand, this suggests that some experiences (such as international skills) are functionally-specific but cut across multiple functions or occupations. More likely, we view the results as consistent with the perspective that an ability to succeed in international settings is a type of general managerial skill given the documented importance of international experience for managerial success in many firms (McCall and Hollenbeck, 2002). Finally, the negative return to having to retool skills to work with clients in a new industry or line of service is an issue only for those working in related fields, another indication of functionally-specific skills. We thus conclude that there is evidence in favor of Prediction 5.B.

Discussion

In this paper we have examined anew the concept of human capital accumulated while working on the job. One contribution is that we proposed and find evidence that functionally-specific and managerial human capital coexist in a single job or person. Specifically, there

appear to be career paths in which people build managerial skills while working in functionally-specific, nonmanagerial jobs, and that transitions to managerial jobs are much more common than the reverse. Within managerial jobs, higher-level positions are more likely to require only managerial skills (not functionally-specific skills) and lower-level managerial positions are more likely to require functionally-specific skills. Moreover, functionally-specific skills are rewarded when applied in managerial jobs within the same functional specialty (i.e. for managers who are in the hierarchy above nonmanagerial workers in the functional specialty).

A second contribution is that we find evidence that a more detailed treatment of the components of on-the-job experience can do a better job of explaining earnings than simple tallies of the number of years worked. While the results on this point were not as strong as for the coexistence of functionally-specific and managerial human capital, the results suggest that future research on other occupational specialties might produce stronger evidence. Taken together, our results provide support for more nuanced views of occupational human capital, and a richer portrait of career dynamics.

One limitation of our analysis is that the data is drawn entirely from the former employees of a single professional services firm. Conventional wisdom regarding career dynamics within this particular professional services industry suggests that the results should be generalizable to other employees in the industry, and perhaps other professional services industries as well. It is also reasonable to expect that the general principle that managerial jobs may differ in the extent of functionally-specific knowledge should apply to jobs in other industries. However, additional research is needed to ascertain the extent to which this is an important issue on a larger scale.

Our research potentially calls into question the standard empirical approach of treating all managerial jobs as generic, with no differentiation of functionally-specific knowledge. One potential alternative would be for future data collection efforts to first classify jobs according to domain-specific knowledge (i.e. “occupation”), and then further identify whether supervisory (i.e. “managerial”) responsibilities are part of the job, which is similar to the approach used in the National Compensation Survey. This would mark a significant conceptual departure from the current classification system used in most approaches, but would not entail significantly more work to collect such data.

Finally, the data we analyze indicate that additional aspects of the “black box” of human capital accumulated on the job may provide rich sources of insights, aside from the managerial vs. functionally-specific dimensions. Specifically, we found that different types of experience accumulated at one firm were differentially related to subsequent labor market outcomes after the employees left to work elsewhere, with the outcomes varying based on whether the subsequent work was in fields requiring related functionally-specific skills. While the differentiation of types of specific experience used here likely are relevant only to occupations related to the professional services industry in this study, the principle potentially is universal: there likely are other specific on-the-job experiences that can be used to analyze the return to human capital accumulated on-the-job. Potential benefits of this research would include a clearer delineation of the roles that formal schooling versus on-the-job learning play in human capital accumulation, and the interactions between the two in determining labor market outcomes.

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Table 1: Supervisory duties in the National Compensation Survey for select occupations

	<u>No supervisory responsibility</u>	<u>Group leader, team leader, non- supervisory position</u>	<u>First supervisory level</u>	<u>Directs through intermediate supervisory levels</u>
Public administration	-	-	.619	.379
Executives	0	0	.675	.325
Management-related	.785	.215	0	0
Accountants/auditors	.761	.239	0	0
Engineers	.593	.239	.138	.030
Math/computer science	.637	.264	.090	.009
Natural sciences	.585	.256	.143	.015
Health diagnostics	.625	.202	.144	.029
Health treatment	.566	.291	.139	.004
University professor	.880	.088	-	-
Teachers	.894	.092	.014	0
Lawyers/judges	.532	.218	.208	.042
Health technical workers	.808	.146	.046	0
Sales manager	0	0	1	0
Service sales	.932	.068	0	0
Retail sales	.926	.074	0	0
Administrative supervisor	0	-	.989	-
Computer operators	.865	.135	0	0
Secretaries	.931	.069	0	0
Records keeping	.941	.059	0	0
Mail distribution	.928	.072	0	0
Protective services	.765	.075	.160	0
Food services	.871	.051	.078	0
Health services	.978	.022	0	0
Building services	.880	.046	.074	0
Personal services	.900	.053	.047	0
Mechanics	.819	.092	.089	0
Construction	.690	.137	.173	0
Machine operators	.923	.077	0	0
Assemblers	.935	.065	0	0
Vehicle operators	.941	.018	.041	0
Construction laborers	.953	.047	0	0
Handlers	.943	.057	0	0
Farm laborers	.820	.087	.093	0

Each cell contains the fraction of jobs in that occupation requiring a certain amount of supervisory responsibilities.

Table 2: Occupational and Managerial Transitions

	All former employees	Left as first level	Left as second level	Left as third level	Left as fourth level
N	1573	151	687	343	214
Occupation in first & current job: Same professional services field vs. other					
a. First job = other field	14.1%	22.9%	12.8%	10.7%	12.2%
Current job = other field					
b. First job = other field	2.6%	3.1%	2.2%	3.4%	1.7%
Current job = same field					
c. First job = same field	16.7%	17.6%	19.0%	18.2%	12.2%
Current job = other field					
d. First job = same field	66.6%	56.5%	66.1%	67.7%	74.0%
Current job = same field					
Manager vs. not in first & current job					
a. First job = manager	39.6%	12.6%	27.2%	50.7%	70.1%
Current job = manager					
b. First job = manager	5.9%	3.3%	5.8%	7.6%	4.7%
Current job = not manager					
c. First job = not manager	32.1%	46.4%	41.6%	26.8%	16.4%
Current job = manager					
d. First job = not manager	22.4%	37.8%	25.3%	14.9%	8.9%
Current job = not manager					

Table 3. The Returns to Managerial Transitions

Managerial transition variables:

Not Manager in First Job	.316***
Manager in Current Job	(.055)
Manager in First Job	.395***
Manager in Current Job	(.054)
Manager in First Job	-.122
Not Manager in Current Job	(.091)
Age	.121***
	(.012)
Age ²	-.001***
	(.000)
Graduate degree	.015
	(.037)
Female	-.364***
	(.042)
Minority	-.179***
	(.059)
Constant	8.875***
	(.275)
Adjusted R ²	.270
N	1186

OLS regression; standard errors in parentheses.

Dependent variable = log real compensation in current or most recent job (2004 dollars).

Significance: ***p < .01, **p < .05, *p < .10

Table 4. The Return to Applying Occupational Experience in Other Fields

Left Firm in Second Level Job	.265*** (.083)	.235*** (.081)
Left Firm in Third Level Job	.363*** (.090)	.298*** (.088)
Left Firm in Fourth or Fifth Level Job	.462*** (.095)	.386*** (.092)
Working in Unrelated Field	.042 (.120)	-.014 (.117)
Interactions – Working in Unrelated Fields and:		
Left Firm in Second Level Job	.119 (.134)	.146 (.130)
Left Firm in Third Level Job	.022 (.149)	.095 (.145)
Left Firm in Fourth or Fifth Level Job	.118 (.159)	.158 (.155)
Manager		.354*** (.045)
Age	.128*** (.013)	.108*** (.013)
Age ²	-.001*** (.000)	-.001*** (.000)
Graduate degree	-.010 (.038)	.004 (.037)
Female	-.385*** (.043)	-.346*** (.042)
Minority	-.152** (.061)	-.151** (.059)
Constant	8.652*** (.289)	8.883*** (.283)
Adjusted R ²	.274	.312
N	1093	1093

Each column is an OLS regression; standard errors in parentheses.

Dependent variable = log real compensation in current or most recent job (2004 dollars).

Significance: ***p<= .01, **p<= .05, *p<= .10

Table 5: Occupational field of current job for managers

	All former Employees	Left as first level	Left as second level	Left as third level	Left as fourth level
N	921	80	431	240	170
Same field	67.3%	56.3%	65.0%	70.0%	74.7%
Other filed	32.7%	43.7%	35.0%	30.0%	25.3%

Table 6. The Return to Occupational Experience within Managerial Jobs

Left Firm in Second Level Job	.190*
	(.102)
Left Firm in Third Level Job	.256**
	(.107)
Left Firm in Fourth or Fifth Level Job	.360***
	(.110)
Working in Unrelated Field	.030
	(.143)
Interactions – Working in Unrelated Field and:	
Left Firm in Second Level Job	.141
	(.156)
Left Firm in Third Level Job	.194
	(.171)
Left Firm in Fourth or Fifth Level Job	.189
	(.175)
Age	.120***
	(.016)
Age ²	-.001***
	(.000)
Graduate degree	-.007
	(.041)
Female	-.336***
	(.048)
Minority	-.174**
	(.068)
Constant	8.913***
	(.370)
Adjusted R ²	.235
N	824

OLS regression; standard errors in parentheses.

Dependent variable = log real compensation in current or most recent job (2004 dollars).

Significance: ***p< = .01, **p< = .05, *p< = .10

Table 7. The Return to Occupational Experience at Different Levels of Managerial Jobs

Left Firm in Second Level Job	.065 (.108)
Left Firm in Third Level Job	.133 (.119)
Left Firm in Fourth or Fifth Level Job	.304** (.127)
VP or higher at smaller company	.023 (.138)
VP or higher at larger company	.752*** (.279)
Interactions – VP or higher at smaller company and:	
Left Firm in Second Level Job	.323** (.148)
Left Firm in Third Level Job	.266* (.159)
Left Firm in Fourth or Fifth Level Job	.208 (.166)
Interactions – VP or higher at larger company and:	
Left Firm in Second Level Job	.276 (.301)
Left Firm in Third Level Job	-.135 (.304)
Left Firm in Fourth or Fifth Level Job	-.307 (.303)
Age	.096*** (.015)
Age ²	-.001*** (.000)
Graduate degree	.000 (.038)
Female	-.270*** (.045)
Minority	-.138** (.064)
Constant	9.517*** (.345)
Adjusted R ²	.298
N	899

OLS regression; standard errors in parentheses.

Dependent variable = log real compensation in current or most recent job (2004 dollars).

Significance: ***p < .01, **p < .05, *p < .10

Table 8. The Return to Specific On-The-Job Experiences

	<u>Those who left as fifth level or lower</u>		<u>Those whose current job is in a <i>related</i> field</u>	<u>Those whose current job is in an <i>unrelated</i> field</u>
Left Firm in Second Level Job	.280*** (.065)	.293*** (.066)	.292*** (.079)	.402*** (.124)
Left Firm in Third Level Job	.353*** (.072)	.352*** (.075)	.375*** (.088)	.416*** (.147)
Left Firm in Fourth or Fifth Level Job	.485*** (.077)	.406*** (.084)	.421*** (.098)	.489*** (.170)
Age	.124*** (.012)	.114*** (.013)	.116*** (.016)	.128*** (.027)
Age ²	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)
Graduate degree	.011 (.037)	.021 (.038)	.052 (.043)	-.116 (.078)
Female	-.387*** (.043)	-.354*** (.044)	-.296*** (.049)	-.465*** (.093)
Minority	-.152** (.061)	-.148** (.061)	-.111 (.071)	-.175 (.119)
Frequently changing type of work or client		.108*** (.041)	.136*** (.046)	-.028 (.087)
Business development with clients or potential clients		.054 (.055)	.069 (.063)	-.075 (.111)
Work with top management or committees in clients		.053 (.048)	.051 (.056)	-.026 (.093)
Work in high profile assignments		.027 (.046)	.007 (.053)	.143 (.099)
Work on international assignments or international teams		.128* (.066)	.109 (.073)	.238* (.144)
Retool skills to work with clients in a new industry or line of service		-.084* (.046)	-.109** (.051)	-.027 (.096)
Constant	8.754*** (.281)	8.864*** (.294)	8.778*** (.343)	8.600*** (.608)
Adjusted R ²	.247	.249	.259	.304
N	1186	1160	747	324

Each column is an OLS regression; standard errors in parentheses.

Dependent variable = log real compensation in current or most recent job (2004 dollars).

Significance: ***p< = .01, **p< = .05, *p< = .10