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Organization Science
Vol. 21, No. 5, September–October 2010, pp. 1034–1053
ISSN 1047-7039 | EISSN 1526-5455 | 10 | 2105 | 1034

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DOI 10.1287/orsc.1090.0492
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The Dynamics of Interorganizational Careers

Matthew Bidwell
The Wharton School, University of Pennsylvania, Philadelphia, Pennsylvania 19104, mbidwell@wharton.upenn.edu

Forrest Briscoe
Smeal College of Business, The Pennsylvania State University, University Park, Pennsylvania 16802, fbriscoe@psu.edu

How do workers build careers across organizations? We propose that increased worker mobility means that workers may now build their careers using *interorganizational career ladders*, working in certain kinds of organizations earlier in a career and in other kinds of organizations later in the career. We develop a matching framework that predicts such interorganizational moves based on how systematic changes in workers' needs and resources over the course of their careers alter the kinds of organizations they will best match. We specifically propose that workers will be more likely to work for organizations that provide more training early in their careers, and work for organizations that have higher demands for skills later in their careers. We use this argument to make three broad predictions: first, that interorganizational transitions are more likely to take place from larger to smaller workplaces, and into organizations in industries that employ a higher proportion of workers in the focal occupation; second, that such skill-based career paths are more common where the labor market provides more opportunities that reward those skills; and third, that the nature of external opportunities will disproportionately affect turnover from organizations on the lower rungs of the career ladder. Data from the career histories of college-educated information technology workers support our hypotheses.

Key words: careers; interfirm mobility; labor markets; organizational size; matching; skills development; information technology workers
History: Published online in *Articles in Advance* February 22, 2010.

In this paper, we apply a core insight from career theory—that workers often move across jobs in a structured progression (Rosenfeld 1992, Schein 1978, Spilerman 1977)—to the study of mobility between organizations. Research on careers within organizations has often examined career ladders, specific sequences of jobs through which workers progress as they gain skills and experience (Doeringer and Piore 1971, Gaertner 1980, Konda and Stewman 1980). By shaping the allocation of workers to positions, those career ladders have important consequences for both firms and workers (DiPrete 1987, p. 422; Villemez and Bridges 1988). Yet the last three decades have seen increasing interorganizational worker mobility, as workers build careers that span multiple organizations (Arthur and Rousseau 1996, Tolbert 1996). Although these changes in employment relationships have attracted substantial interest (Cappelli 1999, Dokko et al. 2009, Fuller 2008, Valcour and Tolbert 2003), we know relatively little about how workers join together jobs in different organizations to build careers. In this paper, we propose that such mobility can be understood to be taking place along interorganizational career ladders, in which workers progress through particular kinds of organizations as they develop their careers.

The series of jobs workers hold as they build their careers often reflects the acquisition of career resources, as workers use one position to acquire the skills, reputation, and relationships necessary to move into a new position requiring those resources. Jobs then follow one another in a career ladder, based on how they provide or utilize those resources. We argue that these same processes of resource acquisition and accumulation can be used to understand how *organizations* follow one another in a career ladder. A foundational idea among organizational sociologists is that an organization's characteristics, such as its size, structure, and industrial sector, affect the nature of the jobs within it (Baron 1984, Hannan 1988). Different kinds of organizations can therefore provide different opportunities to develop and utilize resources. As the process of building a career takes workers through systematically different kinds of jobs, it may then lead them through systematically different kinds of organizations.

Studying the directions of workers' moves across organizations should, therefore, tell us much about how worker needs and organizational practices combine to shape careers in the contemporary labor market—a market where interorganizational moves are the norm, not the exception. Studying such moves could, for example, reveal how workers exploit organizational diversity, working in different kinds of organizations over time as their needs and skills evolve. It could also indicate whether particular kinds of organizations specialize in employing workers at specific career stages. Moreover, because worker mobility creates flows of knowledge, social capital, and organizational routines between firms (Almeida et al. 2003, Dokko and Rosenkopf 2010,

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Phillips 2002, Somaya et al. 2008, Wezel et al. 2006), modeling moves across organizations can help predict which organizations are likely to benefit from those flows and which are likely to incur losses from them. Examining interorganizational career ladders can also provide a new perspective on an age-old subject, the causes of worker mobility, by viewing turnover as a result of systematic changes in the needs and resources of workers.

Yet research on mobility between organizations has not generally explored whether workers are moving across systematically different kinds of organizations as they develop their careers. Instead, mobility has been understood either in terms of the factors precipitating worker exits from firms (Greve 1994, Haveman and Cohen 1994, Lee and Mitchell 1994, Sørensen 2000), or in terms of the factors which lead workers to enter particular types of organizations (Dobrev 2005, Hu 2003). Only rarely have these questions been brought together to ask whether worker mobility follows a logic that links the kinds of organizations that workers move from and go to. Studies within the dual labor market literature used data from the postwar period to examine workers' moves within and between core and periphery industries, focusing mostly on barriers to mobility across those sectors; where they did find movement, it tended to run from periphery to core (Howell and Reese 1986, Rosenfeld 1983, Tolbert 1982). Blossfeld and Mayer (1988) applied a similar lens to the study of transitions between large and small firms among postwar German workers, finding little systematic pattern. More recently, Rao and Drazin (2002) explored contingencies that might encourage firms to hire from one another, showing how external hiring for product innovation leads to particular patterns of recruitment of mutual fund portfolio managers.

In this paper, we seek to predict changes in the kinds of organizations individuals work for as their careers progress, by adapting a basic tenet of career studies—that workers' needs and resources change over time (Schein 1978). We make our predictions by introducing organization-level differences in job characteristics into the matching frameworks often used to understand careers. Matching theories note that workers are most likely to be found in those jobs that best match their needs and abilities (Logan 1996); as workers' needs and abilities change, so do the jobs that they best match (Schein 1978). We focus on changes in workers' demands for skills development and changes in their existing skills as drivers of these evolving resources and needs. We then consider how specific organizational characteristics affect the way that firms develop and use skills: larger firms tend to provide more opportunities for skills development, whereas organizations in occupationally intensive industries—those industries that employ a higher proportion of workers in the focal worker's occupation—tend to have higher demands for skill in that occupation. We bring these premises together to predict how workers will take jobs in different kinds of workplaces at different stages of their careers. We also explore when workers will be more likely to follow such interorganizational career ladders, and how those ladders might affect turnover.

We test our arguments with a study of the careers of information technology (IT) workers. A number of factors make this an attractive setting for understanding interorganizational careers. Because of the ubiquity of computing, IT workers are found in a diverse range of organizations, from dedicated software and services firms to manufacturing, retail, and government organizations. This diversity is helpful when understanding how workers move across different kinds of organizations. The importance of skills in IT work makes this an attractive setting in which to examine how skill development shapes career. And the absence of strong professional institutions helps us study the role of more general organizational and market processes in shaping careers. We test our hypotheses using longitudinal data from a career survey of graduates of IT programs at five U.S. universities. The results support our hypotheses. Supplementary analyses suggest that the effects we observe are predominantly due to changes in the kinds of organizations that workers prefer to work for, rather than forced turnover from large firms or restrictions on workers' ability to work for small firms early in their careers.

Theory Development

A major leitmotif in the study of careers is the notion of a match between workers and different kinds of jobs—a match that evolves as workers accumulate experience over time (Schein 1978). Matching theories propose that a specific job may be a good match for a particular worker for two reasons (Heckman and Sedlacek 1985, Logan 1996). First, the rewards offered by the job, such as money, intrinsic interest, or flexibility, may provide a good match for the worker's preferences. Second, the worker's productive resources such as skills, knowledge, or relationships may be a good match for the particular demands of that job, improving job performance (Jovanovic 1979). The core assumption of these matching theories is that workers will be more likely to end up in jobs for which they are a better match. We might expect that the two sources of improved matches—worker preferences versus job demands—would drive different decisions, with workers choosing jobs that match their preferences and firms choosing workers that meet the job demands. In practice, though, the returns to finding a good match are usually split between both parties: all else equal, workers will be prepared to accept a lower wage for a job that better matches their preferences. For example, those workers that most value job

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attributes such as autonomy or work–life balance may be willing to take a lower-paid job to get more of those attributes (it is possible that such a fit will also raise their productivity). Similarly, employers may be willing to offer a higher wage to a worker who is a better match for the demands of the job and will therefore be more productive in it (Heckman and Sedlacek 1985). Hence, regardless of whether the match stems from worker preferences or job demands, we expect that workers will be more likely to accept jobs for which they are a better match, and that firms will more likely offer jobs to workers who match those jobs best.

The sequence of jobs that workers take as their careers progress can then be understood from the way that workers' resources and preferences change over time. As they build their knowledge, track records, and social networks, workers improve their ability to be hired into more rewarding jobs (Doeringer and Piore 1971, Stewman and Konda 1983). Similarly, as workers mature and their needs and goals develop, their preferences will change, affecting the kinds of jobs that they might want (Schein 1978).

These matching perspectives have generally been used to understand careers within organizations (Hall 1986, Schein 1978). We extend this model to predict how workers might move *across* organizations as their careers develop. Core to our argument is the idea that organizational characteristics substantially impact on the nature of jobs within those organizations (Baron 1984, Kalleberg et al. 1996). Research has shown how job characteristics can be affected by a wide variety of organizational attributes, including the resources available to an organization, the demands of its environment, and the formal practices it adopts such as structural specialization, vertical and horizontal coordination mechanisms, and personnel practices concerning pay, promotion, and training (Baron and Bielby 1980, Kalleberg et al. 1996). Hence, jobs in the same occupation, carrying out ostensibly similar work, can provide very different rewards depending on the nature of the organizations they are in; similarly, the resources required to access jobs with similar responsibilities can vary substantially from one organization to another. Even if workers lack preferences for working in a specific kind of organization, these differences in the nature of jobs found across organizations can make workers a better match for jobs in certain kinds of organizations, based on the particular stage of their careers.

Careers and the Need for Skill Development

There are a variety of different ways that workers' needs and resources evolve as their careers develop (Cherrington et al. 1979, Tolbert and Moen 1998). Psychological and physiological effects of aging, as well as shifts in the kinds of jobs workers perform over time, lead to changes both in how workers value different rewards from their work and in the kinds of knowledge, abilities, and energy they bring to that work (Kanfer and Ackerman 2004, Rhodes 1983). For the sake of simplicity, this paper largely focuses on a single set of changes: workers' accumulation of work-related skills (i.e., human capital; Becker 1962, p. 9). We focus on skill development because it has been a central component of theories about how workers build careers within organizations (Doeringer and Piore 1971). Skill development also affects the careers of workers in almost all occupations and from almost all demographic groups.

We propose two ways in which skill development might affect careers across organizations. First, careers will be shaped by differences in the level of skills demanded by different jobs. Jobs that need greater skills to be done effectively will be best matched to more experienced workers who have acquired such skills. Second, opportunities to acquire skills are an important reward that workers look for when they evaluate jobs (Cappelli 2008, p. 113). Opportunities for skill development occur in part through on-the-job training (Doeringer and Piore 1971, Mincer 1962) and in part through employer-provided formal training. Economists have argued that firms should not train workers in general skills that would also be useful to other employers, because trained workers are liable to be poached or demand higher wages (Chang and Wang 1996). In reality, many firms do provide general skills training; it is common for workers to remain with their employers for long periods of time, allowing firms to recoup training investments. Frictions in the labor market also prevent workers from appropriating the full value of their training in increased wages (Acemoglu and Pischke 1998), and many firms may be able to offer reduced wages to workers in return for the prospect of training (Cappelli 2008, pp. 177–178). Because this skill development will be valued differently by different workers, organizations that provide higher levels of skill development will be a better match for workers who value that skill development more highly.

Workers' needs for skill development affect careers because those needs decline over time. Studies have found that older workers have less desire for training than younger workers (Oosterbeek 1998) and are less willing to engage in self-development (McEnrue 1989). Other research has found that opportunities to develop abilities become a less important attribute in a job as workers become older (Towers Perrin 2001, Wright and Hamilton 1978). Studies of workers' preferences are also suggestive of a declining interest in training, showing that opportunities for promotion are more important for younger workers (Smola and Sutton 2002, Tolbert and Moen 1998, Wright and Hamilton 1978), whereas growth need strength and willingness to delay gratification decline with age (Pogson et al. 2003, Rhodes 1983). Such findings are also consistent with the basic fact that

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the vast majority of formal education is undertaken early on in workers' lives, either before or shortly following their entry to the workplace. Of course, many workers may have ongoing needs for training, as existing knowledge becomes obsolete and workers seek to develop their careers in new directions. Yet even for those workers, skill development is likely to be most important early in the career, when they establish a foundation of work-related knowledge. Within the field of IT for example, technical skills must be constantly updated, yet those skills are only a small part of the knowledge that workers need. Employers report that project management and business-related skills are more important than technical knowledge in their hiring of midlevel IT workers (Zwieg 2006). Such skills change less quickly than technical skills, so workers who have acquired project and business skills have less need for ongoing training.

A large literature explores the effects of skills development on workers' pay and careers (Ang et al. 2002, Halaby 1982, Mincer 1962). Yet research has generally not examined how workers' accumulation of skills might lead them to follow interorganizational career ladders, working in specific kinds of organizations at specific stages of their careers. Hu (2003) addresses this question from the employer's perspective, arguing that large firms will hire younger workers because those firms make greater investments in firm-specific skills. In this paper, we develop a different theory based on accumulation of general skills, and we use it to develop three sets of predictions about what kinds of workplaces individuals are more likely to transition from and to as they climb interorganizational career ladders, about when those skills-based career paths are more likely to occur, and about when individuals are consequently more likely to exit organizations.

Skill Development and Workplace Size

Because they tend to value skill development more highly, less experienced workers are likely to better match jobs in organizations that offer more skill development. One organizational characteristic that correlates strongly with the provision of skill development is organizational size: research shows that the provision of formal training is more common in larger organizations than smaller organizations (Barron et al. 1987, Kalleberg et al. 1996, Lynch and Black 1998) and that larger organizations spend more per worker on the training they conduct (Hu 2003). This increased provision of training by larger organizations probably reflects the greater benefits they receive from such training. Workers tend to remain at larger workplaces over longer periods of time, allowing their employers to recoup more benefits from training (Kalleberg and Mastekaasa 1998). The costs of training are also likely to be lower in large organizations, because recruiting many inexperienced workers together generates economies of scale for training.

These effects of size on skill provision are reinforced by the increased informal training found in large organizations. Large firms have more-structured personnel practices, such as defined career ladders, formalized job descriptions, and formal internal mobility programs (Kalleberg et al. 1996), which can focus both employer and worker on the skills that need to be developed to progress (O'Mahony and Bechky 2006). By protecting and rewarding experienced workers, formal personnel practices also provide incentives for existing employees to train new employees (Doeringer and Piore 1971). As a consequence, research finds that informal training is also more common in larger firms (Barron et al. 1987).

Of course, a desire for training is only one of the factors that might influence workers' match with jobs in large organizations versus small organizations. Larger workplaces also offer higher wages, more benefits, and increased job security (Kalleberg and Van Buren 1996, Villemez and Bridges 1988). Smaller workplaces tend to offer other advantages: they are generally less rigid (Wagner 2001, Marsden et al. 1996), which may lead workers to perceive them as family friendly (MacDermid et al. 2001). Studies have also linked smaller workplaces with increased worker autonomy, a higher scope for creativity, a more supportive work environment, and higher overall job satisfaction (Beer 1964, Kalleberg and Van Buren 1996, MacDermid et al. 2001, Zipp 1991).

The changing balance between workers' needs for skill development and these other rewards will affect how workers move across different-sized organizations. Less experienced workers should be a better match for the greater skill-development opportunities found in large organizations, given the importance those workers place on training. Later in workers' careers, such skill development will play a less prominent role in their employment decisions, leading the overall benefits of being in a large organization to decline. For at least some of those workers, the rewards offered by smaller organizations will also become relatively more attractive. Just as the need for training declines, research shows that preferences for other rewards common in small workplaces, such as a sense of accomplishment and meaning, and other intrinsic rewards, come to the fore among more experienced workers (Cherrington et al. 1979, Kalleberg and Loscocco 1983, Tolbert and Moen 1998). We therefore expect workers to be more likely to pursue and accept jobs in larger organizations earlier in their careers.

Less experienced workers may also be more likely to be offered jobs by larger organizations. Larger organizations have lower costs of training and an increased ability to recoup some of those costs through lower wages. Large firms may also be more likely to adopt other personnel practices that complement training, including recruitment directly from universities, and evaluation and development systems geared toward promoting

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internal candidates. Such personnel practices should be more attractive to large firms, given their lower cost of training; similarly, such structured practices increase the value of training, encouraging large firms to offer more such training. Taken together, these practices should increase the relative supply of jobs in larger organizations for less experienced workers, relative to more experienced workers. Based on these changes in the match between organizational size and worker career stage, we therefore predict the following.

Hypothesis 1 (H1). *Workers are more likely to work for larger organizations earlier in their careers rather than later.*

Occupational Intensity and Interorganizational Careers

Skill development also leads workers to become better suited to skill-intensive jobs over time. To the extent that organizations vary in their demands for skills, we would expect workers to build careers by moving from organizations with low demands for skills to organizations with higher demands. Organizations with a higher demand for skills may in turn be prepared to pay workers who possess those skills more than would organizations who value those skills less. The intrinsic value that workers place on challenging and complex work (Hackman and Oldham 1976) may also encourage workers to move to jobs that will best utilize their skills.

One characteristic that can shape an organization's demand for skills is the industry that the organization operates in. By definition, organizations within the same industry have similar production processes and draw on similar sets of skills and inputs (U.S. Census Bureau 1993). We focus on a particular characteristic of industries that affects how they use the skills of a given occupation: their occupational intensity, defined as the extent to which the industry employs workers who are members of the focal occupation. Most industries employ workers from a wide range of different occupations. Even the simplest manufacturing establishment will employ a variety of managers, administrative assistants, accountants, lawyers, and computer specialists, in addition to their core production workers. Yet not all of these occupations are equally important to the work carried out in a given industry. Instead, organizations are likely to be particularly dependent on those occupations that are most closely involved in conducting the core tasks of that industry. By and large, we expect that the centrality of an occupation to an industry's production process correlates closely with its numerical importance within the industry's workforce (among highly skilled occupations, at least). Software firms are particularly dependent on the quality of their programmers, banks depend more on their financial managers, and so forth. We would therefore describe the software industry as being more occupationally intensive for programmers, and the banking industry as more occupationally intensive for financial managers.

We should emphasize that occupational intensity is conceptually distinct from workplace size. Although it is tempting to think that IT workers in small organizations must be working in technology start-ups, this need not be the case. Small firms in law, retailing, manufacturing—or indeed any industry—also need IT workers to maintain a basic technology infrastructure. Conversely, there are many large software, consulting, and technology hardware firms. It is therefore possible to analyze organizational size and industry occupational intensity as distinct characteristics, as we confirm below.

Where organizations within an industry are more dependent on the skills of a particular occupational group, they are likely to have higher demands for that group's skills. Research on IT workers demonstrates this importance of industry occupational intensity in shaping demands for skills. Industries that employ high proportions of IT workers tend to employ workers with more years of education (Levina et al. 2003) and reward those workers more highly than other industries (Ang et al. 2002, Mithas and Krishnan 2008).

Given their higher demands for skills, organizations in occupationally intensive industries will be a better match for workers with more skills. They are therefore likely to offer more opportunities to more experienced workers relative to less experienced workers. For example, organizations in some highly occupationally intensive industries, such as hedge fund management or human resources (HR) consulting, often prefer to hire workers who already have experience in investment banks or HR functions, respectively (Zoia and Finkel 2008). To the extent that their greater demand for skills leads those firms to reward workers more highly, experienced workers are also likely to be attracted to working in firms in occupationally intensive industries. We therefore expect workers to move from less to more occupationally intensive industries.

Hypothesis 2 (H2). *Workers are more likely to work for organizations in industries that are intensive in their own occupation later in their careers rather than earlier.*

There are important scope conditions surrounding this prediction: notably, minimum levels of occupational intensity and degree of institutionalization. In industries where occupational intensity is too low, organizations may not be equipped to provide basic training to inexperienced workers. In some occupations, career paths may be institutionalized such that workers are expected to work in particular kinds of organizations at particular points in their careers; such career paths may require working in occupationally intensive industries early on in the career (for example, it is often expected that lawyers will begin their careers in law firms but move

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to client businesses, a career pattern that is further promoted by law firms' institutionalized up-or-out practices (Spangler 1986). It is worth noting, though, that the available evidence does not show an overall shift from occupationally intensive law firm jobs toward jobs elsewhere (Dinovitzer et al. 2004)). The occupation that we study, IT, should meet the scope conditions of our predictions. Organizations in many industries have large IT departments (Rai and Bajwa 1997) that should be able to train workers; career paths in IT are also not very institutionalized.

Interorganizational Careers and the Organizational Environment

The above hypotheses explore how differences in the way that organizations provide and demand skills can affect workers' moves across organizations. Yet these effects may not be independent: skill development is more attractive when those skills are going to be better rewarded. Interorganizational career paths that promote skill development may therefore be more common when workers will subsequently have more opportunities to work in organizations that are going to value those skills. In this way, workers' decisions about what size of organization to work for may be dependent on the occupational intensity of their labor market.

An important determinant of workers' current and future opportunities is the organizational composition of their local labor market. Although some workers may move across regions in search of work, the high costs of moving lead a substantial majority of workers to remain in their local labor market when moving jobs (Herzog et al. 1986). Among workers with education beyond high school, for example, Yankow (2003) finds that only one in five job moves involve intercounty migration, and one in 10 involve interstate migration; regional mobility rates are only slightly higher among workers with more education or those working in high-technology industries (Herzog et al. 1986, Kambourov et al. 2008). The number of workers who move locales specifically to take a new job is likely even smaller: Current Population Survey (CPS) data suggest that only about 12% of job changers with a professional degree or higher change jobs as a result of their job search. Prior studies have therefore shown that local organizational populations can affect job mobility through their effects on workers searching for better jobs (Fujiwara-Greve and Greve 2000, Greve and Fujiwara-Greve 2003).

We focus in particular on the effect of local organizations on returns to skills. As noted above, industry occupational intensity increases organizations' demand for skills in that occupation. At the labor market level, regions with a higher density of organizations within occupationally intensive industries will have higher demands, and offer greater rewards, for skills. For example, regions such as Boston, Silicon Valley, and the Research Triangle have a high proportion of jobs in IT-industry firms. Although it may be difficult for inexperienced workers to enter these jobs initially, their presence creates more opportunities for workers with higher skills.

Such increased rewards for skills may increase the likelihood that workers will pursue skill-based interorganizational career paths, moving from larger firms to smaller firms. Workers taking jobs early on in their careers tend to consider where those jobs might lead them. When inexperienced workers expect higher rewards for skills, they are likely to place more emphasis on skill development early in their careers. Hence, in regions such as Boston or the Research Triangle, which have more attractive opportunities for highly skilled workers, workers should be more likely to take jobs in firms that will help them access those opportunities. In addition, increased rewards for skills should disproportionately affect rates of exit from large firms. As rewards for skills increase, workers with the most skills are likely to receive the most attractive job offers; such workers are most likely to be found in large firms, where they received more skills development. Where workers often leave large firms for smaller firms (for all of the reasons discussed above), those exits from large firms would lead to an overall increase in moves from larger firms to smaller firms.

We therefore propose that the regional proportion of jobs in occupationally intensive industries should moderate the effects of experience on workplace size. In labor markets with a higher proportion of jobs in occupationally intensive industries, workers will have more to gain from beginning their careers in large workplaces that foster skill development. Specifically,

Hypothesis 3 (H3). *The decline in organizational size over workers' careers will be greater in magnitude in local labor markets that have a higher proportion of jobs in occupationally intensive industries.*

Interorganizational Careers and Turnover

The above analysis suggests that we can extend our predictions to encompass rates of turnover. To this point, we have been concerned with predicting the *direction* of interorganizational transitions: conditional on a move taking place, where are people leaving from and going to? Yet the same arguments also have implications for the *rates* of those moves—to what extent are workers more likely to leave large or small organizations? The rates of such turnover have profound implications, both for workers' careers and organizational performance (Glebbeek and Bax 2004, Shaw et al. 1998). As a consequence, turnover has been the subject of many studies, which generally find that turnover rates are affected by workers' level of satisfaction with various aspects of their current jobs and by their evaluation of alternatives

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(Griffeth et al. 2000, Hom and Kinicki 2001, Lee and Mitchell 1994).

Our matching framework implies a novel perspective on such turnover, suggesting that moves out of a workplace can be driven by the development of workers' careers. After all, workers traverse interorganizational career ladders by leaving one organization and moving on to the next. Conditions that encourage workers to traverse interorganizational career ladders should therefore generate turnover from those organizations on the lower rungs of these career ladders—organizations that people tend to work for earlier in their careers. Our framework therefore allows us to offer novel predictions about turnover, in which the presence of alternative jobs has a differential effect depending on the kind of organizations individuals currently work in.[1] These effects do not stem from contextual differences in how workers evaluate those alternatives, but rather from how well different organizations prepare workers to take advantage of new opportunities, and from how different organizations play particular roles in workers' careers.

Specifically, we argued above that when a labor market offers more jobs that reward skills, turnover is most likely to increase from organizations that provide skill development, notably, large organizations. Workers in those organizations have received more skill development than those in other organizations, making them more eligible for high-skill positions. Furthermore, where workers choose to join larger firms for skill-development reasons, they will be more likely to leave those firms once those skills are acquired. H3 describes the implications of this argument for the net directions of interfirm moves; here we propose the straightforward implications for the rate of turnover:[2]

Hypothesis 4 (H4). *Turnover from larger workplaces will be higher* (*relative to turnover from smaller workplaces*) *in local labor markets that have a higher proportion of jobs in occupationally intensive industries.*

Methods

We test our predictions with data from a career-history survey of IT workers. Our focus on a single occupation helps eliminate confounding effects on careers stemming from occupationally based variations in organizational size and industry distributions. IT workers in particular constitute a strategic research setting for testing our arguments. First, skills are a key driver of our framework, and skills are important in the IT sector. Second, we are interested in understanding the dynamics of careers that span organizations, and IT skills are highly transferable across organizations. Indeed, much of the early research on highly fluid labor markets focused on IT workers in Silicon Valley. Third, we are interested in exploring how workers move across industries with different occupational distributions. Like a number of other professional and technical occupations, IT workers are found in a wide range of industries with varying occupational intensities.

Data and Sample

The survey sample comprised every graduate from five U.S. universities who had earned at least a BA or BS in an IT-relevant major, such as information technology, electrical engineering, or information sciences and technology, between 1988 and 2001 (some of the graduates had earned MS degrees or PhDs). Moves across organizations are more common early in workers' careers (Topel and Ward 1992), because this is the period in which both skill development and learning about match happen most rapidly. Focusing on the beginning of workers' careers has the further advantage that relatively few workers leave the IT occupation within this window. Two of the universities we studied were private and three public; they were located in the Mid-Atlantic and West Coast regions of the United States. Respondents were asked about the entire sequence of jobs they held since entering the field. A particular advantage of this longitudinal design is that it allows us to distinguish effects of time from cohort effects, which would be collinear in cross-sectional data.

The data were collected using a computer-assisted telephone interviewing system. The interview schedule was developed through iterative testing, including several pretests and a lengthy pilot-testing effort. The resulting interview took 25 to 45 minutes to complete and was administered by trained staff. Interviews began in September 2003 and were completed by April 2004. A total of 2,823 interviews were completed for an effective response rate of 46%.

Respondents were asked whether they had ever held a job in the IT field. They were allowed to decide themselves if their work activity qualified as an IT job, a method used by the U.S. Bureau of Labor Statistics when conducting workforce inventories. Inspection of job titles indicates that such IT jobs included both development and technical support, as well as technical management. Of the 2,823 people interviewed, 2,369 (or 83.9%) had held at least one IT job after graduation. Each of these 2,369 respondents with IT experience were asked, "How many jobs have you had in the IT field?" They were then asked a battery of questions about their first job. The battery was then repeated for the next job that they had had, and so on, until they had described all of their IT jobs.[3] The number of job spells reported by individual workers ranged from one to nine, with a median of two job spells per worker. The median length of job spells was 36 months, including those job spells reported to be ongoing at the time of the survey.[4] These job spells are our central unit of analysis throughout this paper.

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Because job spells occurring during full-time education might be qualitatively different than those entered postcollege, we dropped spells that were identified as internships or co-ops, as well as spells that began before the worker was 22 and either involved less than 20 hours per week in work, or lasted fewer than 180 days. We also dropped any individuals that did not have a bachelor's degree or equivalent.

Dependent Variables

Workplace Size. We measure *workplace size* using the question, "How many employees worked/work for your employer at your primary job site?" Note that this question refers to establishment size rather than firm size (we did not collect data on firm size). An advantage of examining establishment size is that structural variables such as level of hierarchy and opportunities for advancement are largely determined by the size of the specific establishment; workers can access job ladders and resources in their own workplace, but are less affected by job ladders and resources at other workplaces within the same firm. Focusing on establishments also increases response accuracy; respondents are more likely to know the characteristics of their immediate workplace than those of a larger corporate entity (Osterman 1995). Workplace and firm size are also highly correlated, particularly at the upper end of the spectrum. Although small workplaces might be small units within much larger organizations, large workplaces are necessarily part of organizations of at least that size. Consistent with standard practice, we use the natural logarithm of *workplace size* as our dependent variable, to minimize the skewedness of residuals (Hollister 2004, Villemez and Bridges 1988). Although employee self-reports of workplace and company size are extensively used in surveys such as the CPS and the Quarterly Employment Survey (Brown and Medoff 1989, Hollister 2004), there can be concerns about the accuracy of such measures. We validated our measure of *workplace size* by correlating it with responses to questions about two job characteristics that are robustly and routinely associated with workplace size: access to employee benefits (Knoke 1996) and vertical layers (Marsden et al. 1996). An additive index of access to four benefits in the current job spell was correlated with log size (0.35, $p < 0.0001$), as was reporting to a supervisor in the current job spell (0.35, $p < 0.0001$). An additional concern is that the retrospective nature of this measure may introduce bias. Reviews of recall bias in retrospective surveys, though, find little evidence that numerical estimation for measures from more distant time periods is any less accurate than for more recent estimates (Bound et al. 2000). We do not therefore believe that recall bias should affect our results.

Organizations in Occupationally Intensive Industries. For each job spell, respondents were asked two questions about their employer's industry: "Was/is this self-employment or was/is this job through the government, a nonprofit organization, a temporary agency, or was/is it through some other type of private organization?" and for those jobs with private organizations, "In which industry was/is this employer? Would you say manufacturing, wholesale trade, retail, financial services, or some other industry?" Respondents who replied "other" were given the opportunity to provide a verbal description of the industry of their employer. About 70% of respondents who answered the industry question provided such a verbal description. We coded these verbal descriptions to identify the industry. We were able to sort all but about 3% of responses into a range of industry categories: software, IT consulting, computer hardware, Internet services, general IT, financial services, retail and wholesale, construction, food production, transport, telecommunications, pharmaceuticals, health care, education, utilities, extractive industries, manufacturing, and government.[5] This approach, consisting of open-ended answers and subsequent manual coding, reflects the way the U.S. Bureau of Labor Statistics conducts industry coding for the CPS. The employment and industry survey items above were also taken directly from the corresponding CPS items (Polivka and Rothgeb 1993).

We then measured occupational intensity in each of these industries as the percentage of the overall industry workforce that was in the computer specialist occupation (Code 15-1000) using the Bureau of Labor Statistics' National Employment Matrix (NEM). We created a dummy for *organizations in occupationally intensive* industries, which took a value of 1 for the industries in which 24% or more of the workforce were computer specialists: software, IT consulting, computer hardware, and Internet services (inspection of the data revealed a clear break at this point; Mithas and Krishnan 2008 also show that pay in these IT industries is significantly greater even than other industries such as finance and media that make heavy use of technology). We also classified organizations in our general IT industry as occupationally intensive on the basis that their definition required them to be involved in the hardware, software, or IT services listed in the NEM, even though we could not tell which of those specific categories they belonged to. We refer to all other organizations as generalist. Continuous measures of occupational intensity yielded qualitatively similar, but somewhat weaker, results compared to this dichotomization.[6]

It is important to note that our measure of *organizations in occupationally intensive industries* suffers from nonresponse problems, leading to smaller sample sizes in analyses using this variable. Whereas almost all respondents answered the first question about their type of employer, about half of all job spells lack a response

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to the industry question. This nonresponse was not random: responses to the industry question were much more common for graduates of certain universities and slightly more common for less recent job spells, perhaps reflecting the effects of different interviewers implementing the survey. In addition, the use of two different questions to measure industry means that responses are systematically higher for job spells in government services; many more respondents answered the first question, which defined whether their jobs were in the public or private sector. We therefore control for government services in our analyses that use industry data. Where possible, we also run our analyses with and without the *occupational intensity* variable, finding the results to be similar.

Turnover. We analyze the determinants of *turnover* based on the reported end dates of jobs. Job spells that were still ongoing at the time of the survey were treated as censored spells in our event history analyses (i.e., not involving turnover). Because our focus is on voluntary turnover, we also treated job spells that ended due to involuntary turnover as censored. For each job, respondents were asked an open-ended question: "Why did you leave this job?" The 14% of job spell terminations that were due to being fired, laid off, or the company going bankrupt were treated as involuntary. Finally, the 1.3% of job spells that were described as ending due to transfers within the same company were treated as censored. Such transfers do not entail leaving the organization (based on the large of number promotions reported during job spells, we believe that most such transfers were not reported as separate job spells).

Independent Variables

Experience. Our measure of *experience* is the difference between the date that the focal job began and the date that the worker's first regular postcollege job began, minus any time that the worker spent out of the labor market. We report *experience* in years.

Regional Intensity of Jobs in Occupationally Intensive Industries. We assigned job spells to locations using the respondent addresses provided to us by the universities taking part in the study. This approach required us to assume that respondents had lived at the same address throughout their careers (we have no data on addresses of prior job spells). We assess the implications of this assumption in detail in the appendix. We used zip codes to assign individuals to metropolitan statistical areas (MSAs), which delineate major cities and are commonly used to demarcate labor markets (Blau et al. 2000). Overall, 115 MSAs were represented in our data. Fifty percent of job spells were in the largest 7 MSAs, and 75% of job spells were in the largest 22 MSAs. Eighty workers, representing 137 job spells, did not live within an MSA, residing instead within rural areas. We dropped these individuals and job spells from our analyses (results were not materially different when these job spells were included).

We calculated the proportion of jobs in each MSA that were in occupationally intensive industries using secondary data, rather than our survey. For each MSA, we used the Census Bureau's 2002 County Business Patterns survey to calculate the total employment in the three industries with the highest numbers of technology workers: computer and peripheral equipment manufacturing, software publishing, and computer systems design and related services (data on Internet services was not available within the county business patterns data). We then divided this employment by the total employment within the MSA to get the overall proportion of jobs in that MSA that were within occupationally intensive organizations. Additional analysis using data on IT workers from the CPS confirmed that rewards to skills were higher in these regions, with the returns to both education and experience positively related to *regional occupational intensity*.

Control Variables

School-to-Work Transition. We were interested in the extent to which changes in workplace size are directly affected by differences in how organizations recruit from university, rather than other aspects of the accumulation of experience. We therefore included a dummy for each job that immediately followed a degree program. We coded each worker's first job as being part of a *school-to-work transition*, consistent with our definition of the first job. We also coded the first job beginning in the year that a master's or PhD degree was awarded as a *school-to-work transition*.

Number of Jobs. We also examined the *number of jobs* that an individual has held. This variable may measure two contrasting effects: On the one hand, workers with more jobs will have accrued more experience, all else equal. On the other hand, workers with more jobs may differ systematically from other kinds of workers in their propensity to quit or be fired. Such an individual propensity to move jobs might be correlated with other variables of interest, leading to spurious findings. We therefore include a measure of how many postcollege jobs the worker has held, including the current job.

Education. The universities included in the sampling frame provided data on degrees that they had awarded to the respondents. Respondents also reported any degrees they had been awarded since graduating from the universities that participated in the survey. However, we lack information on when many of these degrees were awarded. We therefore omit education from our individual fixed effects analysis. We do, however, include dummies for master's and PhDs in cross-sectional analyses of turnover.

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Demographics. The survey asked respondents whether they had a spouse living with them at home, whether they had children, and how old any children might be. We used the ages of the children to estimate a birth year for the child. For each job spell, we calculated the number of children that had been born during or before the year that the job started. Unfortunately, the data did not allow us to create the same time-varying measure for marriage. We therefore coded individuals' marital status based on their responses at the time of the survey.

To get a fine-grained test of how family commitments shaped careers, we created different dummies for each combination of gender, marital status, and whether the workers had children. The dummy for *single men without children* is our omitted category (there are very small numbers of single individuals with children). We also control for respondent ethnicity; we include a dummy that takes the value 1 if the respondent reported themselves as being *white*, and 0 otherwise.

Time Trends. We experimented with a variety of controls for when a job began, including year dummies and a dummy for the years of the technology bubble from 1997 to 2000. With the exception of the *bubble* dummy, these controls had little effect on our main coefficients. Furthermore, the year dummies were very highly correlated with our experience measure in the fixed effects regressions, leading to inflated standard errors. Given that these time controls did not seem to change our results but increased standard errors, we omitted them from our analyses.

MSA-Level Variables. We also controlled for three characteristics of the MSA that might be correlated with occupational intensity. We used the county business patterns to calculate the mean workplace size for each MSA. Because the size of workplaces employing IT workers may be very different from those employing other workers, we weighted workplace sizes in each industry according to how many IT workers that industry employed (again using data from the National Employment Matrix). We also used data from the 2002 Current Population Survey to calculate the ratio of mean pay for IT professionals to mean pay for all workers. We use this variable to proxy for the demand for IT workers in a given MSA. This proxy should help assess how easy it is for workers to find a job, but not differential demands for more versus less skilled workers. We interact these variables with *experience* in our *workplace size* analyses, and with *workplace size* in our *turnover* analyses, to control for effects on careers that might be driven by these characteristics of MSAs rather than regional occupational intensity. Centering the variables before calculating these interactions reduces problems of multicollinearity among the interaction terms (Aiken and West 1991).

Models

We use three basic modeling strategies to test our hypotheses. Our analyses of *workplace size* test H1 and H3 using individual fixed effects regressions, which hold constant fixed characteristics of the respondents (the analyses are equivalent to inserting a unique dummy variable for each respondent). These analyses eliminate biases caused by unobserved heterogeneity in the ability of the workers or in their time-invariant preferences to work in small versus large workplaces. Using job spells as our unit of analysis, the results reveal which factors increase versus decrease the size of workplace for a particular job, relative to other jobs that the same worker held. These fixed effect analyses are therefore well suited to examining the direction of moves that workers make over their career. We cluster the errors by MSA to account for any nonindependence of errors within MSA.

To examine when workers are found in *organizations in occupationally intensive industries* (H2), we use conditional logit analyses (Chamberlain 1980). These analyses allow each individual to maintain a different baseline probability of taking a job in an organization in an occupationally intensive industry. The analysis then examines the factors that increase the likelihood that the individual will work in an occupationally intensive industry in one of their job spells versus other job spells. Because this analysis is purely within individual, it only uses job spells from individuals who have spells in both occupationally intensive and generalist industries.

Third, we examine the determinants of turnover (H4) using Cox proportional hazard models, which estimate the determinants of the hazard rate of exit from job spells (Allison 1984). An advantage of Cox models is that the rate of exit varies with tenure in an unconstrained manner, allowing us to control for tenure dependence of *turnover* without needing to specify a particular functional form for that dependence (Morita et al. 1993). Two date-related measures control for whether *turnover* is higher during the bubble and whether *turnover* is higher from jobs that started during the bubble.

Results

Means, standard errors, and correlations for each of our variables are provided in Table 1. Among other things, the correlations demonstrate that *workplace size* and *occupational intensity* are separate organizational dimensions. Although *size* and *occupational intensity* are significantly correlated, at −0.17 this correlation is substantively small. As well as small technology firms, the respondents also have jobs in small financial services firms, small manufacturing firms, small government agencies, and so on. We can therefore separately examine the determinants of *workplace size* and *occupational intensity*.

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Table 1 Summary Statistics and Correlations

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. Log *workplace size*	5.12	2.35																		
2. *Occupational intensive*	0.31	0.46	−0.16																	
3. *Experience*	2.30	3.45	−0.1	0.12																
4. *Number jobs*	1.88	1.16	−0.14	0.12	0.74															
5. *First job*	0.50	0.50	0.13	−0.09	−0.67	−0.76														
6. *Master's*	0.29	0.46	0.06	0.02	0.08	0.05	−0.03													
7. *PhD*	0.01	0.11	0.01	0.02	−0.02	−0.02	0.02	0.03												
8. *Single female, no children*	0.05	0.22	0.06	0.07	−0.01	−0.02	0.02	−0.03	−0.02											
9. *Married female, no children*	0.10	0.30	0.04	−0.09	−0.03	−0.04	0.02	0.03	−0.02	−0.08										
10. *Married male, children*	0.46	0.50	0.02	0.08	−0.08	−0.06	0.04	0.07	0.04	−0.22	−0.3									
11. *Married female, children*	0.01	0.11	−0.02	0.01	0.1	0.05	−0.06	0.04	−0.01	−0.03	−0.04	−0.1								
12. *Married male, children*	0.11	0.31	−0.03	−0.03	0.34	0.24	−0.19	0.09	0.02	−0.08	−0.11	−0.32	−0.04							
13. Mean log *size* (MSA)	4.67	0.27	0.01	0.08	0.03	0.03	−0.01	0.09	−0.01	−0.02	0	0.04	0.03	−0.01						
14. *Relative pay* (MSA)	1.60	0.10	0.07	−0.03	0.01	0.01	−0.02	−0.03	0	−0.02	0.01	−0.01	0.01	0.04	−0.3					
15. *Government*	0.09	0.28	−0.01	−0.32	−0.07	−0.06	0.07	0.02	0.02	0.03	0	−0.03	−0.02	−0.02	0.02	−0.06				
16. *Bubble*	0.36	0.48	−0.01	0.05	0.09	0.09	−0.1	−0.01	0.01	0.04	−0.05	−0.07	0.02	0.07	0	0.04	−0.05			
17. *Regional occupational intensity* (MSA)	0.03	0.02	−0.02	0.1	0.04	0.05	−0.04	0.13	0.03	−0.05	−0.04	0.06	0	0	0.47	−0.31	0.01	−0.01		
18. *Contractor*	0.04	0.20	−0.11	0.04	0.04	0.05	0	−0.04	0.03	0.01	−0.02	−0.07	0.03	−0.04	0	0	0	−0.02	−0.05	
19. *Self-employment*	0.03	0.16	−0.27	0.09	0.08	0.11	−0.08	−0.02	0.03	−0.04	−0.02	0	0.01	0.07	−0.03	0.01	−0.04	0	−0.01	−0.03

Workplace Size and Careers

Table 2 presents our fixed effects analyses of *workplace size*. Hypothesis 1 predicts that workers would be more likely to take jobs at large workplaces early in their careers. The hypothesis is supported: *experience* has consistent, negative effects on *workplace size*. These findings demonstrate an overall move from large workplaces to small workplaces. The magnitude of the effect is substantial: based on the coefficient from Model 3, workers taking a job after 10 years of experience will move into workplaces that are only 30% the size of their initial workplace.[7]

Hypothesis 3 suggests that the effects of *experience* on *workplace size* will be moderated by the local proportion of jobs in occupationally intensive industries. We test Hypothesis 3 by including an interaction term between *experience* and *regional proportion of occupationally intensive jobs* (because each respondent is assigned to a single MSA, any non-time-varying MSA-level variables, such as the uninteracted *regional occupational intensity* variable, are collinear with our individual fixed effects). We centered the variables before creating the interaction term to reduce problems of collinearity and assist in interpretation (Aiken and West 1991). We find that the effects of experience on *workplace size* are stronger in MSAs with a higher proportion of jobs in the technology industry, consistent with Hypothesis 3 (Models 3 and 4); workers are more likely to follow skill-based career ladders when there are more attractive jobs available.

Among the controls, we find no effect of *school-to-work* transitions on *workplace size*. This suggests that differences in recruiting strategies are not an important influence on *workplace size* early in the career. We do find that the *number of jobs* a worker has had is positively related to *workplace size*. Additional analyses revealed this to be a spurious correlation. Because turnover is higher from small workplaces, people who have had more jobs are more likely to have previously worked in small workplaces. Given the mathematical limits on workers' ability to move to even smaller workplaces, these workers are less likely to move to smaller workplaces over time. We also find in Model 4 that experienced workers are more likely to move from larger to smaller workplaces when IT workers have higher average pay. The effect disappears in Model 5, however, due to a more limited sample, and we find opposite effects when we restrict our sample to generalist firms in Model 6.

Three models in Table 2 examine whether changes in *workplace size* are driven by moves to technology-intensive industries (we only include job spells for which we have industry data in these analyses). Model 5 shows that the effects of experience are unchanged by controlling for whether organizations are in occupationally intensive industries. We also tested whether our effects are shaped by career paths that take place solely within occupationally intensive industries: in Models 6 and 7, we split the sample into job spells that are within occupationally intensive industries and job spells that are in

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Table 2 Longitudinal Analysis of Log Workplace Size Using Individual Fixed Effects

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
	All jobs	All jobs	All jobs	All jobs	All jobs	Generalist	Occupationally intensive	All jobs	All jobs
Married female, children	−0.480	−0.481	−0.488	−0.406	1.460*	2.068		1.570**	−0.509
	[0.717]	[0.711]	[0.734]	[0.721]	[0.812]	[1.435]		[0.785]	[0.683]
Married male, children	0.0188	−0.006	−0.044	−0.023	−0.253	−0.007	−0.605	−0.144	−0.035
	[0.235]	[0.230]	[0.237]	[0.237]	[0.329]	[0.546]	[0.459]	[0.311]	[0.236]
Bubble	−0.069	−0.042	−0.037	−0.027	0.194	0.081	−0.097	0.166	−0.022
	[0.118]	[0.121]	[0.119]	[0.118]	[0.271]	[0.320]	[0.376]	[0.225]	[0.115]
Number jobs		0.159*	0.179*	0.180**	0.364***	0.521***	−0.140	0.397***	0.183*
		[0.074]	[0.073]	[0.072]	[0.134]	[0.192]	[0.337]	[0.120]	[0.072]
First job		0.012	0.028	0.015	−0.040	−0.126	0.562	−0.004	
		[0.130]	[0.130]	[0.131]	[0.211]	[0.323]	[0.649]	[0.212]	
Experience	−0.075***	−0.117***	−0.114***	−0.118***	−0.184***	−0.217***	−0.034	−0.173***	
	[0.017]	[0.025]	[0.034]	[0.031]	[0.046]	[0.054]	[0.105]	[0.042]	
Experience ∗ mean workplace log size (MSA)				−0.037	0.121	0.088	0.108	0.123	
				[0.053]	[0.119]	[0.128]	[0.357]	[0.110]	
Experience ∗ relative IT pay (MSA)				−0.320**	−0.006	0.571**	−0.897	0.027	
				[0.146]	[0.257]	[0.283]	[0.591]	[0.236]	
Experience ∗ regional occupational intensity (MSA)			−2.582***	−2.859***	−3.446**	−4.640***	−1.953	−3.350***	
			[0.570]	[0.598]	[1.417]	[1.408]	[2.952]	[1.264]	
Occupational intensity					−0.990***			−0.828***	
					[0.217]			[0.203]	
Government					0.298	0.402		0.250	
					[0.331]	[0.357]		[0.297]	
Contractor								−1.207***	
								[0.294]	
Self-employed								−3.517***	
								[0.521]	
<2 years experience									0.040
									[0.130]
2–5 *years experience*									−0.508**
									[0.163]
5–7 *years experience*									−0.971***
									[0.221]
7–10 *years experience*									−1.169***
									[0.255]
10–15 *years experience*									−1.327***
									[0.274]
15–20 *years experience*									−1.431**
									[0.483]
>20 years experience									−0.970
									[0.674]
Constant	5.322***	5.107***	4.812***	4.815***	4.702***	4.354***	4.726***	4.715***	5.089***
	[0.054]	[0.162]	[0.174]	[0.170]	[0.408]	[0.556]	[0.771]	[0.358]	[0.125]
Observations	3,709	3,709	3,709	3,709	1,676	1,153	523	1,676	3,709
Number of respondents	0.02	0.023	0.032	0.035	0.089	0.08	0.078	0.18	0.028
R-squared	1,952	1,952	1,952	1,952	1,038	818	389	1,038	1,952

Notes. Robust standard errors are in brackets. Errors are clustered by MSA.
$^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

generalist industries. We do not find effects of experience and region in the occupationally intensive sample; we do find effects within the generalist sample. It is possible that smaller organizations in occupationally intensive industries are better able to train IT workers, reducing size effects. However, the differences between Models 6 and 7 are not statistically significant, suggesting that variation across the models may simply reflect differences in sample size. We can conclude that our effects are not driven by moves solely within or into organizations in technology-intensive industries. Instead, the presence of organizations in occupationally intensive industries within a labor market appears to have a pervasive effect on workers' careers. This may be because all workers hope to get a job in occupationally intensive industries even though some do not; it may also reflect market effects, as the presence of organizations in occupationally intensive industries forces all firms to raise rewards for skills.

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Model 8 includes controls for whether the job was in *independent contracting* or *self-employment*.[8] Unsurprisingly, both forms of employment have substantial effects on *workplace size*. They do not, however, mediate our main effects: declines in *workplace size* over time are not caused by a greater probability of workers moving into *contracting* or *self-employment*.

We also examined whether there were particular phases of experience that led to changes in *workplace size* (Model 9). For example, did the decline occur disproportionately in the earlier or later phases of workers' careers? We examined this question by introducing dummy variables for the different phases of individuals' careers: 0–2, 2–5, 5–7, 7–10, 10–15, 15–20, and over 20 years. The omitted category is zero experience (i.e., the first job; we therefore drop our first job dummy to facilitate interpretation of the coefficients). These analyses indicate a smooth, monotonic decrease in *workplace size* over the first 20 years of the career. This decrease is significant. For example, the dummies for 5–7 and 10–15 years of experience are significantly more negative than the dummy for 2–5 years of experience. This pattern of experience effects is not consistent with the declines in *workplace size* resulting from large firms' unwillingness to invest in firm-specific skills for workers nearing retirement (Hu 2003). Although firms that make large investments in firm-specific skills might be unwilling to invest in older workers, we find that firm size declines from the very beginning of workers' careers, rather than from some point tangibly closer to retirement age.

Although the effect sizes are generally large, the variance explained by the regressions (R^2) is somewhat low. This probably reflects the variety of different factors that influence firms' and workers' preferences, as well as friction in the search and matching process. Although organizational size has an important influence on the jobs workers take at different stages of their careers, it is far from the only factor affecting job search.

Alternative Explanations of Size Effects

We have proposed that changes in the size of individuals' workplaces over their careers are driven by changes in the match between workers' needs for skill development and firms' costs of providing such skill development. In this section, we weigh the evidence for alternative explanations, as well as exploring to whether our findings are predominantly driven by decisions of workers or employers.

An alternative explanation for our findings is that all workers prefer to work in large firms, but that less able workers are weeded out over time. We performed two analyses to assess this alternative explanation (available from the authors). First, we examined whether involuntary turnover was more likely to lead to a move to a smaller workplace than voluntary turnover. This was not the case. Second, we examined whether workers who had lost out on promotion tournaments were more likely to move to a smaller workplace. We combined the responses to five different yes/no questions for each job, asking whether the respondent in that job was ever promoted, had an increase in responsibility, an increase in accountability, an increase in pay, or a demotion. The alpha of the combined scale was 0.75. We then tested whether a failure to be promoted in a job made a transition to a smaller workplace more likely, conditional on the worker moving jobs (we also used a Heckman selection correction to account for the endogeneity of these transitions, with the start date of the previous job as an instrument). We did not find a significant effect of being promoted on the change in workplace size, suggesting that moves to smaller workplaces are not a result of being passed over for promotion.

Our theory emphasizes that both workers and employers benefit from improving the match between workers' preferences and the rewards of the jobs workers take. It is nonetheless worth assessing whether the observed career paths primarily reflect the decisions of workers or employers. For example, are inexperienced workers struggling to convince smaller firms to hire them before they have been trained? We explored this possibility using a subsample of the data that came from a single school, from whom we received grade point average (GPA) information. If workers would prefer to work in small firms on leaving school but struggle to be hired by them, then we would expect that those workers best able to demonstrate their ability—those with higher GPAs—would be most likely to work in small firms in their first job. Yet we found the opposite: workers with higher GPAs were more likely to work in large firms for their first job. This evidence suggests that, on average, workers do prefer to work for larger firms earlier in their careers.

We also explored the converse possibility, that large organizations are reluctant to hire more experienced workers because they restrict hiring to lower-level ports of entry (Doeringer and Piore 1971). Although it is difficult to entirely rule out such a story, neither the empirical nor theoretical evidence is compelling. Empirically, we find that *workplace size* changes smoothly with *experience* (Model 9). If large firms are only willing to hire workers into more junior levels, then we would expect to see a sharp initial decline in moves to large organizations, because workers were no longer willing to move back toward entry-level jobs. Instead, the decline in *workplace size* seems more gradual and monotonic, suggesting that hiring declines gradually up the levels of the organization. The theoretical grounds to believe that larger firms would be more likely to restrict hiring to ports of entry are also weak. The only study to examine which jobs restrict hiring to ports of entry found no effect of firm size on such restrictions (Pfeffer and Cohen 1984). More broadly, research has found very

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limited effects of ports of entry on hiring in practice (Baker et al. 1994, DiPrete 1987). Evidence suggests that firms adopt an internal labor market because of the difficulties they encounter in hiring more senior workers in tight labor markets, not because they do not want to do so (Bills 1987, Osterman 1984). All of this evidence suggests that restricted entry at higher levels of large organizations is not an important driver of our results.

On the worker side, we were able to confirm that moves from larger firms to smaller firms were consistent with changes in workers' preferences. First, we confirmed that larger workplaces offered more skill development; respondents were asked to rate their current job along a variety of dimensions, including their opportunities for development and advancement ("I have opportunities in this job to learn new skills that could help me get a better job in the future," and "I have opportunities to advance my career in this job"; alpha $= 0.75$). Regression analyses demonstrated a strong, statistically significant ($t = 3.40$) effect of log *workplace size* on these opportunities for advancement. Second, we confirmed that opportunities for skill development became less important over time. One of the survey questions asked respondents who were currently looking for a job about the job characteristics that were most important to them. Skill development certainly mattered to these workers; "having an opportunity to gain new skills" was the second most sought-after job characteristic (a fair supervisor was the first). Consistent with our arguments and prior findings, we also found that experience had a negative effect on how workers rated the importance of learning. Logit analysis indicated that an additional year of experience made workers 8% less likely to describe learning new skills as very important to them ($t = 3.14$). Hence, although we cannot demonstrate that moves from larger to smaller firms were driven by the choices made by workers, we do find that such moves are consistent with observed changes in workers' preferences.

Organizations in Occupationally Intensive Industries

Table 3 presents the results of analyses of occupational intensity. Hypothesis 2 proposes that workers would be more likely to take jobs in organizations in occupationally intensive industries later in their careers. We find support for this hypothesis: the more work experience that workers have accrued, the more likely they are to work in organizations in occupationally intensive industries. The effects of experience are attenuated by inclusion of *workplace size* in the analysis, but they remain significant, albeit at reduced levels. These coefficients also suggest substantial effect sizes. Based on Model 2, each year of experience raises the probability that a worker will take a job in an organization in an occupationally intensive industry by 3.7% (evaluated using a person fixed effect of zero).

Table 3 Determinants of Jobs in Organizations in Occupationally Intensive Industries

	Model 1	Model 2	Model 3
Married female, children	0.003	−0.094	0.027
	[1.144]	[1.162]	[1.008]
Married male, children	−1.355**	−1.345**	−1.386**
	[0.456]	[0.428]	[0.435]
Bubble	−0.007	−0.045	0.0319
	[0.212]	[0.211]	[0.211]
Number jobs		−0.215	−0.152
		[0.141]	[0.140]
First job		−0.124	−0.118
		[0.238]	[0.260]
Log *workplace size*			−0.209***
			[0.0475]
Contracting job			0.129
			[0.407]
Self-employment			0.463
			[0.620]
Experience	0.092**	0.143***	0.106**
	[0.030]	[0.035]	[0.034]
Observations	497	497	497

Notes. Conditional logit models are shown, grouped by respondent. The dependent variable is whether a job spell is in an organization in an occupationally intensive industry. Robust standard errors clustered by MSA are in brackets.
$^{**}p < 0.01$; $^{***}p < 0.001$.

Determinants of Turnover

Table 4 presents analyses of the rate of turnover. We find support for Hypothesis 4, that regions with a higher proportion of jobs in organizations in occupationally intensive industries have higher turnover from large workplaces. We see a positive, significant interaction between *workplace size* and *local proportion of jobs in occupationally intensive industries*. This result confirms our hypothesis that workers are more likely to move out of the lower rungs of the interorganizational ladder when there are more attractive opportunities in the labor market.

Controls in the turnover models have the expected effects. Note that the bubble at the end of the 1990s disproportionately affected turnover out of large workplaces. We interpret this as supporting our basic argument. Just as returns to skills are higher in occupationally intensive regions, so were they also higher during the technology bubble. These increased returns appear to have disproportionately affected turnover of those workers who had sought to develop their skills in larger organizations.

Discussion

This article develops our understanding of interorganizational careers by showing how highly skilled workers move across different kinds of organizations as their

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Table 4 Determinants of Turnover

Model	1	2	3	4	5	6
Individual variables						
Number jobs	0.140***	0.141***	0.115	0.139***	0.11	0.119
	[0.039]	[0.039]	[0.068]	[0.039]	[0.068]	[0.067]
First job	−0.194*	−0.200*	−0.213	−0.202*	−0.225	−0.233*
	[0.079]	[0.078]	[0.116]	[0.079]	[0.115]	[0.115]
Master's	0.015	0.018	0.007	0.023	0.013	0.005
	[0.056]	[0.056]	[0.088]	[0.056]	[0.088]	[0.088]
PhD	0.264	0.278	0.483	0.262	0.479	0.475
	[0.170]	[0.174]	[0.295]	[0.175]	[0.305]	[0.294]
Married male, children	−0.226*	−0.231*	−0.091	−0.232*	−0.067	−0.064
	[0.104]	[0.105]	[0.156]	[0.106]	[0.156]	[0.157]
Married female, children	−0.961**	−0.988**	−1.326*	−0.983**	−1.294*	−1.312*
	[0.354]	[0.360]	[0.562]	[0.359]	[0.559]	[0.562]
Married male, no children	−0.018	−0.015	−0.014	−0.014	−0.004	−0.006
	[0.063]	[0.063]	[0.094]	[0.063]	[0.094]	[0.094]
Married female, no children	−0.205*	−0.195*	−0.190	−0.193*	−0.181	−0.177
	[0.092]	[0.092]	[0.124]	[0.091]	[0.124]	[0.123]
Single female, no children	−0.064	−0.071	−0.097	−0.067	−0.075	−0.076
	[0.126]	[0.126]	[0.166]	[0.125]	[0.167]	[0.165]
Experience	−0.074***	−0.073***	−0.089***	−0.072***	−0.089***	−0.091***
	[0.014]	[0.014]	[0.023]	[0.014]	[0.023]	[0.022]
Job and region variables						
Log *workplace size*	−0.128***	−0.132***	−0.122***	−0.133***	−0.123***	−0.123***
	[0.012]	[0.012]	[0.018]	[0.012]	[0.019]	[0.019]
Job began in bubble	−0.024	−0.026	0.020	−0.020	0.032	0.028
	[0.059]	[0.059]	[0.090]	[0.059]	[0.090]	[0.090]
Bubble	0.287***	0.286***	0.212**	0.292***	0.214**	0.216**
	[0.052]	[0.052]	[0.081]	[0.052]	[0.081]	[0.081]
Mean workplace log size (MSA)	−0.077	−0.065	−0.090	−0.072	−0.088	−0.078
	[0.106]	[0.107]	[0.153]	[0.105]	[0.149]	[0.149]
Relative IT pay (MSA)	0.573*	0.536*	0.699	0.529*	0.683	0.678
	[0.248]	[0.246]	[0.383]	[0.246]	[0.380]	[0.380]
Regional occupational intensity (MSA)	4.054**	4.205**	0.829	4.246**	0.833	1.424
	[1.305]	[1.292]	[2.206]	[1.292]	[2.215]	[2.182]
Contractor	1.113***	1.130***	1.157***	1.132***	1.139***	1.136***
	[0.181]	[0.172]	[0.211]	[0.171]	[0.212]	[0.209]
Self-employed	−0.785***	−0.820***	−0.724**	−0.803***	−0.666*	−0.688*
	[0.160]	[0.162]	[0.266]	[0.164]	[0.273]	[0.272]
Government sector			−0.074		−0.061	−0.080
			[0.104]		[0.104]	[0.104]
Occupationally intensive (Tech)			0.120		0.116	0.102
			[0.085]		[0.085]	[0.084]
Interactions						
Log *workplace size* × *bubble*				0.060**	0.092**	0.093**
				[0.012]	[0.023]	[0.030]
Log *workplace size* × mean log *workplace size* (MSA)				−0.023	−0.031	−0.024
				[0.050]	[0.073]	[0.074]
Log *workplace size* × *relative IT pay* (MSA)				−0.058	0.087	0.103
				[0.115]	[0.166]	[0.166]
Log *workplace size* × *Experience*				0.002	0.003	0.003
				[0.004]	[0.005]	[0.005]
Occupational intensity × *regional occupational intensity*						−8.099*
						[4.001]
Log *workplace size* × *regional occupational intensity*		1.583**	2.125*	1.636**	2.465**	2.254*
		[0.566]	[0.883]	[0.609]	[0.932]	[0.919]
Number of subjects	3,742	3,742	1,690	3,742	1,690	1,690
Number of failures	1,880	1,880	825	1,880	825	825

Notes. Cox proportional hazard models are shown. Internal transfers and involuntary turnover are treated as censored spells. Robust standard errors are in brackets.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

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careers develop. We introduce organization-level differences into matching models of careers to predict how the match between workers and jobs in different kinds of organizations might change over time. We argue in particular that individuals will work in large organizations (which provide more skill development) earlier in their careers and work in organizations in occupationally intensive industries (which have higher demands for those skills) later in their careers. Our longitudinal analysis of the careers of IT workers supports our predictions. We show that workers tend to begin their careers in larger workplaces but gradually move toward smaller workplaces as their careers unfold. We also find that workers are more likely to move into workplaces in occupationally intensive industries as they gain experience. Our findings further demonstrate how these moves are shaped by the local labor market; workers are more likely to move from larger firms to smaller firms in geographic regions where the organizational population rewards skills. Such occupationally intensive regions also show disproportionate increases in turnover from large firms, revealing another feature of interorganizational career ladders: workers respond differently to outside opportunities depending on the nature of their current organization.

Caution is required in generalizing these findings based on a single, highly skilled occupational group at a particular stage of their career. Acquisition of general skills may play a less prominent role in the careers of other occupational groups; the dynamics of interorganizational careers may also be different in occupations with stronger institutions, such as law, accounting, or medicine. The retrospective nature of the survey data may also introduce recall bias (but see Oyer 2004). Data collected via ongoing longitudinal surveys would be of higher quality, but more difficult to collect. It would be particularly valuable to gather longitudinal data on preferences to confirm the importance of interorganizational moves for maintaining a dynamic match between those preferences of workers and the nature of their jobs. The specific survey that we draw on also has some important limitations, including no measure for overall firm (rather than establishment) size, missing data in our measurement of industry, and a lack of geographic information for individual job spells. We also do not have information on jobs that workers take when they leave the IT field. Understanding how careers proceed across occupations would provide a complementary perspective on the dynamics of modern careers.

This paper makes several contributions to research on careers. Much has been written recently on boundaryless careers (Arthur and Rousseau 1996), and consistent with that perspective, most workers in our sample moved firms, pursuing careers across organizations. Yet we show that these transitions often occur in predictable directions; although modern careers may be boundaryless, they are not haphazard. We provide evidence that careers across organizations follow their own logic, as workers link together jobs across different kinds of organizations to match their evolving career needs. Our study also contributes to broader careers research on how workers meet their changing needs over the course of their work life (Schein 1978). Our study highlights interorganizational transitions as an important means by which workers accommodate these changing needs. To the extent that different kinds of organizations offer different rewards, workers can move across organizations over time to reflect their changing needs.

As we have indicated in this paper, careers are shaped by the interaction of workers and organizations. Our study of careers therefore contributes to our understanding of how organizations compete for workers in the labor market. Baron (2004) recently argued for the importance of understanding the different labor market niches organizations occupy, guiding the kinds of workers they attract and employ. Our research suggests that one fruitful way of thinking about labor market niches may be to define them in relation to career stages. We show how individuals pass through different kinds of organizations at different stages of their careers, so that organizations end up specializing in the hiring of workers at different career stages. Our findings also suggest a substantial degree of interdependence among different organizations' labor market strategies. In particular, small organizations and organizations in occupationally intensive industries rely on large organizations and organizations in less occupationally intensive industries for a supply of trained workers.

Our findings also hold implications for research on how worker mobility enhances interfirm knowledge flows (Boeker 1997, Rosenkopf and Almeida 2003). Of particular interest, Almeida et al. (2003) find the effects of worker mobility on learning to be most important for small firms. Our model of interorganizational career ladders suggests an underlying mechanism: many workers leaving large firms are precisely those who have gained skills and are now motivated to use them in another type of workplace. The small-firm recipients of these worker flows may benefit twice over, by attracting this valuable pool of workers and also being better able to utilize the incoming knowledge.

We also contribute to research on the IT workforce (e.g., Ang et al. 2002, Levina and Xin 2007, Mithas and Krishnan 2008). By mapping the flows of IT workers across organizations, we show how IT workers draw on opportunities in different kinds of organizations as they first build and then utilize skills. Some aspects of our findings are somewhat surprising from the perspective of the IT literature. Cross-sectional analysis of the

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CPS by Levina et al. (2003) found that younger workers were more likely to work in more technologically intensive industries. We find that less experienced workers are *less* likely to work in such industries. The difference between these findings may reflect the presence of cohort effects in cross-sectional analysis. Given their rates of growth, firms in technology-intensive industries may have engaged in hiring more recently than generalist firms. They may therefore have hired from younger cohorts, even though a given worker is more likely to work in more technology-intensive industries later in his or her career (Lawrence and Tolbert 2007). Our results suggest that, controlling for these cohort effects, workers are more likely to work for technology-intensive industries over time.

Workers' moves to smaller workplaces over time also seem at odds with the established finding that larger workplaces pay more in IT (Ang et al. 2002), as well as the economy as a whole (Villemez and Bridges 1988). Why then are workers moving out of these workplaces as they acquire skills? It is notable that our transitions to smaller workplaces are not being driven by involuntary turnover, or even a failure to be promoted. Transitions between organizations seem instead to reflect differences in formal and informal skill development. Our findings are most supportive of the wage premium for larger workplaces representing a compensating differential that makes up for worse working conditions in other ways.

Finally, our study contributes a new perspective to the large literature on turnover. Scholars have examined a wide range of influences on organizational exit, including satisfaction with the current job and the nature of alternative opportunities (Hom and Kinicki 2001, Lee and Mitchell 1994). We suggest that the interaction between a worker's type of organization and his or her environment is an important driver in predicting turnover across a given population of workers and organizations. When there are more-attractive jobs for experienced workers, turnover will be higher among the organizations that disproportionately recruit inexperienced workers. One implication of this perspective is that turnover need not reflect mistakes by either workers or organizations in the initial hiring process. Some workers may choose to work for large organizations knowing that they plan to exit once they have acquired valuable skills. Attending to such planned turnover may improve our understanding of job mobility.

Future Directions for Research on Interorganizational Careers

Examining how individuals move across different kinds of organizations over the course of their careers provides a novel means for thinking about how careers are structured. Previous research has explored how the process of attainment is shaped by career ladders within organizations, vacancy chains, and occupational institutions (Gaertner 1980, Tolbert 1996). We show that we can also understand the structure of careers by exploring the way individuals move across different kinds of organizations over time. Although we focus on the role of two salient organizational attributes, size and industry, many other attributes may also affect the role that organizations play in workers' careers. For example, it may be more important for workers to join high-status organizations earlier in their careers to signal their value to future employers. We may also see structured movements along supply chains, for example, if spending time in a customer organization is particularly valuable for those who go to work for suppliers.

Similarly, we have explored how a single determinant of matching, workers' desire for and level of skills, shapes changes over the career. Research suggests that many other worker attributes change over the career, including preference for high income, need for a sense of accomplishment, and desire for job security (Cherrington et al. 1979, Rhodes 1983, Tolbert and Moen 1998). Such changes will also affect the kinds of jobs that workers want, and hence the kinds of organizations that they most want to join. For example, it is possible that older workers will be more likely to work in industries that provide less income but a higher level of intrinsic satisfaction. Future research should explore how these changes affect moves across different kinds of organizations.

Exploring these questions can help us to understand the interorganizational equivalents of the more structured firm and occupational internal labor markets. Much of the early impetus behind the study of those internal labor markets was that they gave structure to worker flows above and beyond that shaped by the laws of market supply and demand. The contention of this paper is that flows across organizations are structured too, as workers move across different kinds of organizations over time. Understanding these flows can allow us to uncover the deep structure of labor markets and shed new light on the strategies of workers and firms that shape the processes of economic attainment.

Acknowledgments

The authors thank Roxana Barbulescu, Diane Burton, Peter Cappelli, Henrich Greve, Arne Kalleberg, Katherine Klein, John Paul MacDuffie, Paul Osterman, Evan Rawley, Lori Rosenkopf, Jesper Sørensen, Valery Yakubovich, the Slump Management Research Group, seminar audiences at Cornell and University of Chicago, editor Pam Tolbert, and two anonymous reviewers for their comments, suggestions, and advice on this paper. They are particularly grateful to Steve Sawyer and Mark Wardell for providing them with access to data they collected under National Science Foundation Grant 0204253.

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Appendix. Potential Biases from Geographic Mobility

An important limitation of our data is that we lack time-varying addresses for workers. Instead, we assume that the workers in our sample have continued to work in the same MSA throughout their careers. We assessed three potential biases from this assumption. First, we explored the extent to which workers moved further away from their university over time (college of graduation has strong effects on where workers in our sample live). On average, we found that workers moved only 28 km further away from college with each job that they took ($t = 2.27$). Given that the median distance from college in our data was 153 km and the median number of jobs was two, such diffusion away from the university appears only a minor effect in our data.

Second, we examined whether workers might systematically move toward areas with higher regional occupational intensity over time. We found no evidence for such patterns: more experienced workers were not significantly more likely to live in more occupationally intensive regions ($t = 1.29$), nor were workers who had had more jobs more likely to live in more occupationally intensive regions ($t = 0.95$). We conclude that our results are not materially biased by workers moving toward more occupationally intensive regions over time. Instead, geographic moves within workers careers appear largely random.

Third, we examined whether changes in measurement error over time might lead MSA-related variables to have stronger effects later in workers' careers, rather than earlier. If workplaces were generally smaller in highly occupationally intensive regions, then the interaction between experience and regional occupational intensity in Table 2 might simply reflect the greater accuracy with which occupational intensity is measured in later periods. We eliminate this bias by controlling for the interaction between *experience* and the mean *size of workplaces* that IT workers work in Table 2. The absence of any effect on this variable demonstrates that our results are not affected by changes in measurement error over time. Although measurement error is undoubtedly a problem in our geographic variables, we conclude that it is not a cause of spurious findings.

Endnotes

[1]Haveman (1995) proposed an alternative interaction effect, in which turnover from large firms would react more slowly to the environment than turnover from smaller firms, but failed to support her hypothesis.

[2]We avoid directly hypothesizing about the effects of workplace size on turnover. Although workers' desire to leave following skills acquisition may increase turnover from large workplaces, other effects such as increased opportunities for mobility within the workplace (Kalleberg and Mastekaasa 1998) will have a confounding effect. Similarly, we do not offer a hypothesis about the interaction between experience and workplace size. On the one hand, our arguments suggest that workers become less of a good fit for large organizations as they gain experience, increasing their turnover from large firms. On the other hand, workers who join firms with higher levels of experience may not be joining because of opportunities for skill development, making them more likely to remain at the firm. These opposite effects make it difficult to develop a clear prediction.

[3]We found that 11.5% of our sample (262 workers) had left the IT workforce since starting work, defined as leaving an IT job prior to the beginning of 2003 and not taking up another IT job. Inspection of the reasons for leaving these jobs indicated that 18% of these exits were for personal reasons such as starting a family, 2% were for retirement, and 11% were to return to education. We also found that those exiting the IT workforce were slightly more likely to have been laid off (15% versus 10% of all exits) and substantially less likely to say they were leaving to take a better job (15% versus 40% of all exits). Only 6% of these exits from IT described their reason for exit as a career change. It is possible that some of those exits were to pursue careers in general management: workers with more management responsibility were more likely to exit the sample. Given the infrequency of exits due to promotions or moves to better jobs, though, such moves into general management are likely not an important reason for sample attrition. We do not believe that these early exits from our sample will bias our results, although they restrict our analysis to career paths that remain within IT.

[4]Our hypotheses regarding shifts in organizational size and industry do not require us to differentiate internal versus external mobility—moves within the same company versus between companies. However, it is important to understand to what extent transitions in our data involved internal versus external moves. The phrasing of the questions encouraged individuals to focus on external transitions in defining jobs. For example, within each job spell, respondents were asked whether they had experienced a promotion within that job. Nonetheless, it is possible that some transitions were internal rather than external. We explored the proportion of internal transitions by examining which transitions involved changes in industry or workplace size. Where transitions were to a workplace of the same size and same industry, we then explored the reasons given for the transition. This method suggested an upper bound of 3% of the transitions as being within the same workplace. We therefore interpret our transitions as overwhelmingly representing external mobility.

[5]Of the 30% of respondents to the industry question who chose one of the five options provided, slightly over half answered manufacturing. It is possible that some of those manufacturing jobs may have been within the computer hardware segment. This problem introduces measurement error into our analyses, making it less likely that we would find an effect. It should not otherwise bias our results.

[6]We validated the resulting classification of jobs spells into *occupationally intensive* and *generalist* instances by collecting resumes for 76 of our respondents using public data from a social networking site. The two authors then coded the 90 of those respondents' job spells for which employers were identified based on whether they were in organizations in occupationally intensive industries. This procedure yielded correspondence rates of 80% and 83%, indicating a high degree of accuracy for this measure.

[7]This effect does not reflect a higher overall prevalence of jobs in small firms versus large firms, because relative availability of jobs in small and large firms should have equal effects on *workplace size* for experienced and inexperienced workers.

[8]A particular concern with contracting job spells is that it is difficult to know whether such spells encompass work performed for a single organization, or work that was done for

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multiple different organizations, because spells were defined by the respondents. In analyses not shown, we excluded these spells from our models with no effect on results.

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