

WHO LEAVES, WHERE TO, AND WHY WORRY?
EMPLOYEE MOBILITY, EMPLOYEE ENTREPRENEURSHIP, AND EFFECTS
ON SOURCE FIRM PERFORMANCE

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Abstract

We theorize that differences in human assets' ability to generate value are linked to exit decisions and their effects on firm performance. Using linked employee-employer data from the U.S. Census Bureau on legal services, we find that employees with higher earnings are less likely to leave relative to employees with lower earnings, but if they do leave, they are more likely to move to a spin-out instead of an incumbent firm. Employee entrepreneurship has a larger adverse impact on source firm performance than moves to established firms, even controlling for observable employee quality. Findings suggest that the transfer of human capital, complementary assets, and opportunities all affect mobility decisions and their impact on source firms.

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Human assets often represent an organization's key competency and source of competitive advantage (Coff, 1997; Lippman & Rumelt, 1982; Teece, 1982). Organizational procedures, norms, and routines are important repositories of firm-specific knowledge (March, 1991; Nelson & Winter, 1982), yet employees are the most important repository for such knowledge, because organizations learn either through their employees' learning or by hiring employees who bring in new knowledge. Indeed, Simon (1991) called the relationship between organizational and individual knowledge 'symbiotic.' However, as Coff eloquently argued, translating human assets to sustainable competitive advantage is fraught with management dilemmas, given the obvious fact that employees "walk out the door each day, leaving some question about whether they will return" (1997: 375). Employee mobility puts firms in the precarious position of not only losing their competitive advantage, but indirectly enabling their competition via the transfer of human assets, routines, and opportunities to either established firms within the same industry or to "spin-outs" (i.e., employee entrepreneurship).¹

A rich literature documents strong support for knowledge spillovers or transfer through employee mobility (Agarwal, Ganco, & Ziedonis, 2009; Almeida & Kogut, 1999; Bhide, 1994; Franco & Filson, 2006; Oettl & Agrawal, 2008; Rosenkopf & Almeida, 2003) and employee entrepreneurship (Agarwal, Franco, Echambadi, & Sarkar, 2004; Franco & Filson, 2006; Hellman, 2007; Klepper & Sleeper, 2005; Phillips, 2002). These scholars have amassed a substantial body of evidence about the advantages of "learning through hiring" (Simon, 1991) for recipient organizations. However, less is known about what types of employees are most likely to leave, what types of firms they are most likely to join, and what competitive ramifications the transfer of human assets has for the performance of the "source firm" (in our context, a firm from which the focal employee exited to either join an established firm or entrepreneurial start-up).² These questions are critically important to address, not only from the micro perspective of an individual employee's

¹ A spin-out is defined as a start-up founded by a former employee of an established firm within the same industry. Employee movement between organizations that have ownership affiliations are typically not considered employee entrepreneurship or mobility events (e.g., Agarwal et al., 2009).

² Some initial research suggests that high-ability individuals are more likely to found start-ups (Braguinsky, Klepper and Ohyama, 2009; Groysberg, Nanda, & Prats, 2007). Further, the performance of source firms is negatively impacted, particularly when mobile employees join rivals (Somaya, Williamson, & Lorinkova, 2007) or found competing start-ups (Phillips, 2002; Wezel, Cattani, & Pennings, 2006).

ability to generate and appropriate value, but also from the macro perspective of a firm's strategic management of its human assets and resultant competitive advantage.

Anecdotally, these issues are best exemplified by the now classic lore of the genesis of Fairchild Semiconductor and its spin-outs. The “traitorous eight”—Shockley Semiconductor Laboratories’ most talented yet underutilized employees, who included Robert Noyce and Gordon Moore—attempted to negotiate William Shockley’s replacement with company founder Arnold Beckman when they disagreed with Shockley about the prospects of his technology (Moore & Davis, 2001; Shurkin, 2006). When these efforts did not result in Shockley’s replacement, the eight researchers tried to offer themselves as a team to Shockley’s rivals (Moore & Davis, 2001; Holbrook, Cohen, Haunshell, & Klepper, 2000). However, realizing that they might encounter similar constraints at another established firm in leveraging their talents, the eight employees ultimately chose to recreate the necessary complementary assets (both physical and human) to form a new venture: Fairchild Semiconductor (Moore & Davis, 2001; Holbrook et al., 2000). History repeated itself at Fairchild; numerous “Fairchildren,” including Intel, were formed by talented employees who not only left themselves, but also transferred or replicated other core and complementary assets when they engaged in employee entrepreneurship (Moore & Davis, 2001). As Gordon Moore noted about the first of Fairchild’s spin-outs:

One day we came to work and discovered that Baldwin, along with a group of people he had suggested we hire, were leaving to set up a competing semiconductor company (Rheem) just down the road. He and his group took with them the “recipes” for manufacturing we had developed. (Moore & Davis, 2001: 4)

Importantly, although Silicon Valley and the semiconductor industry thrived as a result of such initiatives, parent firms Shockley and Fairchild Semiconductor either exited or were marginalized, their erstwhile competitive advantage seriously eroded by the continual loss of critical assets through employee mobility and entrepreneurship (Holbrook et al., 2000; Moore & Davis, 2001). Having learned the cost of losing valuable employees and helping to create his own competition, when Moore started Intel, he made employee entrepreneurship extremely difficult (Moore & Davis, 2001).

These lessons are perhaps not lost on Google, which was recently reported to have taken innovative steps in response to an exodus of talented employees (Morrison, 2009). Given concerns that growth may now prevent talented employees from having the same impact they did when Google was smaller, the company is attempting to identify those at risk of exit, developing sophisticated search algorithms to "get inside people's heads even before they know they might leave" (Morrison, 2009: B1). Particularly notable is that Google's strategy for retaining its human assets is not being used "across the board" for all employees, but targeted toward a differential assessment of who feels the most underutilized and who generates the most value (Morrison, 2009). In part, this may also be a reaction to the "xoogler" phenomenon ("xoogler," a contraction of "ex-Google," is pronounced "zoogler"): employees of Google leaving to create start-ups (Fost, 2008). Google's concern with employee entrepreneurship is due not just to the transfer and replication of relevant knowledge and experience, but also to employees' heightened ability to convince the colleagues best-suited to their new projects to join spin-outs, as well as to access venture capital funding through the former Google employee network (Fost, 2008). Indeed, one key aspect of assessing the importance of this type of movement for parent firms is whether employee entrepreneurship has a significant impact on them. Missing from accounts of Google's secret algorithm for identifying potential "brain drain" (Morrison, 2009) is information on whether and how Google is assessing the impact of employees' moves to established firms or spin-outs.

The above examples illustrate that a comprehensive understanding of the relationship between employee mobility, employee entrepreneurship, complementary assets, and source firm performance across micro and macro levels of analysis is important for several reasons. At the individual level, an understanding of potential career trajectories as a function of both individual-level human assets and the requisite complementary assets may enable employees to make more informed choices about whether they should leave organizations and where they should go. At the firm level, strategic management of human assets requires firms' managements to be aware of the differential likelihood of mobility among their employees, so that they can devise strategies that decrease the risk of losing their most valuable human assets, mitigate the potentially negative

performance consequences of moves, and assess the differential likelihood of moves to rivals versus to spin-outs. At an industry level, the answers to these questions relate to the competitive dynamics between established firms and entrepreneurial start-ups, given the potentially different pressures on source firms resulting from employee movement to established firms versus to spin-outs.

We examined our research questions in the empirical context of the legal services industry—a professional context where knowledge residing in human assets is critical for the creation and appropriation of value. Using data derived from a custom extract of the Longitudinal Employer-Household Dynamics (LEHD) Project used at the U.S. Census Research Data Center in Chicago, we tested our predictions about who leaves, where they go, and the impact of the mobility events on source firm performance. At the individual employee level, we found support for our hypotheses that higher-income earners are less likely to be mobile, but if they do leave, are more likely to be involved in founding a new firm. At the firm level, we found that employee moves to a spin-out have a larger adverse impact on source firm performance than moves to established firms, even after controlling for observable employee quality differences. We also found that the adverse impact of employee entrepreneurship on source firm performance increases with employee earnings.

In addressing these questions, we contribute to the literatures on human resource management (HRM), strategy, entrepreneurship, and to economics and management issues salient to the professional services context. We connect the fields of HRM and strategy by extending Teece's (1986) framework of complementary assets to the micro level mobility decisions of individual employees and the impact of these decisions on macro level firm outcomes. Through this framework, we augment the understanding of how employees and employers generate and appropriate value and the extent to which complementary assets may affect each party's bargaining power vis-à-vis the other. Our research also contributes to the connection between strategy's knowledge-based view and research on knowledge spillovers through employee mobility and employee entrepreneurship by simultaneously examining both the determinants and the effects of knowledge transfer through employee moves to established firms versus employee entrepreneurship.

Further, in keeping with Schumpeter's (1934) concept of creative destruction, we explicitly capture the destruction of source firm value wrought by the creation of spin-outs.

Finally, we add to the growing literature on economics and management issues in the professional services sector. Professional services now account for almost half of the US Gross Domestic Product (GDP) (Bureau of Economic Analysis, 2008), and we extend recent work focused on explaining the size and structure of firms in this important context.³ Our work highlights the role of bargaining power of individual employees, given ability to create new opportunities by reconfiguring complementary assets to make their human assets more productive.

THEORETICAL FRAMEWORK AND HYPOTHESES

Human assets have been recognized as an integral part of value creation, and their value increases with the knowledge intensity of an industry (Coff, 1997; Lippman & Rumelt, 1982). Simon (1991) emphasized that learning occurs in the minds of individuals: organizations learn either by their employees learning or by hiring new employees with new knowledge. The latter type of learning highlights the importance of human assets as a conduit for knowledge transfer or spillover, since employees are free to quit at will (Aldrich & Pfeffer, 1976; Boeker, 1997; Coff, 1997). Indeed, a rich body of literature provides strong support for knowledge spillover or transfer through employee mobility (Almeida & Kogut, 1999; Bhidé, 1994, Franco & Filson, 2006; Oettl & Agrawal, 2008; Rosenkopf & Almeida, 2003) and employee entrepreneurship (Agarwal, Franco, Echambadi, & Sarkar, 2004; Franco & Filson, 2006; Groysberg, Nanda, & Prats, 2009; Klepper & Sleeper, 2005; Phillips, 2002, Wezel, Cattani, & Pennings, 2006).

Although the above studies extol the benefits to recipient firms of knowledge transfer or spillover through human assets, Coff (1997) highlighted the management dilemmas for source firms inherent in their precarious "ownership" of valuable human assets. In particular, Coff questioned

³ Levin and Tadelis (2005) show that when monitoring the output of a firm is difficult and dependent on the input of several team members, the partnership structure is optimal, providing an explanation for the dominant firm structure in the services sector. Garicano and Hubbard (2007) investigate the benefit of referrals as a form of managerial leverage and its implications for optimal firm size in the services sector. Finally, Rebitzer and Taylor (2007) show that the size of the firm is constrained, given potential mobility, by the ability of employees to capture rents.

whether competitive advantage based on human assets is truly sustainable, absent systems to cope with the associated management dilemmas. Further, Coff's work underscored the need for research that integrates micro level human resource management and macro level strategic management to identify factors that may impact employee and organizational appropriation of value, given heterogeneity in the knowledge embodied in different employees. We attempt such integration in this study, by beginning with a framework that models differences in organizational and employee bargaining power as a function of two dimensions: the importance of a firm's complementary assets to value creation, and the ability of an employee to transfer or recreate the complementary assets outside the firm's boundaries.

Value Appropriation, Relative Bargaining Power, and Complementary Assets

In his seminal article, Teece (1986) identified the importance of complementary assets to core technological know-how in both the creation and appropriation of value. Teece's framework has largely been used to explain strategic management issues of value appropriation by innovating firms in high-technology industries (Franco, Sarkar, Agarwal, & Echambadi, forthcoming; Gans & Stern, 2003; Tripsas, 1997), yet it also sheds light on human resource management issues. Our rationale rests on an important observation made by Hart: "Control over non-human assets leads to control over human assets" (1995: 58).

In Figure 1, we adapt Teece's (1986) depiction of core and complementary assets to the context wherein a firm's complementary assets are important for value creation, and the core knowledge for innovation resides within an employee at risk of exit (the focal employee). The complementary assets may consist of organizational knowledge (e.g., codified routines, knowledge embodied in products and processes, and intellectual property rights), nonhuman complementary assets (e.g., physical capital, contractual relationships with buyers/suppliers, brand equity and reputation), and human complementary assets (e.g., tacit knowledge embodied in other employees). An employee's ability to transfer or recreate complementary assets conditions the relative abilities of

employee and firm to appropriate value, as firms can potentially appropriate the portion of created value that may be lost without these complementary assets (Klein, Crawford, & Alchian, 1978).

The x-axis in Figure 1 represents the relative importance for value creation of a firm's complementary assets to the human assets embedded in the focal employee, and the y-axis represents the employee's ability to recreate or transfer these complementary assets outside the firm's boundaries. The relative bargaining power of the firm and the employee is a function of whether the firm possesses complementary assets that are important for value creation, *and* of whether the employee can walk away with these complementary assets or recreate them at low cost after exit. Accordingly, we differentiate three areas in Figure 1.

If complementary assets are important to value creation *and* not easily reproducible outside a firm (e.g., intellectual property rights on complementary knowledge, specialized physical assets), the firm can easily prevent an employee from leaving and competing with it, limiting the employee's outside options. As a result, the firm will possess greater bargaining power—allowing it to appropriate a higher share of the value created (the area labeled “Firm Advantage” in Figure 1). On the other hand, even when the firm possesses complementary assets that are necessary for value creation, if the employee is able to recreate these easily or easily transfer them to a recipient firm, then the employee has higher bargaining power and may be able to appropriate much of the value created (“Employee Advantage” in Figure 1). For example, to the extent that the important complementary assets reside in other employees (who can also be convinced to quit), or are nonhuman assets that can be recreated outside the firm (e.g., relationships with buyers and suppliers), the employee has a bargaining advantage over the employer. The “in-between” area represents a situation of bilateral bargaining power: the firm's complementary assets are important for value creation, and the focal employee has some but not perfect ability to recreate these complementary assets. In this area, the ability of either the employee or the firm to appropriate value is limited, and other features of the environment may determine the abilities of both.

The human assets embodied in a focal employee (core knowledge) determine what is complementary for value creation. Thus, both dimensions represented in Figure 1 will vary with the

amount of human assets a focal employee embodies. The lower the human assets of the focal employee, the more important are the firm's complementary assets for value creation, and the *less* able the employee will be to transfer and/or recreate these complementary assets.

Who Leaves? Types of Human Assets and Propensity for Exit

In examining questions related to employee propensity to exit, our key underlying construct is the ability of an employee to generate value for an employer. This ability equals the contribution of the employee to the value of the employer when surrounded by the complete set of complementary assets at the employer. This construct, which is highly correlated with employee earnings, is related to many factors, including the employee's innate ability, education, and experience; motivation to work; social network (Shaw et al., 2006); and position and responsibilities in the firm (Elfenbein, Hamilton, & Zenger, 2008; Salamin & Horn, 2005; Williams & Livingstone, 1994; Zenger, 1992). Because these factors vary among individuals, employee ability to generate value within a firm is heterogeneous.

Employees with low human capital are likely to contribute less than those with high human capital to total created value. Further, they are likely to have less ability to recreate or transfer complementary assets, which diminishes their bargaining power and ability to appropriate value. Accordingly, they fall in the "Firm Advantage" area of Figure 1.

Strong skills, education, experience, and work ethic imply higher levels of knowledge embodied in employees. Further, these factors are correlated with promotions, which increase individuals' control and authority in a firm (Greenberg & Ornstein, 1983; Huselid, 1995; Phillips, 2002; Salamin & Horn, 2005; Trevor, Gerhart, & Boudreau, 1997; Zenger, 1992). These employees have higher bargaining power because of their strong contribution to value creation and their ability to replicate necessary complementary assets. As a result, they are able to appropriate a greater share of the value generated because they can credibly threaten to exit and transfer complementary resources and opportunities from a firm. Transferred resources may include technologies identified while working within the firm (Agarwal et al., 2004; Bhide, 1994; Klepper & Sleeper, 2005),

supporting team members (Groysberg et al., 2009), and social networks (Burton, Sørensen, & Beckman 2002). Transferred opportunities may include attracting clients (i.e., a firm's "book") to a new firm (Stull, 2009; Taylor, 2000, 2005), a focus on niche industry segments (Agarwal et al., 2004; Hurley, 2009), and creation of new products and practices (Mondics, 2009; Taylor, 2000). Consequently, high value generators have high bargaining power vis-à-vis their firms and can appropriate most of the value they create.⁴ They are thus likely to be in either the "Bilateral Bargaining Power" or "Employee Advantage" area of Figure 1.

We posit that, although the exit of employees with high human capital diminishes firm value more than does the exit of those with low human capital, the former are less likely to *actually* exit, given their ability to appropriate value to their advantage. This view is consistent with evidence from the HRM literature that firms provide both pecuniary and nonpecuniary benefits to such employees to reduce turnover (Allen & Griffeth, 2001; Salamin & Horn, 2005; Trevor, Gerhart, & Boudreau, 1997; Williams & Livingstone, 1994; Zenger, 1992), often in systems of complementary high-performance wage practices (Huselid, 1995). Since pay satisfaction is often a function of relative rather than absolute pay (Berkowitz, Fraser, Treasure, & Cochran, 1987; McFarlin & Sweeney, 1992), employees often weigh pay differentials among their coworkers more than labor market differentials (Coff, 1997; Nickerson & Zenger, 2008). Thus, firms' sharing "rents" with high-performing employees in the form of higher wages not only increases employees' perceptions of distributive and procedural justice (McFarlin & Sweeney, 1992), but also creates a penalty for exiting (Coff, 1997; Weiss, 1990), given their perception that they are well paid for their performance (Coff, 1997; Lawler & Jenkins, 1990; Zenger, 1992).

Additionally, firms can increase nonpecuniary job satisfaction in several ways. Since professionals and employees with higher levels of knowledge value the intrinsic satisfaction of their work, autonomy, and input (Humphrys & O'Brien, 1986; Raelin, 1991), firms that optimize the fit of

⁴ This may also explain the partnership as the standard governance structure in professional service industries, wherein there is transfer rather than spillover of relevant knowledge and complementary assets. Levin and Tadelis (2005) provided an alternative suggestion: when monitoring the quality of a service is difficult, firms may choose to hire low-quality workers. Since the partnership structure provides an incentive for partners to hire better employees, this explains the preponderance of partnerships within the professional service sector.

their complementary assets to employees' core knowledge better motivate these people to stay and perform well (Hackman & Oldham, 1980). Firms can also increase the value they provide to employees by creating strong internal ties (Dess & Shaw, 2001; Jackson et al., 1991; Lee et al., 2004), thus increasing complementarities with other assets and decreasing the likelihood of exit.

To the extent that the above HRM strategies translate into high-performing employees' having excellent ability to appropriate value and thus gain high earnings, it is not optimal for them to leave a firm and incur the costs and risks of mobility, whether they go to a rival firm or to a spin-out. Although such employees may be able to transfer or recreate a firm's complementary assets outside its boundaries, they are not likely to do so. Coff (1997) provided case study evidence that although high-producing security brokers could leave their current firms with 95 percent of their clients and business, their turnover rate was less than 10 percent, given their firms' "rent-sharing" in the form of pay, performance-based incentives, and high participation in critical management-related decisions. This argument leads us to our first baseline hypothesis:

Hypothesis 1. The relationship between earnings and the likelihood of employee mobility is negative.

Where to? Employee Moves to Spin-outs vs. Established Firms

The above discussion relates employee turnover to employee ability to generate value, but does not distinguish between exiting to an established firm and to a start-up. Groysberg et al. (2009) and Elfenbein et al. (2008) provided some evidence that higher performers or higher earners may be more likely to begin start-ups than are other employees; however, these studies do not offer any theoretical explanation of their empirical findings. We posit that, conditional on mobility, employees with high earnings are more likely to exhibit employee entrepreneurship than to move to established firms⁵.

There are important differences between an employee move to an established firm and employee entrepreneurship. By definition, starting a new enterprise implies undertaking the risk of

⁵ Braguinsky et al. (2009), in a related vein, connect an employee's entrepreneurship ability to their ability to create value for a firm.

operating a new business; the fact that more than a third of new firms do not survive for five years (Agarwal & Audretsch, 2001) attests to the inherent uncertainty of venturing out on your own. Drucker (1985) attributed this high failure rate not to the quality of the ideas or innovations underlying entrepreneurial enterprises, but to the lack of business and management skills among their founders. He stated that although the inertial tendencies of management cause problems in established organizations, the *absence* of management is the biggest problem in new organizations. Anecdotally, Gordon Moore attributed Shockley Semiconductor's failure to its lack of management experience (Moore & Davis, 2001). Thus, for a new firm, the challenges relate to the creation of an organizational structure and the generation of synergies between the core knowledge embodied in people and the complementary assets that are requisite for value creation (the x-axis of Figure 1).

Unlike joining an established firm, starting a new venture requires an individual to address issues related to optimal organization. In this context, the individual's ability to transfer or recreate complementary assets (the y-axis of Figure 1) is key. As discussed above, since earnings are typically correlated with ability, experience, and status, high earners are better than low earners at replicating complementary assets and transferring resources and opportunities outside of the source firms (Agarwal et al., 2004; Bhide, 1994; Burton, Sørensen, & Beckman 2002; Groysberg et al., 2009; Hurley, 2009; Klepper & Sleeper, 2005; Mondics, 2009; Taylor, 2005; Stull, 2009). Further, transferring or replicating these resources and opportunities to "new soil" is easier than trying to graft them onto an existing organization. For example, complex internal networks that create value are easier to replicate when a team, rather than an individual, moves to a new setting, and the likelihood of team mobility is higher when a start-up, rather than an existing firm, is that new setting (Ganco, 2009). Accordingly, high earners founding new firms have higher value creation potential and lower set-up costs and risks than low earners. In contrast, mobile employees with lower earnings may be limited in their ability to replicate complementary assets effectively, and they may be more likely move to established firms rather than to found start-ups.

Additionally, high and low earners may also have different motives. As discussed above, high earners can appropriate most of the value they create, and thus, their motivation for exit could be

twofold. First, they may believe they could generate or appropriate even more value outside their current firm because they see underexploited opportunities, poor fit with their skills, and other such constraints at that firm. These inertial tendencies are likely to exist at other established firms as well, and a move might even exacerbate them, to the extent that differences in corporate culture create a difficult match (Coff, 1997). Thus, if motivated by frustration with parental inertia and perception of underexploited opportunities (Agarwal et al., 2004; Klepper & Thompson, 2008), employees are more likely to move to spin-outs than to existing firms. Second, high earners are likely to have diminishing marginal returns to pecuniary gain and may value nonpecuniary factors such as job satisfaction and autonomy more than low earners (Blanchflower & Oswald, 1998; Gompers et al., 2005; Hamilton, 2000; Puri & Robinson, 2006; Teece, 2003). Starting a new firm enables them to fulfill nonpecuniary aspirations better than moving to an existing firm with constraining norms.

In sum, we expect employees with high earnings to be less likely to move, but if they do move, they are more likely to start new firms. Accordingly,

Hypothesis 2: Conditional on mobility, employees with greater earnings are more likely to join spin-outs than established firms.

Why Worry? Impact on Source Firm Performance

How do the micro level mobility choices of employees affect macro level firm performance? We now turn to the analysis of the impact of moves to established firms and to spin-outs on source firm performance. Keeping to the framework established above, we argue that employees' moves to spin-outs have a greater adverse effect on their source firms' performance than employees' moves to established firms, and that this differential increases with the quality of the mobile human assets.

Regardless of whether an employee goes to an established firm or to a spin-out, the mobility event represents the source firm's loss of the focal human asset as a critical resource (Phillips, 2002). The competitive impact on the source firm of this loss is a function of the recipient firm's ability to capitalize on the focal human asset and will be greater for employee movement to a spin-out than to an established firm because an established firm will find it harder to assimilate the employee's

accumulated firm-specific skills, resources, and idiosyncratic knowledge (Coff, 1997; Polanyi, 1962; Williamson, 1975). Furthermore, Agarwal et al. (2004) showed that spin-outs inherit knowledge from their parents through their founders, while the link between knowledge at one established firm and another after mobility events has not been shown to be as direct or clear.

Moreover, moving to a spin-out also results in a greater replication and transfer of complementary assets, thus impacting the source firm more adversely than a move to an established firm. Wezel et al. (2006) hypothesized that the replication of a source firm's organizational knowledge and routines in a spin-out is a likely cause of the greater adverse impact of employee moves to spin-outs versus those to established firms. More importantly, employees are better able to transfer both nonhuman and human complementary assets to spin-outs than to established firms (Agarwal et al., 2004). In particular, supporting team members are important complementary assets (Groysberg et al., 2009) that are more susceptible to transfer to a start-up than to an existing firm (Ganco, 2009). Such transfers will have a larger negative impact on the source firm's performance than will transfers to established firms.

In addition, employees who start a firm are also more motivated to transfer the necessary resources and capabilities, given the high risk and uncertainty associated with starting a new venture (Agarwal & Audretsch, 2001; Drucker, 1985, Khessina & Carroll, 2008). While employees who move to established firms have the relative luxury of leveraging the latter's existing complementary assets, as noted above, employee entrepreneurs need to re-create complementary assets, making the transfer of assets and opportunities to start-ups more likely.

The transfer of nonhuman complementary assets also increases the impact of employee entrepreneurs on their parent firms. Brand loyalty and reputation are important assets that differentiate firms and provide competitive advantage (Podolny, 1993; Porter, 1980; Rao, 1994; Schmalensee, 1982; Shapiro, 1983). When employees exit to established firms, they are less able to leverage their source firms' brand loyalty and reputation, as the recipient firms have their own brand and reputational capital. Further, new employees may be assigned to tasks, clients, and projects that are incompatible with the resources and opportunities they might transfer from their prior firms. In

contrast, employee entrepreneurs may be more able to leverage their prior affiliations, since buyers, suppliers, venture capitalists, and other contractual parties will use parent firms' brand equity and status as a signal to gauge the potential success with new ventures (Burton, Sørensen, & Beckman, 2002). Research in relationship marketing highlights the importance of employees as the "face of the firm," even in firm-firm interactions (e.g., alliances, business-to-business sales), and the importance of employees increases in firm customer relationships (e.g., end-consumer sales) and in professional services (provider-customer) relationships (Berling, 1993; Crosby et al., 1990; Iacobucci & Ostrom 1996; Solomon et al., 1985). Employees leaving to start new firms can capitalize on these relationships and cash in on their parent firms' reputations, since brand loyalty is connected to the employees rather than to the firms (Beatty et al., 1996), and customers are more willing to follow the employees than to stay with the parents (Beatty et al., 1996; Stull, 2009; Taylor, 2000, 2005).

The transfer of complementary assets and opportunities is obviously damaging to a source firm. Since complementary assets are more likely to be transferred to start-ups than to existing firms, we theorize that employee moves to spin-outs have a larger negative impact than moves to established firms. Consequently, we propose:

Hypothesis 3. The adverse impact on source firm performance of employee mobility is greater for moves to spin-outs than moves to established firms.

Our final hypothesis regarding the impact of mobility on source firm performance directly flows from the micro-macro link implications of the previous hypotheses. Phillips (2002) argued that loss of employees with high ability to generate value has a more detrimental effect on a firm's performance than loss of employees with less such ability, since in the former case the parent firm loses employees who are core to its creation of value. At the micro level, we argued in Hypothesis 1 that employees with higher ability to generate value have greater ability to transfer and/or recreate complementary assets, and in Hypothesis 2 we argued that they are more likely to join spin-outs than established firms. Further, as discussed in the development of Hypothesis 3, employee mobility adversely impacts parent firm performance through the transfer and replication of complementary

assets, and exiting employees have greater ability and incentive to transfer/replicate complementary assets when moving to a spin-out than when moving to an established firm.

If employees with higher ability to generate value are more likely to exit to create spin-outs and more able to transfer or recreate complementary assets, it follows that the difference in the impact on source firm performance associated with an exit to an established firm versus one to a spin-out increases with the exiting employee's ability to generate value. If the employee has low value-generating ability, then her or his ability to replicate complementary assets is also very low, no matter whether she/he moves to a spin-out or an established firm. As his/her ability to generate value increases, she/he is also able to transfer a larger pool of complementary assets and opportunities. Given higher absolute differences in both the core and complementary assets that may be transferred to a spin-out relative to an established firm, the absolute difference in the impact of a move to spin-out and a move to an established firm increases with the mobile employee's earnings. This reasoning leads us to the following:

Hypothesis 4. The greater adverse impact on source firm performance of employee moves to spin-outs relative to moves to established firms increases with the earnings of the mobile individuals.

DATA AND METHODOLOGY

Context: The U.S. Legal Services Industry

We tested our hypotheses using data from the legal services industry, focusing on a professional service industry not only because such industries are knowledge intensive and cast human assets in critical roles, but also because they are highly important to the U.S. economy. Notwithstanding the positive effects of high-technology industries on economic growth, professional services are a large and growing portion of the economy. Services constituted 68 percent of the U.S. GDP in 2007, as compared to manufacturing, which constituted only 19 percent.⁶ In fact, the shift from manufacturing to services in developed nations has been well

⁶ Statistics on GDP by industry are from the Industry Economic Accounts Program at the Bureau of Economic Analysis. Data are available at http://www.bea.gov/industry/xls/GDPbyInd_VA_NAICS_1998-2008.xls[0].

documented since the middle of the 20th century (Baumol, 1967; Fuchs, 1968). As Buera and Kaboski (2008) noted, the rising role of the services sector is largely attributable to growth in professional services (including legal, financial, management, consulting, education, and health care), which contributed to 46.5 percent of GDP in 2007 (Bureau of Economic Analysis, 2008).

Since professional services are human capital intensive, replicability of complementary assets is potentially much easier than it is in manufacturing industries. The legal services industry is similar to other professional service industries in that complementary assets are likely to be embodied in people, and human assets are more important than physical assets (Teece, 2003). Because employers own complementary physical assets but not complementary human assets, the latter can be transferred away from a firm more easily. As a result, mobility and spin-out generation should be much more common in the professional services sector (Teece, 2003). Although the mechanisms underpinning mobility and their impact on parent firm performance hold for both manufacturing and professional services, the effects are much more critical in the latter. Furthermore, employment contracts in legal services exclude noncompete clauses and, for key employees already in the industry, namely, lawyers who have passed relevant bar exams, the barriers to mobility and entry are low. As a result, the costs associated with mobility are relatively low for employees (at least within the borders of a state), and new firm creation rates are high.⁷ Thus, the legal services industry represents an active environment in which to study moves to both established firms and spin-outs.

The dominant organizational design in legal services is partnership, wherein partners own firms and almost all revenues are returned to employees and partners as taxable earnings. The majority of these firms' employees fall into the following categories: low-paid assistants, secretaries, and paralegals (staff); associate and other salaried lawyers; and equity partners. Lawyers who become partners are typically promoted within six or seven years of joining their firms, at which point they can earn a share of revenues. These are divided either evenly or on the basis of individual contribution (Gilson & Mnookin, 1985). It is also worth noting that an important driver of mobility

⁷ Because bar exams are state-specific, lawyers' credentials do not necessarily transfer across state borders but are generally transferrable within state borders. In other words, the direct costs of mobility and the direct costs of new firm generation are low within states in this industry.

in this industry is the “tournament” employment system, in which associates who are not promoted to partner are typically forced to leave. Since tournament-driven mobility potentially correlates with some of our predictions (Hypotheses 1 and 2) but is not the focus of our theory, we employed a variety of robustness checks to rule out such alternative explanations.

Data Source

The data for the study are derived from the Longitudinal Employer-Household Dynamics (LEHD) Project available at the Census Research Data Centers. Our custom extract includes linked employer-employee data drawn from state-level unemployment insurance (UI) records and several data products from the U.S. Census Bureau. Every quarter, organizations that pay into their state’s UI fund submit form ES-202, which lists all employees covered by the UI program, their taxable earnings, and firm characteristics. From these mandatory submissions, the LEHD project constructs both *employer characteristics files*, which include longitudinal records of firm-level⁸ characteristics, and *employment history files*, which include longitudinal records of all employment “spells” (periods), including employer name and taxable earnings, for all employees covered by UI. *Individual characteristics files*, which contain such indicators as gender, date of birth, race, ethnicity, and education, are drawn or imputed from the Social Security Administration’s “Personal Characteristics Files,” the Decennial Census, the Current Population Survey, and the Survey of Income and Program Participation. Together, these data files detail individual- and firm-level characteristics and the history of all employee-employer dyads covered by the UI system.⁹

Our data identify all individuals employed in U.S. legal services over more than 40 quarters in ten large states. Since the data are drawn from mandatory filings, they cover the entire universe of legal services firms in the ten states. This universality permitted us to track interfirm employee

⁸ Because the data were collected at the state level, the firm identifier is actually a firm-state identifier. As a result, our definition of firm includes only the activities of a given firm located within a given state’s borders. Data limitations precluded linking firms across state borders, so a firm that operated in states x and y was disaggregated into two records: the firm’s activities located in state x and the firm’s activities located in state y. The high cost of crossing state borders in the legal services industry minimizes the impact of this issue on our empirical results.

⁹ For more information on the LEHD program, see http://lehd.did.census.gov/led/library/tech_user_guides/overview_master_zero_obs_103008.pdf

mobility and to identify new firms. All results have been cleared for disclosure by the U.S. Census Bureau to ensure that no individual respondent or firm could be identified in our presentation.

We draw a random 25 percent sample of the employees in the data to establish our sample for our tests of Hypotheses 1 and 2. We restricted that sample to employees who earned more than \$25,000 per year and were employed at a firm that both contained more than five people and did not exit the data in a measured or the subsequent year. The first restriction excludes employees with a weak attachment to the labor market; the second restriction excludes employees of very small firms that contribute only a small percentage of the total industry revenues (Gilson & Mnookin, 1985), and the third restriction excludes employees of firms that die within two years of the individual moving. This last restriction is particularly important to understanding employee mobility from healthy firms—the focus of our theoretical argument—given that employees leaving dying firms may be systematically different than employees who leave a healthy firm.

For our tests of Hypotheses 3 and 4, we aggregated all the employee-level data to the firm level. As in the sample used to test Hypotheses 1 and 2, we excluded employees of very small firms (less than five people) and of dying firms (firms that die within the next two years) to eliminate their effects on the measured impact of mobility on firm performance. We also exclude firms with revenues per employee of less than \$10,000 or more than \$1,000,000 and firms that lost more than 20 employees in any payroll class to an established firm or to a spin-out in a given year. This last restriction allowed us to exclude mergers, acquisitions, and administrative recoding of organizational identifiers.¹⁰ Given our focus on the impact of individual mobility on firm performance, this trimming was consistent with our analysis.

Estimation Methodology

Our analytic strategy was to first identify the individual characteristics related to employee mobility in general and then to moves to spin-outs in particular. Then, after establishing which types

¹⁰ An administrative recode is when the data collection agency changes a firm's identification number. Administrative recodes appear in the data to be large mobility events where *all* of a firm's employees move from an existing firm to a new firm. Inclusion of these events would contaminate our measures of mobility to spin-outs.

of employees were more likely to make each type of exit, we examined the impact on the performance of the firms they left of each type. In the first stage of analysis, we estimated a series of linear probability models with dependent variables that were dummies indicating general mobility and mobility to a spin-out. We included firm-year fixed effects to absorb any variation owing to unobserved characteristics that were constant within a firm-year.

Computing constraints drove our choice of a linear probability model over a conditional logit model. Even our 25 percent random sample was very large, making conditional logit computationally infeasible.¹¹ Instead, we included robust standard errors in the linear probability estimation to account for inherent heteroskedasticity. Out-of-sample predictions were extremely rare in our data, suggesting that the model performed acceptably.

In the second stage, we estimated a series of fixed-effects linear regression equations of firm performance as a function of the intensity of different types of employee mobility and firm characteristics. These allowed us to assess the impact of the quantity and quality of exiting employees on source firm performance. Our explanatory variables included number of exiting employees, their combined pay, and the number in different pay classes. We included firm fixed effects to absorb any variation caused by unobserved firm-constant characteristics.

Variables

Employee mobility. The dependent variable for tests of Hypothesis 1, *employee mobility*, is a dummy variable coded 1 if an employee's dominant employer changed since the previous year and 0 otherwise. A dominant employer is the one at which the employee earned the most during the year.

Employee exit to spin-out. This dependent variable for testing Hypothesis 2 is a dummy coded 1 if an employee's dominant employer changed since the previous year and the new employer appeared in the data for the first time in that year. This measure of *exit to spin-out* is broader than the typical definition of a spin-out founder. To the extent that nonfounding employees who join spin-outs are similar to employees who move to established firms, our results differentiating between

¹¹ Because of data confidentiality concerns, all analyses had to be performed on-site at a Census Research Data Center. The time and computing power available at these centers thus limited our analyses.

moves to established firms and moves to spin-outs should be seen as conservative. That is, the presence of employee exits to established firms should bias our analysis against finding significant differences between the two categories. Alternatively, nonfounding employees who join a spin-out during the first year of its existence (especially at higher levels of earnings) may be driven by motives and preferences similar to those of founder(s)—which may translate into similar characteristics and impact on the parent firm. If that is the case, in the context of our theoretical questions, the difference between founding and nonfounding employees who join early is less crucial.

Firm performance. The dependent variable for testing Hypotheses 3 and 4, *firm performance*, was measured as revenues per employee. In the partnership model, almost all revenues are returned to employees and partners as taxable earnings. By aggregating the earnings of all employees inside a firm, we could construct its total revenues (less noncompensation costs and set-asides for future years). To compare firms of different sizes, we then divided revenues by number of employees to obtain the average firm revenue generated per employee (including partners, associates, and staff). The firm performance measures are calculated at least one year after the measured mobility events, thus the firm performance measures are based on the earnings of the retained workforce and any individuals hired to replace the moving employees.

Employee earnings. Our key explanatory variable for Hypotheses 1 and 2, *employee earnings*, was measured as all forms of taxable compensation that an employee received in a given calendar year; including salary, bonuses, and other reported income.

Firm-level mobility. The key explanatory variables for Hypotheses 3 and 4 were measures of firm-level mobility. We aggregated our exit measures over five years to capture the lagged effect of employee mobility on firm performance and also to facilitate disclosure review at the Bureau of the Census. We constructed two different variables to capture types of mobility and of employees.

First, we counted the number of unique individuals who left a firm to join another established firm in each measurement year and the four years prior to it. We did the same for employees leaving to join a spin-out. As a result, for every firm-year in the data, our measure captured the human assets that exited to established firms and to spin-outs.

Our second measure was based on employee mobility at different levels of employee earnings. We sorted employees exiting to established firms and those exiting to spin-outs into these earnings classes: \$25,000–\$100,000, \$100,000–\$300,000, \$300,000–\$5,000,000, and \$5,000,000+. We then counted the number of movers in each class over the past five years.

Control variables. For the employee-level mobility estimations we controlled for observable demographic and human asset differences by including measures of age, age squared, gender, race, tenure with source firm, tenure squared, and imputed years of education. Gender and race were dummy variables (male/female and white/nonwhite, respectively). Age was a continuous variable. Years of education was a continuous variable imputed by the Census Bureau. Tenure was a continuous variable measuring years worked at a current employer. We include a dummy for individuals with less than one year of tenure to capture the effect of employees who do not have strong ties to the labor market. Since our data began in the middle of the careers of some employees, this variable was “left-censored” and undermeasured for employees who began working in the industry before the data began. To address this issue, we constructed a dummy indicating potentially left-censored tenure spells.

For the firm performance estimations, we included a firm fixed effect and also controlled for the means of the observed demographic and human asset variables measured over all of a firm’s employees. Specifically, we measured mean age, education, and percentages of whites and men in each firm in the fourth quarter of each year. Because workforces change over time as firms hire and lose employees, year averages would have been biased, overcounting employees at firms with high employment fluidity. Calculating within just one quarter minimized the impact of fluidity on our measures, but we could still have overcounted employees, because the total number employed over a quarter might exceed a firm’s steady-state employment.

Tables 1 and 2 give descriptive statistics and correlations for the individual-level mobility data and the firm-level performance data, respectively. There is no evidence of high correlations (except for variables with their squared terms). As shown in Table 1, 9.5 percent of employees changed dominant employer in a given year, and 1.3 percent left to go to spin-outs in any given year.

The two rates imply that 14 percent of exiters go to spin-outs. Our sample was largely white (84%) and female (56%), and it included many short-tenured employees. The average age was 40 years; average education was 14 years of schooling; and average earnings were \$67,047 per year.

Per Table 2, the average revenues per employee for firms were \$63,007.¹² The workforce had an average age of 38 years, average education of 13.85 years, and average composition of 83 percent white and 30 percent male. Every year, the firms lost an average 8.13 employees with total pay of \$301,705 to other established firms and lost 0.77 employees with total pay of \$36,838 to spin-outs. On average, those exiting to established firms earned \$37,089, and those exiting to spin-outs earned \$47,704.

RESULTS

Table 3 contains our results on employee mobility decisions. Model 1 in Table 3 provides estimates of the impact of employee characteristics on employee mobility. Model 2 captures the impact of employee characteristics on the decision to go to a spin-out conditional on employee mobility. Model 1 indicates that employee earnings are negatively related to employee mobility, and the square of earnings is positively related to mobility. Combining the effect of the two coefficients implies that the marginal effect of earnings on mobility is negative for employees earning between \$0 and \$5,200,000. Although disclosure concerns prevent us from identifying the maximum earnings level in the data, \$5,200,000 is over 45 standard deviations away from the mean of employee earnings (\$67,047). This finding thus suggests strong support for Hypothesis 1. To put the size of the coefficients into context, a 35-year-old male with 18 years of education and 10 years of tenure who earns \$100,000 per year has a 5.8 percent probability of mobility, and an employee with the same characteristics who makes \$300,000 per year has a 3.8 percent probability of mobility. The difference is a 35 percent drop. In addition to the earnings effects, we also found that older employees, those with longer tenure, and men were all less likely to exit.

¹² Individual-level measures and firm-level measures differ due to the different sampling frames for the individual data and the firm-level data and due to the churning concerns raised earlier.

In Model 2 of Table 3, the sample is restricted to the mobile employees, and the results on the predictors of moves to spin-outs are conditional on mobility. The estimates demonstrate that employee earnings are positively related to employee entrepreneurship conditional on mobility, and the square of employee earnings is negatively related to employee entrepreneurship. The marginal effect of earnings on employee entrepreneurship conditional on mobility is positive for employees earning less than \$3,500,000. This maximum represents 30 standard deviations from the mean of employee earnings, thereby supporting Hypothesis 2. Again, to put the estimates into context, a 35-year-old male with 18 years of education and 10 years of tenure who earns \$100,000 per year and leaves his current employer has a 16.6 percent probability of joining a spin-out, but an employee with the same characteristics who makes \$300,000 per year has a 21.8 percent probability of doing so.¹³ This difference represents a 31 percent increase in the likelihood of employee entrepreneurship conditional on mobility. As before, conditional on mobility, male and longer-tenured employees are more likely to move to spin-outs.

Table 4 reports the estimates of the relationship between source firm performance and employee moves to established firms and to spin-outs. The results in Table 4 demonstrate that the impact of exits to spin-outs is significant and negative, and the impact of exits to established firms is not significant. The difference in coefficients is strongly statistically significant (at 0.1% level). These findings support Hypothesis 3. Specifically, although employee exit to an established firm is associated with no significant loss, an exit to a spin-out adversely impacts the source firm's revenue per employee by \$269, which translates to a \$22,865 loss for an average-sized firm (which is 85 employees).

Table 5 provides results on the relationship between exiting employee ability and source firm performance. The coefficients on the number of employees exiting in each earnings class measure

¹³ For a 35-year-old male with 18 years of education and 10 years of tenure earning \$100,000 per year, the probability of staying with his employer is 94.2 percent; the probability of moving to an established firm is 4.8 percent; and the probability of going to a spin-out is 1.0 percent. For an employee with the same characteristics who earns \$300,000, the probability of staying with his employer is 96.2 percent; that of a move to an established firm is 3.0 percent; and that of a move to a spin-out is 0.8 percent.

the impact of each type of exit on source firm performance. For moves to established ventures, exits of employees earning less than \$100,000 actually positively impact source firm performance and exits of those in the higher pay classes have no significant impact. However, the estimates for employees moving to spin-outs tell a different story. Exits to new ventures of employees who earn less than \$100,000 do not have a significant impact on parent firm performance, but exits of those in higher pay classes have a significant and negative impact that increases with pay class. Specifically, the adverse impact of a \$300,000–\$5,000,000 earner’s move to a spin-out is greater than the adverse impact of such a move made by a \$100,000–\$300,000 earner. The latter’s exit is associated with a loss of \$193,015 in revenue for an average sized firm; the former’s, with a loss of \$1,000,007. The average earnings of employees who leave to spin-outs is \$158,941 for employees in the \$100,000–\$300,000 range and \$482,036 for employees in the \$300,000–\$5,000,000 range; thus the revenue loss at the firm is larger than the value that was appropriated by the leaving individual. The coefficient differences between employee entrepreneurship and mobility to established firms are strongly statistically significant for the two higher pay classes. These results, suggesting that the adverse impact on firm performance of employee entrepreneurship relative to mobility to established firms increases with the compensation of the exiting employee, support Hypothesis 4.

The effects of the control variables are consistent throughout the firm performance regressions. The average education of its workforce is positively related to firm performance. Gender composition is significantly related to revenue per employee within firms; those with a greater percentage of male employees have more revenue per employee. Occupational differences by gender within law firms likely drive this result. Racial composition is not a significant factor, and average workforce age is not consistently significant.

Additional Analysis and Robustness Checks

Our analysis connects micro and macro level analysis by examining the determinants of mobility at the individual level and connecting these individual decisions with firm-level outcomes. However, alternative micro and macro processes may explain our findings. To probe our analyses

further, we examined whether our results persisted after we accounted for involuntary turnover, heterogeneity in mobility decisions across occupations, the aggregate quality of mobility events and alternative measures of firm performance.

An assumption in our theoretical section was that all mobility decisions are voluntary; however, employee mobility may also be involuntary. Notwithstanding that involuntary exits may be generally related to underlying individual characteristics for value creation, we examined the robustness of our results after accounting for three primary sources of involuntary turnover. First, we controlled for turnover driven by the up-or-out tournament model of promotion (Rebitzer and Taylor, 2007). Second, we controlled for turnover preceded by poor performance. Third, we excluded turnover that was likely driven by the temporary nature of internships.

Results of the coefficients of interest are demonstrated in Table 6.¹⁴ The coefficients capture the impact of earnings on individuals' mobility decisions for the group of individuals that are less likely to be moving involuntarily. Because involuntary exit due to the tournament model typically occurs after six or seven years at a firm, in the first set of coefficients we focused on employees with five or fewer years of tenure at the firm (panel 1).¹⁵ Second, to exclude employees who may have lost their jobs due to poor individual performance, we focused on employees whose wage growth was in the top quartile of similar employees in the prior year (panel 2) and we focused on employees who are in the top quartile of their employer's earnings distribution (panel 3). Third, we controlled for the mobility of interns who are likely to be young and work for fixed terms, by focusing on employees who are at least 30 years old (panel 4). In all specifications, the results are consistent with the baseline model. Hypotheses 1 and 2 are supported even when focusing only on employees who are very unlikely to face involuntarily mobility.

¹⁴ Due to space constraints, only partial tables are included. Full tables and additional information on specifications are available from the authors.

¹⁵ Turnover driven by the up-or-out system is also unlikely to occur for workers with more than seven years tenure. We performed similar analysis focusing only on employees with tenure greater than seven years, obtaining results again consistent with Table 3. Given left-censoring and truncation of the tenure variable at ten years, sample size related disclosure concerns prevent us from reporting the estimates.

Next, we explored whether the relationships stated in Hypotheses 1 and 2 hold for employees with high ability to generate value for their firms. In particular, clerks, paralegals, administrators, and other nonlawyers might drive employee-level results. However, if high-value-generating employees are key firm resources, then it is important to examine whether their mobility decisions were the same as in the full sample. We continue the methodology above and focus on employees with earnings greater than \$100,000 (panel 5) and employees with 16 or more years of imputed education (panel 6). Again, the results provide consistent support for Hypotheses 1 and 2. Together, the robustness checks suggest that our findings hold for attorneys who move voluntarily.

At the macro level we extended the analysis to examine the effect of the aggregate quality of movers on firm performance. Table 7 contains estimates of the impact of the aggregate quality of exiting employees (as measured by the cumulative pre-mobility earnings of all movers) on firm performance. Again, the estimates demonstrate an adverse impact on parent firm performance of employee moves to spin-outs, but moves to established firms do not have a significant effect on source firm performance with the difference in coefficients being strongly statistically significant.

Finally, in unreported regressions, we examined the sensitivity of our results to firm performance measures other than revenue per employee. Because they are the ultimate decision makers in most law firms, partners may seek to maximize revenue per partner instead of revenue per employee. Under the assumption that partners are the highest earners in their firms, we reestimated the results for Hypotheses 3 and 4 using *revenue per high-earning employee* as our dependent variable, first with \$100,000 or more, and second with \$300,000 or more as earnings levels. Results were robust to these two different specifications of the dependent variable.

DISCUSSION AND CONCLUSION

We connect micro level decisions and their macro level outcomes by examining both determinants of employee mobility and its effects on firm performance. We focus on moves from non-dying firms to both established firms and to spin-outs. Differences in the observable quality of exiting employees, in the importance of appropriating new opportunities, and in the unobservable

quality of exiting employees may differentiate the impacts of these two types of mobility. Understanding the relative impacts of employee exits to established firms and employee entrepreneurship on source firm performance provides insights into the value of human capital in different contexts, the value of knowledge transfer, and the nature of the spin-out process.

At the micro level, we predicted and found support for a negative relationship between an employee's ability to generate value (as proxied by earnings) and mobility (Hypothesis 1). Further, we theorized and showed that conditional on mobility, the likelihood of exit to a spin-out relative to exit to an established firm increases with earnings (Hypothesis 2). At the macro level, we developed hypotheses related to the effect of both the quantity (Hypothesis 3) and the quality (Hypothesis 4) of the employees exiting to established firms and spin-outs on source firm performance. We found that employee entrepreneurship events have a larger negative effect on parent firm performance than employee moves to established firms (Hypothesis 3), and the difference in the sizes of the effects of the two types of mobility events is positively related to the ability of the exiting employees to generate value (Hypothesis 4). Importantly, our findings suggest that the larger adverse impact on source firm performance of employee entrepreneurship over mobility to established firms is not driven only by the observable factors of exiting employee quantity and quality. The support found for Hypothesis 4 suggests that even after observable employee quality is controlled for, the (per person) effect of moves to spin-outs relative to moves to established firms increases with employee quality. In other words, if two observably equivalent employees exit a firm, one to an established firm and one to a spin-out, the source firm is more adversely impacted by the spin-out event; and further, the difference in impact on source firm performance increases with observable employee quality. This pattern suggests that after accounting for the effects of observable quantity and quality of exiting employees on source firm performance, much of the adverse effect can be attributed to the importance of complementary assets, given that their transfer or recreation is more likely to occur to spin-outs rather than to established firms.

The differential ability to replicate or transfer complementary assets when moving to an established firm relative to moving to a spin-out also relates to the market opportunities that are

being exploited. To the extent that specific opportunities (e.g. ability to transfer client accounts or capitalize on underutilized technologies or enter new markets) trigger employee entrepreneurship, but general opportunities (better career development, higher compensation) trigger moves to established firms, the former are more likely to come at the expense of a source firm, and employee entrepreneurship will have the greater detrimental effect on source firm performance.

Further, our results also provide evidence that employee entrepreneurship is correlated with the existence of unobserved and/or undervalued human capital. An employer can undercompensate employees with unobserved/undervalued human capital relative to the value they generate. Such employees can appropriate a larger share of the value they create only by resorting to employee entrepreneurship, since established firms will only compensate them for what they can observe and value. The loss of employees with systematically undervalued human capital will adversely impact source firms more than the loss of employees with appropriately valued human capital.

Finally, it is important to note that in our empirical context, high earnings correlate strongly with age and gender. In particular, most partners in law firms are older males. One additional correlation is that partners are more likely to stay with their firms, but if they do leave, they are more likely to go to spin-outs. In light of the theoretical construct we developed, this result is not surprising. A partner is more likely to have a bargaining advantage, since the importance of complementary assets to his ability to create value is low, and he is more able to recreate these complementary assets should he move.

Limitations and Future Research

The limitations to our study also provide avenues for future research. The first relates to generalizability to other contexts. To the extent that legal services' dominant organizational structure—the partnership model—characterizes most professional services industry contexts, we believe that our theory and empirical evidence will shed light on issues related to employee mobility, employee entrepreneurship, and effects on source firm performance in such industries. Future research could examine whether our findings pertain in other knowledge-intensive industries and for different organizational structures. Second, our empirical design treats all individuals as independent

mobility events and does not account for team structures. To the extent that employees commonly exit in teams in the legal services industry, we cannot tease out the differential effects of team membership among a collection of identical independent individuals. To address such concerns in future research, we hope to utilize our unique employer-employee data and examine the impact of the team membership of mobile employees on both source and recipient firm performance.

Importantly, although we theorized and supported an effect of the relationship of employees' ability to generate value with their ability to transfer or recreate complementary assets on their mobility decisions and the subsequent effect on source firm performance, explicitly testing the effects of transferring or recreating different types of complementary assets was beyond the scope of this study. As discussed above, organizational knowledge, nonhuman, and human complementary assets are all potentially transferable or replicable. Teasing out the differential explanatory power of each type of complementary asset would be an immensely valuable avenue for future research. For instance, both Phillips (2002) and Wezel et al. (2006) have conjectured that in professional services, high-level routines are more easily transferred to start-ups than to existing firms. As a result, one mechanism through which employee entrepreneurship would have a larger adverse impact on source firm performance than employee moves to established firms is through the replication of routines. Employees who exit will be able to replicate more routines or replicate them more effectively at a new firm than at an established firm. Consequently, a spin-out will be more similar to its parent than an established firm that receives employees from the same source. As a result, moves to spin-outs pose a greater competitive challenge than moves to existing firms.

Alternatively, the differential impact of complementary assets on employee mobility and source firm performance could also be related to differences in employees' ability to transfer complementary assets in professional services and in high-tech manufacturing. As Teece (2003) noted, professional services personnel play a very different role from those in high-tech industries. The complementary assets in professional services are typically embodied in human assets, and these human assets are typically more important than physical assets. Because the most important complementary assets in professional services firms are human assets that are rivalrous and can be

easily recreated or transferred through employee mobility, the impact of employee mobility and employee entrepreneurship on the performance of a professional services firm will be more pronounced than its impact on a high-tech firm. This difference is worth investigating.

Our study did not explore the role of legal specializations in the mobility decisions of attorneys. Garicano and Hubbard (2007) demonstrated that complementarities between specializations of lawyers play an important role in determining the boundaries of legal service firms. As a consequence, the exit of an employee with a specialty that complements his or her employer's portfolio of human assets will have a larger impact on source firm performance than the exit of an employee who does not so complement the practice. In both our micro and macro analyses, we focus on the level of human capital, but the *type* of human capital and human assets possessed by employee and firm, respectively, could confound our findings. Although data limitations put such an examination beyond the scope of our study, these questions may be fruitful avenues of future research, since they relate to the complementarities between the different types of knowledge embodied in human capital, not just its ordinal level or amount (as proxied by earnings).

Contributions

Our study contributes to both micro and macro research streams. We answer Coff's (1997) call to examine the microfoundations of strategy research and contribute to it by linking individuals' mobility to firm performance. Specifically, we demonstrate how employee ability to generate value affects employer performance through the employee's incentive and ability to replicate and transfer important complementary assets. In doing so, our research complements existing HRM research. In addition, we apply a macro level strategy framework to the implications of micro level mobility and turnover decisions by examining the relationship between core human assets and complementary assets in value generation. At the micro level, the importance and replicability of complementary assets is an important driver of employee mobility decisions and a valuable construct to examine as firms develop systems and practices to attract and retain high-value employees. Importantly, we

show that the ability and knowledge of individual employees are indeed value-creating assets and that these employees' moves to entrepreneurial contexts do adversely affect firms.

Our macro level evidence that employee entrepreneurship has a larger negative impact for source firms than employee moves to established firms suggests that firms should tailor their micro level human capital strategies to reduce spin-out generation more than traditional employee mobility. The most valuable employees appear to be the ones most likely to move to entrepreneurial firms. To avoid the loss of those who generate the most value, managers need to identify and assess which employees are most able to replicate or transfer a firm's complementary assets and then strengthen their incentives to stay, or weaken their ability to replicate the complementary assets. Clearly, this issue is of current interest among firms, as noted in recent popular press articles (Lafsky, 2009; Morrison, 2009).

We also contribute to the stream of research on knowledge spillovers within the strategy literature, by integrating work on employee mobility and employee entrepreneurship and exploring the impacts of underlying factors on each phenomenon. Understanding employee entrepreneurship requires integrating these two large lines of research because employee entrepreneurs fall into both categories. Our current work is an early step toward addressing both these micro level events simultaneously. We observed employees who moved to existing firms to differ from employees who moved to new firms. In particular, employee entrepreneurs are on average more highly paid, more experienced, and more educated than employees who move to existing firms. These characteristics are all crude measures of an employee's ability to generate value, which suggests that, conditional on mobility, more valuable employees go to start-ups. As a result, research that compares employee mobility and employee entrepreneurship must, at the least, control for observable differences in individuals. For managers, these findings help identify the types of employees with the highest propensity to adversely impact their employer through employee entrepreneurship.

To the entrepreneurship literature, we make several contributions. To the extensive body of research on what individual traits and qualities are correlated with the decision to become an entrepreneur (Lazear, 2005; Nicolau et al., 2008; Robinson & Sexton, 1994), we add that an

employee's ability to create and capture value is important to her/his decision to go to a spin-out. Further, if an employee's ability to create and capture value is tied to the nature of complementary assets, then his/her ability to replicate those assets is critical in the spin-out decision. By focusing on complementary assets, we highlight the mechanism driving the larger negative impact of moves to new ventures. Specifically, we address how the importance and replicability of complementary assets affect the impact of human capital transfer, routine transfer, and opportunity transfer on source firm performance. Because we find a large adverse impact of employee entrepreneurship on parent firm performance, our study supports the Schumpeterian view that the creation of new ventures potentially results in the destruction of value at a source firm rather than a mere transfer of the same knowledge from one firm to another, at least in this sector.

In summary, the purpose of our study was to answer the questions, *Who leaves, where to, and why worry?* We find that high-earning individuals tend to move less, but if they do move, they tend to start new firms. Controlling for earnings, we find that employee entrepreneurship events are significantly detrimental for source firm performance while employees who move to existing firms have an insignificant impact. Our findings suggest that the negative impact on parent persists even after controlling for potential selection of high-ability individuals into start-ups. Our study sheds new light on the interaction of parent and spin-out, with implications for competitive dynamics and parent firm strategies, because parent firm performance is affected not just by the quality of exiting employees, but also the quality of the opportunity that they pursue.

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FIGURE 1

Complementary Assets and Relative Bargaining Power of Employee

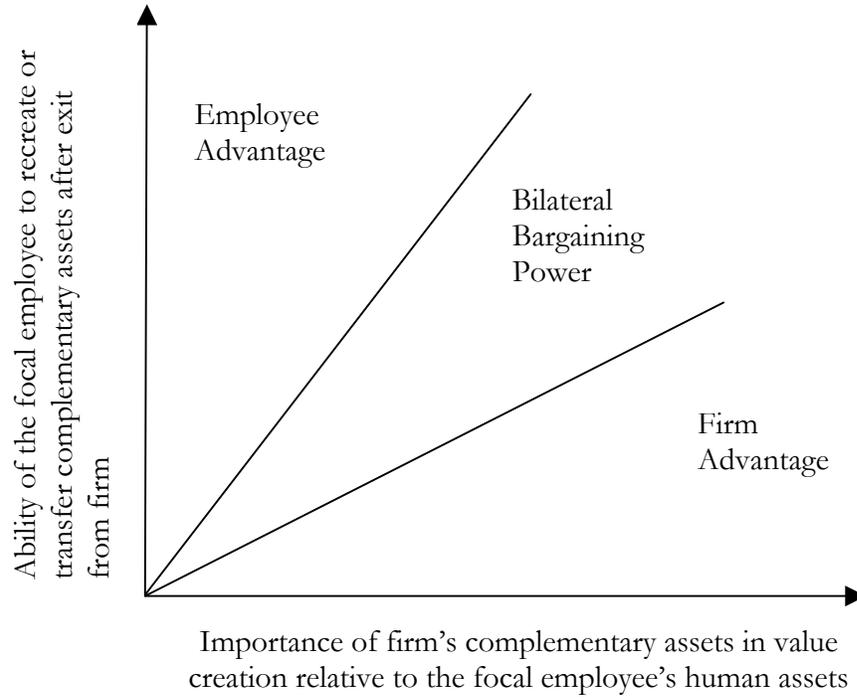


TABLE 1
Descriptive Statistics: Employee Data

	Variable	Mean	Standard Deviation	Correlations														
				1	2	3	4	5	6	7	8	9	10	11	12	13		
1.	Mobility	0.10	0.29	1														
2.	Mobility to spin-out	0.01	0.11	0.36	1													
3.	Age	40.10	10.78	-0.05	-0.01	1												
4.	Age ²	1724.21	937.47	-0.05	-0.01	0.99	1											
5.	Years of Education	14.57	2.53	-0.02	0.01	0.09	0.07	1										
6.	Years of Tenure	2.21	2.60	-0.08	-0.01	0.22	0.21	0.13	1									
7.	Years of Tenure ²	11.66	24.01	-0.08	-0.02	0.21	0.20	0.11	0.92	1								
8.	Tenure < 1 year?	0.49	0.50	0.07	-0.01	-0.12	-0.11	-0.15	-0.69	-0.46	1							
9.	Tenure is Censored?	0.15	0.35	-0.06	-0.02	0.05	0.05	0.17	0.33	0.35	-0.41	1						
10.	White	0.84	0.37	-0.02	0.01	0.12	0.12	0.09	0.08	0.07	-0.08	0.07	1					
11.	Male	0.43	0.50	0.00	-0.01	0.03	0.03	-0.05	-0.09	-0.06	0.11	-0.07	0.04	1				
12.	Annual Earnings (\$1000s)	67	112	-0.04	0.00	0.11	0.11	0.12	0.12	0.10	-0.10	0.05	0.08	0.18	1			
13.	Annual Earnings (\$1000s) ²	17121	804923	0.00	0.00	0.02	0.02	0.01	0.02	0.02	-0.01	0.01	0.01	0.02	0.73	1		

Note: N = 767,307

TABLE 2
Descriptive Statistics: Firm Data

Variable	Means	Standard Deviation	Correlations															
			1	2	3	4	5	6	7	8	9	10	11	12	13	14		
1. Cumulative payroll per employee in t – 1	63.01	47.87	1.00															
2. Cumulative payroll of leavers to established firms	301.71	592.97	0.22	1.00														
3. Cumulative payroll of leavers to spin-outs	36.84	155.50	0.12	0.27	1.00													
4. Cumulative # of emps leaving to established firms	8.13	11.00	0.18	0.87	0.29	1.00												
5. Cumulative # of emps leaving to spin-outs	0.77	1.66	0.09	0.38	0.63	0.47	1.00											
6. Cumulative # of employees leaving to established firms (0-\$100k)	7.79	10.21	0.17	0.83	0.28	0.99	0.47	1.00										
7. Cumulative # of emps leaving to established firms (\$100k-\$300k)	0.33	1.37	0.18	0.77	0.18	0.60	0.22	0.51	1.00									
8. Cumulative # of emps leaving to established firms (\$300k-\$5M)	0.012	0.136	0.14	0.29	0.10	0.17	0.09	0.14	0.21	1.00								
9. Cumulative # of emps leaving to spin-outs (0-\$100k)	0.70	1.47	0.08	0.36	0.54	0.46	0.98	0.47	0.19	0.07	1.00							
10. Cumulative # of emps leaving to spin-outs (\$100k-\$300k)	0.06	0.35	0.10	0.27	0.56	0.27	0.57	0.26	0.23	0.09	0.40	1.00						
11. Cumulative # of emps leaving to spin-outs (\$300k-\$5M)	0.002	0.050	0.09	0.10	0.45	0.08	0.26	0.08	0.05	0.08	0.18	0.20	1.00					
12. Average age	38.01	6.87	0.00	-0.09	-0.02	-0.13	-0.04	-0.13	-0.05	-0.01	-0.05	0.00	0.00	1.00				
13. Average education	13.85	1.38	0.13	0.03	0.04	0.02	0.04	0.02	0.03	0.03	0.03	0.03	0.02	0.33	1.00			
14. Percent White	0.83	0.25	0.00	-0.07	-0.01	-0.09	-0.01	-0.09	-0.05	-0.01	-0.01	0.00	0.00	0.29	0.14	1.00		
15. Percent Male	0.30	0.22	0.17	0.09	0.04	0.09	0.04	0.08	0.07	0.03	0.04	0.04	0.03	0.00	0.04	0.04	1.00	

Note: N = 70130

TABLE 3
Linear Probability Model on Employee Mobility

	Model 1		Model 2	
	DV: Mobility		DV: Mobility to Spin-out Mobility	
	(Coefficients and errors x10⁻⁴)		(Coefficients and errors x10⁻⁴)	
Age	-0.792 ***	(0.179)	0.939	(0.586)
Age^2	-0.000993	(0.00196)	-0.00963	(0.00677)
Years of Education	0.346 ***	(0.133)	0.658 ***	(0.394)
Years of Tenure	-10.9 ***	(0.703)	7.97 ***	(2.24)
Years of Tenure^2	0.582 ***	(0.0557)	-0.592 ***	(0.207)
Tenure < 1 year?	4.28 **	(1.7)	-0.518	(4.57)
Tenure is Censored?	-18.3 ***	(1.59)	20.1 **	(8.01)
Male	-8.59 ***	(0.699)	6.61 ***	(2.24)
Annual Earnings (\$1000s)	-0.101 ***	(0.00471)	0.260 ***	(0.026)
Annual Earnings (\$1000s)^2	0.00000095 ***	(0.0000009)	-0.000036 ***	(0.0000065)
Constant	150 ***	(4.37)	80.4 ***	(13.3)
N Observations	767307		73061	
N Groups	37758		15252	

Note: Models control for race and include firm-year fixed effects.

Robust standard errors are in parentheses.

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

TABLE 4
Source Firm Performance and Number of Mobile Employees

	DV: Revenue/worker	
Payroll per employee in t – 1	-0.0015	(0.0018)
Cumulative # of employees leaving to established firms	-0.0187	(0.0334)
Cumulative # of employees leaving to spin-outs	-0.2691 **	(0.1056)
Total # employees in quarter 1	-0.0771 ***	(0.0074)
Average age	0.1018 ***	(0.0330)
Average education	0.5341 ***	(0.1251)
Average tenure	-1.6794 ***	(0.1624)
Percent white	1.3539	(0.8398)
Percent male	4.9576 ***	(0.8239)
Constant	50.6183 ***	(2.0519)
N Observations	70130	
N Groups	18454	

Note: Model includes firm and year fixed effects.

Robust standard errors are in parentheses.

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

TABLE 5
Source Firm Performance and Compensation of Mobile Employees

	DV:	
	Revenue/worker	
Cumulative payroll per employee in t – 1	-0.0012	(0.0018)
Cumulative # of employees leaving to established firms (0-\$100k)	0.0661 ***	(0.0360)
Cumulative # of employees leaving to established firms (\$100k-\$300k)	0.1334	(0.1873)
Cumulative # of employees leaving to established firms (\$300k-\$5M)	0.8336	(1.2414)
Cumulative # of employees leaving to spin-outs (0-\$100k)	0.1984	(0.1283)
Cumulative # of employees leaving to spin-outs (\$100k-\$300k)	-2.2708 ***	(0.4889)
Cumulative # of employees leaving to spin-outs (\$300k-\$5M)	-11.7648 ***	(1.4966)
Average age	0.1805 ***	(0.0305)
Average education	0.0907	(0.1222)
Percent white	0.3364	(0.8401)
Percent male	5.0674 ***	(0.8258)
Constant	52.6925 ***	(1.9369)
N Observations	70130	
N Groups	18454	

Note: Model includes firm and year fixed effects.

Robust standard errors are in parentheses.

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

TABLE 6
Linear Probability Model on Employee Mobility: Robustness

Focal subgroup:	Model 1	Model 2
	DV: Mobility (Coefficients x 10 ⁻⁴)	DV: Mobility to Spin-out Mobility (Coefficients x 10 ⁻⁴)
1. Tenure <= 5 years		
Annual Earnings (\$1000s)	-0.125 ***	0.26 ***
Annual Earnings (\$1000s) ²	0.0000115 ***	-0.0000707 ***
2. Within employer wage growth top 25% (in <i>t</i>-1)		
Annual Earnings (\$1000s)	-0.0715 ***	0.222 ***
Annual Earnings (\$1000s) ²	0.00000708 ***	-0.0000286 ***
3. Within employer wage distribution top 25% (in <i>t</i>-1)		
Annual Earnings (\$1000s)	-0.067 ***	0.189 ***
Annual Earnings (\$1000s) ²	0.00000624 ***	-0.0000265 ***
4. Age >=30		
Annual Earnings (\$1000s)	-0.0999 ***	0.26 ***
Annual Earnings (\$1000s) ²	0.00000942 ***	-0.0000365 ***
5. Earnings >=\$100,000		
Annual Earnings (\$1000s)	-0.0315 ***	0.117 ***
Annual Earnings (\$1000s) ²	0.00000295 ***	-0.0000165 ***
6. Years of education >=16		
Annual Earnings (\$1000s)	-0.0905 ***	0.265 ***
Annual Earnings (\$1000s) ²	0.00000809 ***	-0.000033 ***
N Observations	767307	73061
N Groups	37758	15252

Note: Models include all controls from Table 3 including firm-year fixed effects.

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

TABLE 7
Source Firm Performance and Total Payroll of Mobile Employees

	DV:	
	Revenue/worker	
Payroll per employee in t – 1	-0.0016	(0.0018)
Cumulative payroll of employees leaving to established firms	0.0002	(0.0006)
Cumulative payroll of employees leaving to spin-outs	-0.0062 ***	(0.0012)
Average age	0.0399	(0.0324)
Average education	0.4500 ***	(0.1250)
Percent white	1.1353	(0.8409)
Percent male	4.7760 ***	(0.8250)
Constant	49.8202 ***	(2.0383)
N Observations	70130	
N Groups	18454	

Note: Model includes firm and year fixed effects.

Robust standard errors are in parentheses.

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level