INTERNAL MARKETS, PERSONAL NETWORKS, AND HUMAN RESOURCE ALLOCATION: HOW MANAGERS CREATE VALUE THROUGH INTERNAL HIRING

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ABSTRACT

Internal hiring matches current employees to new jobs within an organization and represents a critical yet overlooked source of value creation, enabling managers to generate greater value from their existing stock of human resources by creating complementary matches between people and jobs. Yet despite the fact that more than half of all jobs are filled internally, our knowledge of how workers are allocated to jobs within organizations remains grounded in work on bureaucratic internal labor markets and intraorganizational careers describing internal labor markets that bear little resemblance to their contemporary counterparts. In this paper, I describe the effects of two processes that have emerged to replace the use of bureaucratic rules for facilitating internal mobility – market-oriented posting and relationship-oriented sponsorship – on two sets of outcomes which link directly to value creation and value capture – quality of hire and compensation. Using data on over 11,000 internal hires made over a five year period within a large US health insurance company, I find that market-oriented posting results in better hires but at a higher cost. In addition to providing a more complete picture of hiring and mobility, this work sheds light on the tradeoffs associated with the use of markets and networks for allocating resources within firms.

Amid conversations about boundaryless careers, free-agent workers and hired guns, it is easy to forget that a substantial amount of mobility still takes place within organizations. In fact, nearly half of all open jobs in large organizations - and substantially more at the executive levels - are filled internally (e.g. Crispin & Mehler, 2013). Internal hiring is the primary process used to allocate human resources within firms and creates opportunities for internal mobility, which serves many useful functions. It facilitates the transfer of knowledge across internal boundaries (Argote & Ingram, 2000), motivates employees by signaling opportunities for future advancement (Bidwell & Keller, 2014), encourages the development of firm-specific skills (Campion, Cheraskin, & Stevens, 1994), increases worker satisfaction, performance and productivity (Jackson, 2013), and decreases dysfunctional turnover (Allen, Bryant, & Vardaman, 2010). With human resources now representing the most important resource in most firms (Powell & Snellman, 2004) and in light of recent research demonstrating the high costs and even higher failure rates associated with external hires at all organizational levels (e.g. Bidwell, 2011; Groysberg, Lee, & Nanda, 2008), the ability to find and create complementary matches between people and jobs *within* the firm represents a key source of value creation in modern organizations (Zenger, Felin, & Bigelow, 2011).

While scholars have explored how other key resources, such as financial capital (e.g. Stein, 1997) and managerial attention (e.g. Ocasio, 1997), are allocated within firms, we know surprisingly little about the contemporary internal allocation of human resources. Recent work has documented how job characteristics shape both whether a job is likely to be filled internally (Bidwell & Keller, 2014) and the qualifications (e.g. experience) of the candidates likely to be placed into the job (Drazin & Rao, 2002). Yet internal hiring processes – that is, the ways in which managers search for, evaluate, and select among potential internal candidates – have received little systematic attention. However, research has shown that the use of formal versus informal external

hiring processes (e.g. the use of referrals versus job postings) shapes not only who is hired, but also their pay, performance, and turnover (Burks, Cowgill, Hoffman, & Housman, 2013; Fernandez, Castilla, & Moore, 2000; Seidel, Polzer, & Stewart, 2000), as has recent research comparing internal versus external hiring (Agrawal, Knoeber, & Tsoulouhas, 2006; Bidwell, 2011). We therefore might expect any variations among internal hiring processes to have similarly significant consequences for both workers and firms.

Studying internal hiring also promises to contribute important insights to ongoing conversations about the changing nature of internal resource allocation more generally. As firm have transitioned away from hierarchical structures characterized by centralized decision-making and towards flatter, leaner structures characterized by decentralized decision-making, bureaucratic internal labor markets have gradually disintegrated (Cappelli & Keller, 2014), internal markets and social networks have emerged as the primary mechanisms through with current workers are matched to new jobs, echoing broader changes in how resources are allocated within organizations. Indeed, the failures of bureaucratic planning systems in contemporary firms have received considerable attention (Cowen & Parker, 1997; McEvily, Soda, & Tortoriello, 2014; Mintzberg, 1994), with recent work identifying internal markets and network forms of coordination as the two primary substitutes for bureaucratic control over the allocation of key resources. Work on internal markets has generally emphasized how the use of market pricing within the firm may lead to improved managerial decision-making regarding resource allocation, as all of the information regarding the resource being considered is reflected in its price (Ellig, 2001; Felin & Zenger, 2011). Other work on internal markets has explored how high-powered incentives can be designed to reduce coordination costs by aligning the interests of managers making allocative decisions with the interests of the firm (Zenger & Hesterly, 1997; Zenger, 2002). Work on network forms of coordination has emphasized how the social relationships

among actors within the firm can lead to improved allocative decisions by providing managers with opportunities to share information on resources that would be otherwise unavailable to centralized, higher-level decision-makers (Nahapiet & Ghoshal, 1998; Tsai & Ghoshal, 1998). Because internal markets and social networks have been presented as alternatives to bureaucratic control, much of the current literature has either compared internal markets with bureaucratic control (e.g. Stein, 1997) or compared social networks with bureaucratic control (e.g. Tsai, 2002). Much less work has explored the tradeoffs associated with using internal markets or personal networks to allocate internal resources, despite the fact that market mechanisms and social networks are likely to operate simultaneously within firms.

Contemporary internal labor markets represent a particularly fruitful context for exploring these tradeoffs. Much of our understanding of internal hiring and mobility is grounded in the foundational research on traditional, hierarchal internal labor markets and a closely related literature on intraorganizational careers, which drew sharp distinctions between the bureaucratic processes for allocating human capital operating within the firm and the market processes operating outside the firm. This work described how internal hiring decisions were centralized in personnel offices and governed by strict bureaucratic rules used to maintain lines of progression along clearly defined job ladders, with employees exerting little control over their careers within the firm (Althauser & Kalleberg, 1981; Glaser, 1968; Diprete, 1987; Doeringer & Piore, 1971; Rosenbaum, 1990). Contemporary internal labor markets look dramatically different: hiring decisions having been largely decentralized, with authority over promotions, transfers and external hiring delegated to individual managers; organizational delayering, broader job descriptions, and the rise of project-based work have all but eliminated clear paths for advancement; and employees have been tasked with taking control of their careers. The cumulative effect of these changes has rendered the use of bureaucratic rules for allocating human resources obsolete (Piore, 2002).

Absent bureaucratic rules, the allocation of workers to jobs now takes place through two very different processes (Marsden & Gorman, 1999; Pinfield, 1995). *Posting* is a market-oriented process. A manager creates an internal market for an open job by broadcasting information about the position throughout the organization via an internal job board and inviting current employees to apply. The use of internal job posting systems is widespread, with 95% of organizations posting jobs internally (Taleo Research, 2005). *Sponsorship* is a more relational process. A manager identifies a candidate through her personal network and appoints that candidate to the job without others being formally considered. Not only are posting and sponsorship the two most commonly used internal hiring processes, they often operate concurrently within firms, as managers have been granted substantial discretion both over the hiring decision and the hiring process (Marsden & Gorman, 1999; Pinfield, 1995). With little if any work examining internal hiring in contemporary organizations, it is unclear whether a market-oriented or relationship-oriented allocative process is more likely to generate more valuable internal matches and what tradeoffs, if any, might be associated with the use of posting versus sponsorship.

In this paper, I shed light on these tradeoffs by developing theory to explain how key differences between the market-oriented posting process and relationship-oriented sponsorship process affect two outcomes with implications for value creation and value capture: quality of hire – as revealed by job performance, turnover, and subsequent advancement – and compensation. Though the informational benefits associated with social networks have received considerable attention (Borgatti & Cross, 2003; Bradach & Eccles, 1989; Cross, Parker, Prusak, & Borgatti, 2001; Granovetter, 1985), I predict that the market-oriented posting process will improve managerial decision-making relative to the more relational sponsorship process, creating more value though higher quality internal hires. In doing so, I describe how posting brings two features of markets into the firm that are largely absent in sponsorship – self-selection and formality. The

behavioral theory of the firm highlights two key challenges facing boundedly rational decision makers, identifying a set of alternatives and evaluating the consequences of those alternatives (Cyert & March, 1963; Simon, 1955). I argue that in contrast to the active managerial search required in sponsorship, allowing workers to self-select into the consideration set for an open job reduces the likelihood an exceptional internal candidate will be overlooked. Moreover, when compared to the relative informality of a relationship-oriented allocative process, the formality of the market will encourage managers to seek out information that allows them to better evaluate the fit between a candidate's qualifications and the requirements of the job, while also limiting the use of irrelevant information that may lead to poor hiring decisions.

However, I also predict that these same market features will lead to higher salaries though their effect on salary negotiations, limiting the amount of value a firm is able to capture through better internal hiring decisions. Self-selection and formality introduce open competition into the internal hiring process. While competition often drives down prices in external markets, I argue that it will serve to increase prices for human capital within the firm, as candidates who are hired though a competitive process are more likely to both initiate and adopt a competitive approach to salary negotiations.

Taken together, these predictions suggest that there are important tradeoffs associated with allocating human capital formally though markets or informally through the use of a manager's social network, with posting resulting in better hires but at a higher cost. However, with the performance and retention benefits associated with better internal hires likely to far exceed the higher salary costs, posting is likely to allow firms to both create and capture substantially more value. These arguments suggest that a market-oriented process will also benefit workers, who similarly capture more value through higher salaries.

I use multiple modeling strategies in testing these predictions, which are largely supported using five years (2008-2012) of personnel records covering all employees of a large health insurance provider, as well as data on more than 350,000 internal and external job applications. While personnel records have been previously used to identify which employees move to which jobs (Bidwell, 2011; Dencker, 2008), data on the processes by which workers move jobs is rare. These data are distinctive in that they clearly identify the mechanism used to facilitate each of the 11,000+ internal hires made during this period, allowing me to conduct what is, to my knowledge, the first detailed study of the differences in outcomes associated with these two very different internal hiring processes.

In unpacking the processes used to allocate workers to jobs within contemporary organizations, this study helps to provide a more complete understanding of labor markets and mobility. While robust literatures are developing to explore outcomes associated with different external hiring processes (e.g. Fernandez et al., 2000) as well as the cost and quality tradeoffs associated with internal versus external hiring (e.g. Bidwell, 2011), this work has tended to treat internal hiring as a homogeneous process, unintentionally obscuring potential variations in the processes used to move workers to new jobs within firms. More broadly, this study contributes to a growing body of literature exploring how resources are bundled and deployed within contemporary organizations (Sirmon, Gove, & Hitt, 2008; Sirmon & Hitt, 2009) by highlighting the tradeoffs associated with using markets versus network approaches for allocating internal resources. This study extends recent work exploring the effects of introducing market mechanisms into firms (Felin & Zenger, 2011) by showing how mechanisms other than prices and high-powered incentives can be leveraged to improve managerial decision-making, while also adding to a small but important collection of studies which highlight the potential limitations of relational exchange (Casciaro & Lobo, 2008; Rogan & Sorenson, 2014; Sorenson & Waguespack, 2006).

Moreover, in identifying the micro-level mechanisms (decision-making and negotiations) through which these two distinct organizational processes shape outcomes which link directly to value creation and value capture (quality of hire and compensation), this study contributes to a burgeoning literature focused on identifying the micro-foundations of human-resource based competitive advantage (Coff & Kryscynski, 2011; Ployhart & Hale, 2014).

THEORY & HYPOTHESES

Internal Hiring in Contemporary Organizations

Before developing theory, it is useful to both define internal hiring and describe key features of the allocative processes at the center of this study – posting and sponsorship. Once the province of centralized personnel offices, managers are now largely responsible for staffing the jobs that fall under their direct supervision, having been granted substantial discretion over which candidates are considered and who is ultimately hired (Jacoby, 2004). Internal hiring occurs when a manager fills an open job by hiring a worker currently employed by the organization in a different job, resulting in the reallocation of that worker to a new set of organizational activities. It is important to note that internal hiring is conceptually distinct from corporate restructurings, in which large groups of workers – often entire departments or lines of business – are redeployed, en masse, to new products or markets (Capron, Dussauge, & Mitchell, 1998; London, 1996).

Internal job posting systems date back to at least the 1940s. They were originally instituted at the insistence of unions, who saw them as a way to curtail managerial discretion over staffing decisions and thereby limit the scope for discrimination, favoritism, and nepotism to affect opportunities for internal advancement. Management saw these systems as requiring them to relinquish a long held right, so they fought to limit their scope. As a result, early job posting systems typically covered a limited set of jobs and placed significant restrictions on which employees were allowed to apply for those jobs (Cappelli, 2008). For those jobs that were

covered, detailed selection criteria were established and often privileged seniority over ability, providing individual managers with little choice over whom to hire (Jacoby, 1985; Slichter, Healy, & Livernash, 1960).

Contemporary job posting systems are much more encompassing. Managers post information about open jobs located at all but the very top levels of the organization to an internal job board and invite interested candidates located throughout the organization to apply and compete for the job, mirroring the typical process used to hire from the outside[1]. While the requirements of the job are likely to influence who applies, candidates who do not possess the qualifications described in the job posting but nevertheless would like to be considered are still able to submit an application. The hiring manager evaluates the applications and extends an offer to their preferred candidate, who may or may not negotiate the terms before deciding whether to accept or reject the job. Once an offer is accepted, it is typical for unsuccessful internal candidates to be notified and given the opportunity to learn why they did not get the job (Miller, 1984; Pinfield, 1995).

Posting is often the default internal hiring process. Upwards of 95% of firms now use internal job boards (Taleo Research, 2005) and many have developed policies encouraging managers to post open positions internally, in large part to protect themselves from allegations of discrimination (Strum, 2001). Yet despite these policies and the widespread availability of internal job boards, managers can and often do bypass the posting system. This is in part due to the fact that no state or federal laws require firms to post jobs and in part because internal staffing policies

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[1] When posting a job, a manager has the option of restricting the competition to internal candidates or opening the competition to both internal and external candidates. While it is hard to pin down an exact figure, a reasonable estimate is that around half of jobs above entry-level (which are by definition filled externally) are posted internally and externally at the same time (Jacoby, 2005). This means that the posting process may or may not result in an internal hire, depending on who is selected. For the purposes of this paper, I present posting as an internal allocative process, because my interest is in looking at outcomes associated with posting when an internal hire is made. In supplemental empirical analyses, I control for the presence of external candidates on the key dependent variables.

are both rarely enforced and allow for flexible interpretations (Pinfield, 1995). In fact, the Society of Human Resource Management, the leading professional association for human resource professionals, has recommended to hiring managers that "even if you have an internal process for posting available jobs, there may be times when you decide not to follow this process" (SHRM, 2000: 7). In particular, managers are likely to bypass the posting system when they already have a qualified candidate in mind for the job.

When managers do bypass the posting process, they turn a relational process I refer to as *sponsorship*[2]. Social networks are a central feature of organizational life, as interactions among individuals inevitably lead workers to develop networks of personal relationships (Kanter, 1977; McEvily et al., 2014; Podolny & Baron, 1997). A sponsoring manager uses her personal social network to identify potential candidates and then appoints her preferred candidate to the job absent open competition. Though it is possible for sponsoring managers to exhaust their personal connections as they search for potential candidates, the vast majority of internal hires made through sponsorship involve the consideration of a single candidate with a direct connection to the hiring manager, typically a current or previous colleague (Pinfield, 1995).

An abundance of evidence suggests that posting and sponsorship operate side-by-side within firms, as equally viable ways to fill jobs. Marsden and Gorman (1999) examined survey data on a representative sample of US work establishments and found that posting and sponsorship were widely used in combination for filling vacancies with internal candidates. Pinfield's (1995) study of internal hiring in a forest-products company revealed that more than half of all positions were filled through sponsorship despite company policy that all jobs be posted. And though over 95 percent of firms report posting at least some open jobs internally (Taleo Research, 2005)

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[2] I adopt the term sponsorship from classic literatures on career mobility within organizations (Rosenbaum, 1979) and upward social mobility more generally (Turner, 1960), in which it is used to describe systems in which individuals selected for advancement are shielded from competition.

research continues to demonstrate the importance of relationships on internal advancement (Bielby, 2000; Ibarra, 1993; Podolny & Baron, 1997).

It is important to note that while posting and sponsorship are conceptually distinct internal allocative processes, sponsorship may sometimes masquerade as posting in practice. That is, it is possible that a manager may post a job having already identified the candidate they are going to select through their social network, a practice referred to as a "wired search" (Bielby, 2000). However, the prevalence of "wired searches" and other practices that might artificially restrict the openness of the posting process, such as shaping job requirements around a single candidate or discouraging employees from applying for certain jobs, are largely mitigated by concerns about allegations of discrimination (Strum, 2001) as well as the possibility that employees who feel they were mistreated or misled will simply leave the organization (Billsberry, 2007; Cappelli, 2008).

From the descriptions above, it is clear that market-oriented posting and relationship-oriented sponsorship differ in several ways. In developing theory to understand the tradeoffs between these two allocative process, I highlight the fact that posting is characterized by two market-like features, self-selection and formality, that are largely absent in sponsorship, which instead involves active managerial search and using personnel connections to gather information.

Bounded Rationality and Quality of Hire

A key facet of behavioral theories of the firm is the presumption that decision-makers are boundedly rational. Because decision-makers are cognitively limited and have limited time, information, and resources at their disposal, neither the complete set of alternatives from which a decision maker can choose is known ex ante, nor are the consequences involved in choosing among the available alternatives (March & Simon, 1958). As a result, failures in generating and evaluating alternatives have been identified as two of the chief reasons why managers fail to optimally allocate available resources (Afuah & Tucci, 2012; Knudsen & Levinthal, 2007).

Self-selection and generating alternatives. Because the complete set of alternatives is not known ex ante, boundedly rational decision-makers must engage in search to generate alternatives. Search not costless, however, and one of the ways decision-makers economize is by considering only a small portion of available alternatives (Hauser & Wernerfelt, 1990; Shocker, Ben-Akiva, Boccara, & Nedungadi, 1991). While considering more alternatives does not guarantee a better decision (Iyengar & Kamenica, 2010), decision-making success does tend to improve when more alternatives are considered (Alexander, 1979; Gemünden & Hauschildt, 1985; Nutt, 1998), in part because it lessens the odds that a superior alternative will be left out of the consideration set.

Self-selection enables managers to generate more alternatives without incurring many of the costs associated with a broader search (Afuah & Tucci, 2012). Markets facilitate resource allocation by providing a common platform for widely dispersed buyers and sellers to exchange information about their needs and preferences (Zenger et al., 2011). Self-selection refers to the ability of market participants to choose which available opportunities to pursue based on this information rather than have those matches determined by managerial authority.

One way managers (as buyers) are able to harness the power of self- selection is by broadcasting information about an opportunity and allowing interested sellers to self-select into the set of alternatives to be considered by the manager. Rather than the manager assuming the responsibility for generating alternatives through active search, sellers search for opportunities that match their preferences. Because sellers have more information on their preferences than managers and are likely to seek out alternatives that meet those preferences, searches that may be considered distant from the perspective of the manager may often be considered local from the perspective of the seller. By essentially transforming local search into distant search (Afuah & Tucci, 2012), self-selection should be expected to expand the number of alternatives considered by a manager – and more alternatives reduces the risk that a quality alternative will be overlooked.

The posting process enables managers to harness the power of self-selection by broadcasting information about an open job and allowing internal candidates located throughout the organization, including those in in more distant areas, such as workers located in a different location, department or function, to self-select into a queue of candidates competing for the job. In contrast, sponsorship provides no formal mechanism for employees to express their interest in an open job. Rather than broadcast information about the opening and allow interested candidates to self-select into the candidate pool, the manager actively searches for alternatives (Mintzberg, Raisinghani, & Théorêt, 1976) through their personal network. The pool of potential candidates is therefore restricted by a manager's previous experience and connections. While information about internal candidates residing outside a manager's immediate network is likely accessible (e.g. through human resource information systems, talking with HR, etc.), obtaining this information takes time and effort and the likelihood of finding a superior alternative is uncertain. Moreover, managers are more likely to place a higher value on information obtained through their social network, further discouraging the search for candidates residing outside of it. As a result, sponsoring managers typically only consider those candidates with whom they are already familiar, and even the most well-connected managers in large organizations are unlikely to be familiar will all potential internal candidates.

In sum, by enabling candidates located both within and outside a hiring manager's social network to self-select into the consideration set, posting should therefore be expected to generate a larger set of candidates than would otherwise be accessible through a manager's personal network, reducing the likelihood that an exceptional internal candidate will be overlooked.

Formality and evaluating alternatives. In addition to the challenges associated with generating alternatives, boundedly rational managers also face difficulties evaluating alternatives. In particular, recent work has called attention to the problems associated with bounded awareness,

which refers to the propensity of boundedly rational individuals to fail to seek out or incorporate relevant and accessible information into their decision-making process, instead relying on less relevant information. Bounded awareness is one symptom of intuitive thinking, which often fails to allow for the possibility that evidence needed to make a good decision is missing. As a result, decision-makers tend to make decisions based on a subset of available information (Brenner, Koehler, & Tversky, 1996; Kahneman, 2011). This "misalignment between the information needed for a good decision and information included in the decision-making process" (Bazerman & Chugh, 2005: 10) can lead to costly errors. Such errors are problematic in the hiring context, where managers are notorious for their "stubborn reliance on intuition and subjectivity" (Highhouse, 2008: 333).

Research suggests that interpersonal networks serve as conduits for information exchange within organizations, providing managers with ready access to information that is richer, more complete, and perceived as more trustworthy than information obtained from other sources (Bradach & Eccles, 1989; Granovetter, 1985; Podolny & Baron, 1997). While this information might be expected to improve decision-making, access to information alone is not enough to ensure a good decision; managers must still select which information to use and which information to ignore. In fact, studies spanning different contexts and levels of analysis, from those examining individual hiring decisions[3] to firm-level decisions about selecting merger and

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[3] There is ample evidence that managers rely on irrelevant information when making hiring decisions. For example, managers often give substantial weight to performance in a previous job despite the fact that is often a poor predictor of future performance (Cascio & Aguinis, 2008) and frequently allow attributes such as gender, race, attractiveness, and weight to influence hiring decisions (e.g. Agerström & Rooth, 2011; Bertrand & Mullainathan, 2004; Marlowe, Schneider, & Nelson, 1996). There is also an equal amount of evidence that hiring managers fail to seek out relevant information, even when it is easily accessible. For example, managers routinely bypass proven selection aids in favor of unstructured interviews (Highhouse, 2008) and use interviews to confirm their first impressions of candidates at the expense of gathering job-relevant information (Dougherty, Turban, & Callender, 1994).

acquisition partners (Rogan & Sorenson, 2014), show that managers routinely struggle to objectively evaluate alternatives with whom they have an existing connection.

A market-oriented allocative process may therefore actually be superior to an information-rich relational process in helping managers to overcome problems associated with bounded awareness by shaping the information used to evaluate alternatives. Markets are institutions supported by a system of rules and conventions designed to facilitate exchange among buyers and sellers (Casson, 1982; Menard, 1995; Polyani, 1957). These rules and conventions – which I refer to as formality – are both impersonal and non-arbitrary, thereby providing a stable framework for transactions to take place (Menard, 1995: 1967). These rules and conventions serve several functions, two of which are establishing the terms of exchange and defining what constitutes legitimate behaviors (Loasby, 2000). In establishing the terms of exchange, the market generates at set of evaluation criteria; in defining what constitutes legitimate behaviors, the market imposes accountability on buyers. The presence of formal evaluation criteria and a high level of accountability discipline managerial decision-making in different ways.

Evaluation criteria and relevant information. For markets to function, there must be a mechanism for managers (as buyers) to broadcast information to potential sellers about the good or service they are looking to procure (Zenger et al., 2011). Though managers may have difficulties fully articulating their needs (Nickerson & Zenger, 2004), this initial information helps to establish the terms of exchange in that it serves as the initial criteria against which sellers evaluate their interest in pursuing the opportunity and as the initial criteria against which the buyer evaluate those sellers who self-select into the consideration set. As a result, sellers are likely to provide, and buyers are likely to seek out, information that enables buyers to evaluate alternatives against a set of established criteria.

One way posting introduces the formality of markets is through the use of formal job descriptions. The posting process requires a manager to create a formal job description, necessary for broadcasting information about an open job to potential candidates. Though it can be difficult to develop accurate, comprehensive job descriptions (Backhaus, 2004; Sanchez & Levine, 2012), the requirements defined at this initial stage nevertheless serve as a set of formal criteria against which potential candidates are evaluated. In contrast, sponsorship does not require the manager to create a formal job description prior to evaluating candidates. A manager must possess a reasonable understanding of the job requirements as well as desirable candidate attributes, but because the manager does not have to broadcast information about the open job, a formal job description is not necessary. This allows the manager to informally mold the job requirements around their preferred candidate rather than evaluating the candidate against the requirements of the job (Miner, 1987; Sanchez & Levine, 2012). When compared to sponsorship, the presence of formal evaluation criteria in posting is therefore more likely to prompt managers to reconsider the relevance of the information used to evaluate candidates, with managers more likely to recognize and seek out information enabling them to evaluate a candidate's ability to perform well in the job.

Accountability and irrelevant information. Mechanisms that impose responsibility and accountability ensure the continued participation of market participants by instilling confidence that future transactions will be completed in a fair, honest, and orderly manner. Of particular note, perceptions of the process by which firms make allocative decisions in a market can effect perceptions of fairness, with decisions that appear to be free of bias and based on objective criteria perceived as more fair and legitimate (Bies, Tripp, & Neale, 1993; Williams, 1987). Market-based accountability should therefore encourage managers to avoid using information that would lead their decisions to be perceived as subjective.

Posting embeds a market-like accountability in the hiring process through the custom of requiring managers to explain to unsuccessful internal candidates why they were not selected. For every successful internal candidate there are likely to be multiple unsuccessful candidates. Because these unsuccessful internal candidates remain employees, it is important to clearly communicate the reasons why they did not get the job in order to minimize any sense of unfairness that may decrease motivation, performance, and potentially lead to dysfunctional turnover. By ensuring that hiring decisions have to be communicated and defended, the custom of explaining to employees why they were not selected embeds accountability into the internal hiring process (Tetlock, 1992).

Sponsoring managers informally search for candidates through their personal network, so workers are often unaware they are being considered (Pinfield, 1995). As a result, accountability is more limited than it is in posting, though it is not entirely absent. Managers are required to communicate their decision to a supervisor but because supervisors typically grant managers substantial discretion over who is selected, those decisions do not have to defended to a broader audience. The higher level of accountability generated though the competitive posting process should therefore guard against the use of irrelevant information, as managers are more likely to use objective criteria in justifying their hiring decisions to a broader audience.

As a whole, these arguments suggest that infusing self-selection and formality into the internal hiring process will help boundedly rational managers overcome problems associated with generating and evaluating alternatives. Self-selection is likely to be more effective than active managerial search in reducing the likelihood that an exceptional candidate will be overlooked, while the formality of the market is likely to be more effective at disciplining managers to avoid costly errors associated with bounded awareness. As a result, I expect posting to create more value than sponsorship by generating higher quality internal hires, as revealed by worker performance,

turnover and subsequent advancement. Specifically, I predict that when compared to sponsored internal hires:

H1: Workers hired through posting will have higher performance ratings in the new job.

H2: Workers hired through posting will be less likely to exit the firm.

H3: Workers hired through posting will be more likely to subsequently be promoted.

Competition and Compensation

Quality of hire is only part of story, as the value a firm is able to capture from even the highest quality hire is largely contingent on how much they are paid. It is therefore important to understand how posting and sponsorship shape compensation. To do so, it is useful to switch from the manager's perspective and think about how salary negotiations from the perspective of the worker.

Markets are characterized by open competition, with sellers aware that they are competing for buyers with other sellers (Menard, 1995). Self-selection and formality are two of the key mechanisms supporting the competitive nature of markets. Self-selection allows sellers to pursue the opportunities they are interested in and the formality facilitates the exchange of information that ultimately allows buyers to compare information on widely dispersed alternatives and make a selection (Zenger et al., 2011).

Posting is characterized by open competition. Interested candidates self-select into the consideration set when they apply for an open job. In doing so, they form a labor queue – a set of workers competing for a specific job at a specific time (Reskin & Roos, 1990). The formality of the posting process underscores the competitive nature of posting, as the fact that employees have to actively submit an application makes them aware that they are entering into a competition they are not assured of winning. In contrast, to the extent there is competition in sponsorship, it lacks structure and transparency. Because search is costly, managers routinely consider a small pool of

internal candidates (often just a single candidate). Moreover, because managers gather information on potential candidates informally, in those cases where multiple candidates are considered, those who are not selected are often unaware of being considered (Pinfield, 1995).

While competition is often seen as a way to lower prices by pitting multiple suppliers against one another, recent work exploring the social psychological aspects of negotiation provides reason to expect the opposite in the internal hiring context. A key premise in this literature is that situational factors prime individuals to place more or less emphasis on the importance of dyadic relationships in negotiations. The more emphasis an individual places on the dyadic relationship in a negotiation context, the more likely they are to adopt a relational orientation to negotiation, and individuals adopting a relational orientation to negotiation are more likely to forgo economic gain in an effort to develop relational capital (Curhan, Elfenbein, & Xu, 2006; Curhan, Neale, Ross, & Rosencranz-Engelmann, 2008: 193; Gelfand et al., 2006).

Sponsorship is much more likely to cue a worker to focus on their relationship with the hiring manager. Because the hiring manager personally appointed the worker to the job absent any formal competition, the relationship with the hiring manager is likely to be particularly salient and highly valued at the time an initial job offer is presented. This is unlikely to be case in posting, with the competitive nature of the process emphasizing the transactional nature of the employment relationship. As a result, workers hired through sponsorship are more likely to adopt a relational orientation approach when the time comes to negotiate compensation.

There are two reasons to expect that adopting a relational orientation towards salary negotiations has important implications for how much a worker is likely to earn. First, a worker adopting a relational orientation is less likely to initiate a salary negotiation. Focused on developing relational capital, she will want to avoid appearing self-interested and feel uncomfortable with the idea of asking for more money (Gelfand et al., 2006). She is also more

likely to perceive the initial offer as fair; being more attuned to other party's goals should reduce the likelihood she will assume the other party's interests are opposed to their own, a common error in negotiations (Cross, Bacon, & Morris, 2000; Gelfand et al., 2006; Thompson & Deharpport, 1998). Second, an individual adopting a relational orientation is more likely to employ an accommodative negotiation strategy whereas an individual adopting a transactional orientation is more likely to negotiate competitively (Curhan et al., 2008), and accommodative approaches to salary negotiation have been shown to result in lower raises than competitive approaches (Marks & Harold, 2011).

This suggests that there is an important tradeoff between the quality and costs associated with different internal hiring processes. Though posting is likely to create more value, the firm does not capture all of that value, as workers capture a portion of that value through higher compensation. Relative to sponsorship, the competitive nature of the posting process will increase the likelihood that workers both initiate salary negotiations and adopt a more economically beneficial approach when they do choose to negotiate, leading me to predict that:

H4: Internal candidates hired through posting will receive higher starting salaries than sponsored employees entering equivalent jobs.

DATA & METHODS

I test my hypotheses using monthly personnel records covering the years 2008 to 2012 from the US operations of Fortune 100 health insurance company, which I call HealthCo. The primary data for my analyses consist of more than 11,000 internal hires made during the observation period, which are identified from a larger dataset consisting of 1,914,519 monthly observations covering 56,811 worker employed by HealthCo between 2008 and 2012.

While using data from a single firm limits the confidence with which I can generalize my results, these data are particularly well suited to test my hypotheses. The distinguishing feature of

these data is that the way in which HealthCo has linked their various human resource information systems allows me to clearly identify whether posting or sponsorship was used to facilitate each and every internal hire. I am also able to link these personnel records to a companion dataset with information on more than 350,000 internal and external job applications submitted during 2012, allowing me to conduct several robustness checks. Using personnel data from a single organization has several other advantages, including the fact that my performance measures are standardized across jobs and that I am able to control for the effects of job content and the location of different jobs (and therefore different attributes of moves between jobs), all of which would pose substantial empirical difficulties in a multi-firm study. Moreover, obtaining this type of data from even a single firm is quite challenging; many firms fail to systematically record any data related to employee mobility (ERC, 2010; Oracle, 2012) and for those that do, the fear of sanctions were internal analyses to reveal previously unrecognized patterns of illegal discrimination has the perverse effect of discouraging firms from exploring these processes (Strum, 2001). The setting itself reduces at least some concerns about generalizability, as HealthCo mirrors other large contemporary organizations in several respects: hiring decisions are delegated to individual managers, employees are explicitly encouraged to actively manage their careers amid a lack of well-defined advancement paths, and there are substantial amounts of lateral and vertical mobility across broadly defined jobs.

Identifying Internal Hires

An internal hire occurs when a manager fills an open job with a current employee[4], as indicated by a change in an employee's job code, department, or both from one month to the next. An employee who changes job codes takes on a new set of tasks and responsibilities. A move to a

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[4] HealthCo has a vacancy-driven hiring process, meaning that all hires – internal and external – are preceded by an open job.

new department represents a move to different area of the business, as departments are organized around products, geographic markets, and customers (internal and external). All entry-level jobs at HealthCo are filled through external hiring; internal hiring is used alongside external hiring to fill jobs above entry-level.

It is important to emphasize that a change in job code does not simply represent a change in title, with little change to the work actually performed (Miner, 1987). Jobs at HealthCo are broadly defined by hierarchical level, function, and role. In an average year, approximately 34,000 employees were distributed across 462 job codes. Jobs are organized into nine different levels [(1) Entry-level, (2) Team Lead, (3) Supervisor/Analyst, (4) Manager/Professional, (5) Director/Technical Leader, (6) Vice President, (7) Senior Vice President, (8) Executive Vice President, (9) CEO] and thirty functional areas, including those common to most large firms (e.g. Sales, Finance/Accounting, HR, and Marketing) as well as several more specific to the health insurance industry (e.g. Clinical Guidance, Provider Contracting). Roles indicate the specific competencies needed to perform the job. For example, "Creative Developer" is a Level 3 role in Marketing; "Recruiting Lead" is a Level 3 role in Human Resources; and "Architect", "Applications Consultant" and "Project Manager" are all Level 3 roles with IT, each linked to different competencies. As a result, a change in job code reflects a meaningful change in the work a person does.

Dependent Variables

Quality of hire and compensation are the two primary outcomes of interest in this study. Researchers have used a wide variety of post-hire outcomes to assess quality of hire (e.g, see Breaugh & Starke, 2000; Zottoli & Wanous, 2000). In an effort to provide a holistic accounting of the quality of internal hires with HealthCo, I test my hypotheses using multiple indicators of quality: performance ratings, relative performance, turnover, and subsequent advancement.

Performance ratings and relative performance. I use five measures of job performance from HealthCo's annual performance evaluation as a first set of quality indicators.

Contribution score. A worker's *contribution score* assesses their contribution to the success of the organization. In jobs with a less direct impact on organization-level outcomes (e.g. those at lower levels), the contribution score is typically used to assess their contribution to the department or line of business. It is measured on a 0 to 4 scale [0=not contributing (0%), 1=low contribution (3.2%), 2=moderate contribution (19%), 3=full contribution (66.8%), and 4=exemplary contribution (11%)].

Competency score. A worker's *competency score* assesses their skills relative to what is required for the job. Each worker receives a separate score for each of the eight competencies assigned to their job code[5]. Each competency is measured on a 1 to 4 scale [1=Learning, 2=Exhibiting, 3=Demonstrating, 4=Modeling]. I average these individual scores to compute an overall competency score [1-2 (11.4%), 2-3 (66.2%), 3-4 (12.4%)].

Relative performance. Managers also rank workers in similar jobs as part of an annual calibration process (described below). However, workers are not simply ordered according to their contribution and competency scores; rather, this is intended to be a measure of overall value to the organization that takes into account both previous performance and future potential. Although there are no formally established guidelines dictating how finely managers should distinguish among workers, these calibration sessions typically create "buckets" of employees; a group of 100 employees may not be ranked from 1 (highest) to 100 (lowest), but rather the top five employees may receive a 1, the next ten a 2, the next twenty-five a 3, and so on. I use these ranking to create three dichotomous measures of relative performance: whether a worker is ranked

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[5] Selected from an overall library of 124 competencies customized for HealthCo.

in top the quartile (*top 25%*), bottom half (*bottom 50%*), or bottom quartile (*bottom 25%*) of her cohort in her first year in the new job.

While all of these are subjective measures of performance, several researchers have argued that subjective ratings are among the most valid measures of performance despite concerns about the potential for managerial bias to affect ratings (Cascio, 1998). Subjective ratings enable managers to take into consideration a variety of behaviors and outputs relevant to the job (Medoff & Abraham, 1981) as well as account for factors affecting performance outside the control of the individual worker (Campbell, McCloy, Oppler, & Sager, 1993). However, it is also important to note that HealthCo's annual evaluation process helps to reduce potential concerns about supervisory bias affecting individual performance ratings. Managers who supervise workers in similar jobs meet in person to review and discuss their ratings of individual workers – a process known as calibration. These calibration discussions are intended to ensure that managers are evaluating workers against a common standard and to identify and correct instances where managers may have rated employees too harshly or leniently. Research has shown that calibration tends to reduce subjectivity and bias in performance ratings both because ratings are likely to be more consistent across employees when managers share a common view on rating standards (McIntyre, Smith, & Hassett, 1984; Pulakos, 1984) and because "fellow managers do not do not usually let each other off easily if they believe an employee has been rated unfairly, creating peer pressure that provides a powerful incentive to make accurate ratings" (Pulakos & O'Leary, 2011: 152–3).

Turnover. Turnover is a second indicator of match quality (Jovanovic, 1979; Mortensen, 1988). I create two dichotomous measures of turnover indicating whether a worker exits the organization with the first 12 months (*turnover12*) or 24 months (*turnover24*) of moving to a new job. I do not distinguish between voluntary and involuntary turnover for two reasons.

Conceptually, both are indicators of poor matches, with the worker and firm both more likely to terminate an ill-fitting employment relationship. Empirically, while the data do indicate whether turnover was voluntary or involuntary, managers and HR staff at HealthCo both told me not to trust these indicators as reflecting the actual reasons an employee left the organization. Consistent with research showing that turnover rates are relatively low among internal hires in non-entry-level jobs (Bidwell, 2011), approximately 5% of internal hires exited the firm within 12 months, while 13% exited within 24 months.

Promotion. Subsequent promotion is a third indicator of quality. Promotions are internal hires that result in the employee moving into a higher level job. Because time to promotion varies across jobs, I create two dichotomous measures of subsequent advancement: whether a worker was promoted within 24 months (*prom24*) or 36 months (*prom36*) of moving into a new job. Approximately 14% of internal hires were subsequently promoted within 24 months, while 31% were promoted within 36 months.

Starting salary. The starting salary is the natural logarithm of the salary a worker receives in the first month in a new job. Salary accounts for the vast majority of compensation for most workers at HealthCo. Sales workers represent the main exception and their bonuses, which are tied to clearly defined sales targets, can account for a substantial portion of their total income. However, the bonus amount these workers are expected to receive based on their targets are factored into the annual salary figures recorded in HealthCo's personnel records. For example, if a salesperson is hired into a job with a base salary of $80,000 and expects to earn a bonus of $40,000, for a total expected annual compensation of $120,000, her salary in the monthly personnel record from which I pull this figure will be $120,000. This means that the salary figure I use represents the total compensation she should expect to earn during the year, which is the figure upon which she will be negotiating.

Independent Variable

The independent variable is a dichotomous indicator of whether posting (1) or sponsorship (0) was used to fill the job, identified through an unambiguous indicator in the first monthly observation of a worker in her new job. 3,841 (43%) of internal hires were made through posting and 5,458 (57%) through sponsorship.

Control Variables

An important concern when using non-experimental data is the potential for omitted variables to create spurious correlations between the independent and dependent variables. Hiring managers at Health Co. are able to choose whether to fill a job through posting or sponsorship. A particular concern in this study is that there may be variables that both affect a manager's decision of which process to use as well as the outcomes of interest. In the absence of existing empirical evidence, it seems likely that the choice to use posting or sponsorship might be affected by two factors: attributes of job and the manager's perception of the availability of qualified candidates. It could be that there are certain jobs that are always posted and others that are always filled through sponsorship. It could also be the case that managers only post jobs if they have been unable to or assume they will be unable to identify qualified candidates through their personal network. I leverage the level of detail in my data to address the first issue, which enable me to control for many of the job characteristics that might be expected to have an effect on the choice between posting and sponsorship. To address the second issue, I run a series of robustness checks using an instrumental variable approach, which I describe in more detail later in the paper.

Job attributes. In order to compare the outcomes associated with different processes used to staff similar jobs, I control for several job-level attributes. I include dummy variables to control for hierarchical rank, function area and the state a job is located in (51% of job are located in the headquarters state). In order to control for fixed propensities of different jobs to be filled by

posting or sponsorship, I also include separate dummies for each of 266 job codes filled though internal hiring during my observation period. Importantly, the data reveal no systematic differences in the types of jobs that are filled through posting or sponsorship. Of all the job codes filled internally from 2008-2012, 84% were filled by both posting and sponsorship, and moves into those jobs accounted for 99% of all internal hires. Moreover, 75% of the job codes filled exclusively through either posting or sponsorship were only filled once or twice, 88% only three times, and none more than six times. It is therefore likely that even those job codes filled exclusively through one process during this time periods are nevertheless open to being filled through both processes, with the apparent exclusivity an artifact of so few hires having been made into those job codes.

Job transition attributes. Another concern is that the outcomes may be affected by the types of moves workers are making rather than how those moves are made. For example, we might expect workers moving to more similar jobs to have higher levels of performance and that sponsored workers are likely to come from more similar jobs because managers are more likely to have personal connections to workers in similar jobs. To account for this possibility, I include dummies for whether an internal hire resulted in a worker moving into a new job in the same function or same department. Similarly, I include dummies indicating whether an internal hire resulted in a promotion (a vertical advancement; n=4,843), an expansion (a lateral advancement which results in an expansion of the worker's competencies; n=3,594), or a transfer (a lateral move to the same job in a different department; n=1,122), which may affect pay and/or performance. I include the worker's salary in the final month of their previous job in some models to account for the possibility that internal salary adjustments may be based on an employee's previous salary even when moving across very different jobs.

Individual attributes. I also include controls for a variety of candidate attributes. Demographic characteristics include gender, age and age-squared, and ethnicity. Tenure and tenure-squared are calculated as the number of months (squared) a worker has been employed by the firm. I include a worker's contribution and competency scores in their previous job as a rough indicator of pre-hire quality. HealthCo does not include years of education or highest degree completed in their personnel records.

Additional controls. I include dummies for each year in the sample to reflect changing labor market conditions. In models predicting relative performance, I control for the size of a worker's performance rating cohort (e.g. the number of workers in their forced ranking group).

Sample Restrictions

The samples used for each of my analyses vary according to a number of restrictions I placed on the data. In the analyses where performance ratings are used as dependent variables, I dropped observations with missing performance data, which occurred when workers had been hired to recently to assess or exited the firm before being assessed (n=2,484). In both the turnover and advancement models, the samples are restricted to those workers who were hired early enough for me to calculate the dependent variables of interest (e.g. to be included in the model predicting turnover in 12 months, a worker either had to have exited the firm within 12 months of moving into their new job or occupied the job for 12 months). Finally, in the compensation models, I excluded observations with missing salary data (n=28).

ANALYSIS & RESULTS

Table 1 provides means, standard deviations, and correlations for the main dependent and independent variables, with each observation representing an internal hire. Of particular interest are the correlations between the multiple measures of quality of hire. The correlation between the contribution and competency scores (r = .67) which indicate that these two measures pick up

different aspects of performance. The correlations between these two measures and the relative ranking variables covary in the expected directions while also suggesting that they are also picking up different aspects of performance, as they are positively correlated with a worker ending up in the Top 25% (r = .43, .45) and negatively correlated with a worker ending up in the Bottom 50% (r = -.46, -.50) and Bottom 25% (r = -.40, -.46). The low correlations among the performance rating variables and the turnover and subsequent promotion variables (none exceed r = +/- .13) suggest that each of these variables are capturing a different element of performance. It is also important to note the low correlations between salary and each of the performance measures (none exceed r = +/- .16), which underscore the notion that salary does not simply reflect a manager's expectations about performance in the new job, but is instead largely determined by a negotiation process which occurs prior to a manager observing actual performance (Jovanovic, 1979). This is important in interpreting the results, as I argue that while posting results in both higher quality hires and higher salaries, the higher salaries are not a result of the manager expecting a higher level of performance. In fact, the robustness checks suggest that, if anything, managers are likely to expect sponsored hires to perform better.

Insert Table 1 about here

Performance

Table 2 presents analyses of each of the five performance measures. I use ordinary least squares regressions in models using competency and contribution scores as the dependent variables. Competency score is a continuous variable and though contribution score is a discrete, ordinal measure, the OLS model is easier to interpret than an ordered logit model (and both provide similar results). I use a logit specification for models where relative performance is outcome of interest, as the dependent variables are binary. The unit of analysis in all models is an

internal hire and the performance measures reflect performance in the first year on the job. I cluster the errors by individuals to account for non-independence among the errors.

Using contribution and competency scores as the dependent variables, Models 1 and 2 provide support for Hypothesis 1, with the significant positive coefficient for posting in both models indicate that internal hires made through posting outperform internal hires made through sponsorship. The effect sizes are relatively small, with posting resulting in an increase of approximately one-tenth of a standard deviation on each measure of performance, an issue I return to in the robustness checks. Model 3 provides additional support for Hypothesis 1 in demonstrating that internal hires made through posting are approximately 13% more likely to be rated in the top quartile of their respective performance/potential distribution than sponsored internal hires. Models 4 and 5 further reveal that internal hires made through posting are less likely to have poor performance ratings in the new job. The significant negative coefficients for posting indicate that internal hires made through posting are approximately 13% less likely to fall in the bottom half of the ratings distribution and approximately 15% less likely to fall in the bottom quartile. Taken together, these results strongly suggest that posting leads to better internal hiring decisions, in part by helping managers avoiding hiring mistakes.

Insert Table 2 about here

Turnover

Models 7 and 8 in Table 3 use logit models to test Hypothesis 2, that internal hires made through posting are less likely to exit the firm. Both models provide support for this hypothesis, with the significant negative coefficients for posting indicating that internal hires made through posting are around 20% less likely to exit the firm within 12 months (Model 7) and around 18% less likely to exit the firm within 24 months (Model 8).

Insert Table 3 about here

Subsequent Advancement

Models 9 and 10 in Table 3 also use logit models test Hypothesis 3, that internal hires made through posting are more likely to be subsequently promoted. I find very limited support for this argument. The coefficient for posting in not significantly different from zero in Model 9, indicating that there is no difference the 24 month promotion rates of internal hires made through posting or sponsorship. The coefficient for posting is positive but only marginally significant in Model 10, provided some indication that posting *may* be more likely lead promotion over a 36 month period, but nothing conclusive.

Salary

Models 5 and 6 in Table 3 test Hypotheses 4, that internal hires made through posting will receive higher starting salaries than sponsored hires entering equivalent jobs. The significant positive coefficient for posting in Model 11 provides support for this hypothesis, revealing that posted hires receives nearly 4% higher salaries, on average, than sponsored hires. The 4% posting premium remains after controlling for performance in the previous job (Model 12).

Mobility Patterns and Within Department Hires

In theorizing about the effects of self-selection and formality on quality of hire, I made two complementary arguments, one that suggests that self-selection improves quality by expanding the pool of potential candidates and the other that formality helps to shape the information managers use when evaluating candidates. The regression results above, however, do not allow me to whether one or both of these mechanisms are driving the results. To examine this issue in more detail, I first present descriptive statistics on internal source of hire (Table 4). These data reveal that posting is significantly more likely to result in hires from different departments, functions,

cities and even different buildings, consistent with my argument that self-selection lessens the likelihood that manager will overlook an exception candidate by allowing managers to more readily identify candidates widely dispersed throughout the organization. I then ran a series of regressions restricting the analysis to internal hires made within departments (Table 5). Because managers are likely to be aware of and have access to much more detailed information on candidates located within their own department, this provides a stronger test of my argument that, beyond providing more alternatives, posting improves decision making by disciplining what information they use in evaluating candidates. Consistent with my theorizing, the results are nearly identical to those presented in Tables 2 and 3. In fact, if we assume that managers not only have ready access to, but already possess detailed information (both relevant and irrelevant to their ability to do the job) on candidates within their department, we might conclude that markets are particularly beneficial in helping managers to avoid the use of irrelevant information when evaluating well-known alternatives, a commonly cited reason for hiring errors (Highhouse, 2008).

Insert Tables 4 & 5 about here

Supplementary Analyses and Robustness Checks

As noted above, a potential concern with my use of ordinary least squares and logit models above is the potential endogeneity of posting. While I am able to control for the fixed propensities for certain jobs to be filled by posting or sponsorship, I do not have a variable which would allow me to control for the possibility that managers only post jobs if they are unable to first identify qualified candidates through their personal network. However, it is important to note that if this were indeed the case, we would expect the endogenous nature of this choice to affect the quality of hire results in the opposite direction; if managers are most likely to use sponsorship when they are able to personally identify an excellent candidate, sponsored hires should be expected to

outperform hires made through posting. Empirically addressing this potential endogeneity nevertheless seems prudent and I do so using an instrumental variable approach.

An instrumental variable should correlate strongly with endogenous variable (posting) but not with the second stage error term (Hamilton & Nickerson, 2003; Semadeni, Withers, & Certo, 2014). A variable that appears to meet these two conditions is the *percentage of similar jobs filled by posting in other departments in the preceding two months*. My discussions with both hiring managers and HR staff at HealthCo confirmed that managers regularly, (a) ask other managers how they recently filled similar jobs, or (b) contact HR and ask how similar positions have been filled recently. While both mechanisms should be expected to influence the manager's decision on how to fill the job, how similar jobs are filled in other parts of the organization should have little direct effect on post-hire outcomes or salary.

Table 6 compares the results for competency and contribution scores using OLS (Models 1 and 2) to those using both a traditional 2SLS approach (Models 3 and 4) and a 2SLS treatment approach which accounts for the binary nature of my endogenous variable (Models 5 and 6). The first stage estimates reveal that I do not have to worry about instrument weakness. As can be seen by comparing the results of the different equations, the results are consistent with those obtained using OLS. In fact, after I controlled for the endogeneity bias, the effect of posting of both competency and contribution scores are substantially stronger, increasing from an increase of around one-tenth of a standard deviation to nearly four-tenths of a standard deviation for contribution and over half a standard deviation for competency.

Insert Table 6 about here

Table 7 presents the results for relative performance using instrumental variable probit models. Aside from the change in coefficient magnitude, the main difference between these results

and those from the logit models is that there is no significant relationship between how a worker enters a job and their likelihood of landing in the top quartile of the performance distribution. Taken together, the interpretation of these results remains unchanged – posting disciplines managers to make better internal hiring decisions, in part by avoiding hiring mistakes.

Insert Table 7 about here

Table 8 presents the results for turnover and subsequent advancement using instrumental variable probit models, as well as the result for salary using a traditional 2SLS approach. Again, the results lead to similar interpretations as the non-instrumental variable models, with the main difference being the magnitude of the coefficients. The one substantive difference is that the IV Probit specification indicates that while internal hires are less likely to exit the firms with 12 months, they are not more or less likely to exit the firm within the longer 24 month time period.

Insert Table 8 about here

Wired Searches

While posting and sponsorship are conceptually distinct, it is possible for a manager to post a job having already decided who they are going to select. Though these jobs are posted, they are actually filled through sponsorship. If this was a common occurrence and/or these instances were difficult to identify empirically, it would be difficult to interpret my results. These so-called "wired searches" are likely to be most common in firms that require managers to post all jobs. Because Health Co. has established formal systems for filling jobs through both posting and sponsorship, managers are able to avoid posting jobs when they already have a candidate in mind and thereby avoid the potential negative consequences that emerge from other employees having felt they participated in an unfair selection process (Billsberry, 2007). I nevertheless conducted

two additional robustness checks to rule of the possibility that my results are affected by the inclusion of wired searches. First, I reviewed each of the 1,695 internal hires made between 2011 and 2012 for which I have detailed application data. Those instances where there was only a single internal applicant (and no external applicants) could potentially be wired searches, with managers either tailoring the job description around a particular candidate and/or discouraging others employees from applying. Less than 5% of internal hires meet these criteria and of those, two-thirds were open for more than a month, suggesting that the hiring manager was hoping to find additional candidates. A total of 30 posted internal hires (1.4%) are potentially wired searches, leading me to believe that such searches are not driving my results. Second, I identified all of the postings during this period which were open a week or less (n = 45), another potential indication that the hiring manager created the posting for a specific candidate and therefore wanted to limit the number of other candidates who would apply. In both cases, dropping these observations from the analyses does not substantively change the results.

External Candidates as an Alternative Explanation

I ran an additional series of robustness checks to ensure that the results for posting were not driven by external market forces. When posting a job, a manager has the option of restricting the competition to internal candidates by only posting the job internally, or opening the competition to both internal and external candidates by also posting the job externally. An alternative explanation for the performance findings might be that the inclusion of external candidates allows managers to benchmark internal candidates against the market, leading to better hires when an internal candidate is selected (Billsberry, 2007). Perhaps more importantly, an alternative explanation for the higher starting salaries associated with posting might be that mere exposure to the external market is responsible for driving up the starting salaries for posted jobs,

with the results driven by those instances in which external candidates were considered but an internal candidate was selected.

In order to rule out these alternative explanations, I use data from 2011 and 2012 that allows me to identify the number of internal and external candidates that applied to every posted job and how far they made it through the hiring process. This allows me to identify which job postings were restricted to internal candidates and which were open to external candidates. Table 9 reveals the result of analyses including a dummy variable equal to one if external candidates were considered for the position. Because this data begin in mid-2011, I am unable to calculate results for turnover and subsequent advancement. Of the 869 internal hires for whom I have both performance ratings and salary data, 578 (66%) were hired without considering an external candidate; 291 (34%) internal hires competed against at least one external candidate. The results indicate that opening the job to external candidates has no effect on performance (Models 1-5) or starting salary (Models 6-7).

Insert Table 9 about here

DISCUSSION

This research advances our understanding of how human resources are allocated within firms by shedding light on the processes used to facilitate internal hiring within contemporary organizations. Despite the prevalence of internal hiring and its impact on the fortunes of firms and workers, our current models of internal hiring are still largely based on literatures exploring advancement with highly bureaucratic internal labor markets that bear little resemblance to their more contemporary counterparts. This study provides a much-needed update to these earlier models, identifying and describing the two most commonly used internal hiring processes –

market-oriented posting and relationship-oriented sponsorship. I develop theory predicting the relative effects of posting and sponsorship on quality of hire and compensation by highlighting that posting is characterized by two market-like features, self-selection and formality, that are largely absent in sponsorship, which instead involves active managerial search and a reliance on personnel connections for gathering information.

I argued that introducing these two market features would improve decision-making by helping managers to overcome challenges associated with generating and evaluating alternatives. Self-selection should generate a larger pool of alternatives, reducing the likelihood and exceptional alternative will be overlooked, while the formality of the market should encourage managers to both incorporate relevant information and avoid irrelevant information as they evaluate candidate qualifications against the requirements of the jobs. Consistent with these arguments, I found that employees hired through posting outperform their counterparts hired through sponsorship and are less likely to exit the firm, though there is no discernable difference in their likelihood of subsequent advancement.

However, this improved decision-making comes at a price. I argued that employees hired through the more competitive posting would be less likely to adopt a relational orientation to salary negotiations therefore more likely to both initiate salary negotiations and adopt a more effective, competitive approach when doing so. Though I am unable to test this mechanism directly (I do not observe the difference between initial and final salary offers), the results are consistent with this account, as employees hired through posting are paid ~4% more than sponsored employees hired into equivalent jobs.

Despite this posting premium, these results suggest that posting enables firms to both create and capture substantially more value than sponsorship. Unfortunately, my data do not allow me to directly measure the value created by higher levels of individual performance or the savings

associated with higher retention rates. However, with the costs of replacing an employee alone

running anywhere between 20% and 200% of an employee's annual salary (Boushey & Glynn,

2012), the combined performance and retention benefits associated with better internal hires are

likely to far exceed the higher salary costs. Moreover, the posting premium suggests that workers

also share in the increased value creation, earning higher salaries for equivalent work. The market-

oriented posting process therefore appears to benefit both firms and workers.

As with all single-firm studies, some caution is necessary in generalizing these results.

Examining mobility within firms requires tradeoffs between depth and generalizability, requiring

detailed internal data that can be difficult to obtain from multiple sites. This is made even more

difficult by the fact that few firms actually capture data on the processes by which employees

move to new jobs. My conversations with HealthCo officials and with human resource leaders at

multiple additional organizations during the course of this study, however, have not revealed any

reason to believe that HealthCo's internal hiring practices are different from other large

organizations.

In addition to not being able to directly measure value creation, this study does not account

for potential costs associated with creating an internal market for talent beyond the salary

premium. Additional costs might include the investments made to implement and maintain an

internal job board and the time involved in screening and evaluating job applications. Along these

lines, a particularly promising avenue for future research would be to explore whether posting

imposes additional costs by creating a visible set of employees who lost out in an open

competition, such as lower performance or increased turnover.

Despite these limitations, this work makes several important contributions. In highlighting

the ways in which self-selection and formality shape managerial decision-making and

negotiations, this study adds to the growing insights about the benefits and limitations of bringing

market mechanisms within firms (Zenger et al., 2011). To date this work has focused

predominately on the ways in which the infusion of high powered incentives shapes individual

behavior (Ellig, 2001; Zenger & Hesterly, 1997; Zenger, 1992). More recently, scholars have

begun to explore the ways in which firms are able to harness the information aggregation powers

of the market to improve internal decision-making though the use of prediction and information

markets, with the idea being that the widely diffused information can be aggregated into

something akin to a price (Ellig, 2001; Felin & Zenger, 2011). This study complements and

extends this work by showing how two less explored features of markets – self-selection and

formality – improve decision-making in the absence of a price mechanism. Moreover, I show that,

contrary to what extant theory predicts about the role of competition in external markets, infusing

competition within the firm actually increases prices. Finally, in identifying the micro-level

mechanisms through which these macro-level allocative processes shape individual behaviors, this

work speaks to a growing body of literature interested in micro-foundations of strategic

organization (Felin & Foss, 2005; Ployhart & Hale, 2014) as well as a more specific literature on

the micro foundations of human capital-based competitive advantage (Coff & Kryscynski, 2011).

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TABLE 1
Descriptive Statistics & Correlations[a]

	Variable	n	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	posting	11803	0.43	0.5															
2	instrumental var.	11331	0.44	0.27	0.30														
3	contribution score	9520	2.85	0.64	-0.05	-0.04													
4	competency score	9590	2.55	0.53	-0.05	-0.03	0.67												
5	top 25%	10115	0.29	0.45	-0.01	0.02	0.43	0.45											
6	bottom 50%	10115	0.49	0.5	0.02	-0.02	-0.46	-0.50	-0.60										
7	bottom 25%	10115	0.25	0.43	0.03	-0.01	-0.40	-0.46	-0.35	0.59									
8	turnover (12)	8359	0.03	0.16	-0.01	0.01	-0.05	-0.03	-0.03	0.03	0.03								
9	turnover (24)	5508	0.12	0.32	-0.03	-0.02	-0.12	-0.11	-0.09	0.08	0.07	0.56							
10	promotion (24)	5675	0.13	0.33	0.02	0.06	0.06	0.06	0.06	-0.06	-0.06	-0.01	-0.09						
11	promotion (36)	3739	0.24	0.43	0.07	0.10	0.06	0.06	0.05	-0.06	-0.06	-0.01	-0.08	0.87					
12	salary (ln)	11776	11.02	0.4	-0.10	-0.18	0.08	0.13	0.03	-0.01	0.00	0.03	0.03	-0.15	-0.16				
13	job level	11803	4.63	0.76	-0.15	-0.27	0.12	0.13	0.01	-0.01	-0.01	0.01	0.03	-0.32	-0.39	0.73			
14	same dept	11803	0.58	0.49	-0.39	-0.06	0.17	0.17	0.11	-0.14	-0.14	-0.03	-0.11	-0.03	-0.10	-0.02	-0.01		
15	same function	11803	0.68	0.47	-0.14	-0.02	0.03	0.08	0.06	-0.05	-0.05	-0.01	-0.02	-0.09	-0.12	0.07	0.03	0.21	
16	promotion	11803	0.48	0.5	0.15	0.13	0.03	0.05	0.08	-0.05	-0.02	-0.04	-0.08	-0.07	-0.09	-0.30	-0.16	0.08	0.05
17	expansion	11803	0.39	0.49	-0.10	-0.14	0.00	-0.03	-0.06	0.03	0.01	0.02	0.04	0.03	0.03	0.23	0.19	0.03	-0.17
18	transfer	11803	0.13	0.33	-0.09	0.01	-0.04	-0.03	-0.04	0.03	0.01	0.04	0.06	0.06	0.09	0.12	-0.04	-0.16	0.17
19	female	11697	0.64	0.48	0.01	0.04	-0.05	-0.03	0.02	-0.02	-0.02	-0.03	-0.04	0.01	0.00	-0.22	-0.14	0.01	-0.03
20	minority	11697	0.24	0.42	0.03	0.05	-0.07	-0.06	-0.01	0.02	0.03	0.01	0.00	-0.03	-0.02	-0.11	-0.11	-0.03	0.02
21	white	11803	0.76	0.43	-0.02	-0.06	0.07	0.06	0.01	-0.02	-0.03	-0.01	0.00	0.02	0.01	0.12	0.11	0.03	-0.02
22	black	11803	0.1	0.3	0.04	0.06	-0.09	-0.10	-0.01	0.02	0.04	0.00	-0.01	-0.01	-0.01	-0.12	-0.13	-0.04	0.01
23	latino	11803	0.08	0.27	0.01	0.04	-0.03	0.02	0.00	0.01	-0.01	0.02	0.01	-0.03	-0.02	-0.10	-0.06	0.00	0.00
24	asian	11803	0.03	0.18	-0.03	-0.04	0.05	0.04	0.00	0.01	0.01	0.01	0.02	-0.02	-0.01	0.10	0.08	0.02	0.02
25	tenure	11803	5.4	5.22	-0.04	0.00	0.10	0.14	0.02	-0.03	-0.03	-0.03	-0.07	-0.06	-0.06	0.14	0.15	0.01	-0.05
26	tenure2	11803	56.33	122.2	-0.07	-0.02	0.05	0.08	0.01	-0.02	-0.01	-0.02	-0.05	-0.06	-0.07	0.12	0.12	0.04	-0.03
27	age	11697	38.59	9.93	-0.15	-0.12	-0.02	0.03	-0.02	0.01	0.00	0.01	0.04	-0.15	-0.20	0.31	0.26	0.03	0.03
28	age2	11697	1588.12	837.31	-0.15	-0.12	-0.03	0.02	-0.03	0.02	0.00	0.01	0.05	-0.14	-0.19	0.29	0.24	0.03	0.03
29	rating group size	10115	479.3	408.2	0.05	0.07	0.03	-0.01	0.02	-0.04	-0.06	0.01	-0.01	0.07	0.12	-0.18	-0.23	0.05	0.01
30	last salary (ln)	11787	10.93	0.42	-0.17	-0.23	0.09	0.13	0.02	-0.01	-0.02	0.03	0.04	-0.13	-0.14	0.94	0.72	0.00	0.07
31	last contribution	9866	2.89	0.61	-0.03	-0.05	0.52	0.42	0.24	-0.23	-0.19	-0.05	-0.09	0.04	0.08	0.09	0.12	0.10	0.00
32	last competency	9897	2.57	0.51	-0.02	-0.01	0.41	0.59	0.25	-0.25	-0.20	-0.05	-0.09	0.01	0.04	0.13	0.12	0.10	0.03
33	year	11803	2010.51	1.31	0.04	0.08	0.02	0.02	-0.02	0.01	-0.01	0.23	0.47	0.28	0.54	0.04	0.04	-0.19	-0.11

	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
17 expansion	-0.77																
18 transfer	-0.37	-0.30															
19 female	0.01	-0.02	0.01														
20 minority	0.07	-0.06	-0.02	0.02													
21 white	-0.07	0.06	0.02	-0.02	-1.00												
22 black	0.06	-0.05	-0.03	0.07	0.62	-0.60											
23 latino	0.04	-0.04	0.00	0.02	0.52	-0.51	-0.10										
24 asian	-0.01	0.00	0.01	-0.08	0.34	-0.33	-0.06	-0.05									
25 tenure	-0.09	0.11	-0.02	0.08	-0.06	0.07	-0.01	-0.02	-0.03								
26 tenure2	-0.09	0.09	-0.01	0.08	-0.06	0.07	-0.02	-0.03	-0.04	0.92							
27 age	-0.25	0.18	0.11	0.06	-0.08	0.08	-0.05	-0.03	-0.03	0.28	0.29						
28 age2	-0.23	0.16	0.11	0.06	-0.09	0.09	-0.06	-0.04	-0.03	0.26	0.28	0.99					
29 rating group size	0.11	-0.11	0.00	-0.03	0.05	-0.06	0.01	0.04	0.06	0.03	0.01	-0.09	-0.09				
30 last salary (ln)	-0.40	0.29	0.18	-0.21	-0.13	0.13	-0.13	-0.12	0.11	0.18	0.16	0.36	0.34	-0.16			
31 last contribution	0.05	-0.02	-0.05	-0.03	-0.06	0.06	-0.10	-0.01	0.04	0.14	0.07	-0.01	-0.02	0.01	0.09		
32 last competency	0.08	-0.06	-0.03	0.00	-0.03	0.03	-0.10	0.05	0.02	0.20	0.11	0.05	0.04	-0.01	0.12	0.67	
33 year	-0.06	0.06	0.01	0.01	0.01	-0.02	0.00	0.02	-0.01	0.07	0.04	0.03	0.02	0.11	0.05	0.01	0.01

[a] Unit of analysis is an internal hire

TABLE 2
Performance[a]

Variables	Model 1 OLS Contribution	Model 2 OLS Competency	Model 3 Logit Top 25%	Model 4 Logit Bottom 50%	Model 5 Logit Bottom 25%
Posting	0.0542**	0.0621**	0.129*	-0.133**	-0.149*
	[0.0155]	[0.0123]	[0.0548]	[0.0516]	[0.0634]
Level 4	-0.0406	-0.117*	-0.34	0.275	0.14
	[0.0862]	[0.0551]	[1.086]	[1.001]	[0.751]
Level 5	0.15	-0.395*	-0.592	0.678	0.798*
	[0.251]	[0.166]	[1.005]	[0.916]	[0.339]
Level 6	0.0491	-0.143	0.0583	0.128	0.566*
	[0.260]	[0.174]	[0.200]	[0.197]	[0.271]
Same Department	0.208**	0.175**	0.392**	-0.439**	-0.495**
	[0.0159]	[0.0126]	[0.0586]	[0.0531]	[0.0635]
Same Function	0.0316*	0.0751**	0.295**	-0.155**	-0.152*
	[0.0149]	[0.0125]	[0.0591]	[0.0534]	[0.0644]
Promotion	0.00351	-0.0219	0.242**	-0.0874	0.0152
	[0.0216]	[0.0168]	[0.0820]	[0.0718]	[0.0857]
Female	0.0026	0.0233†	0.115*	-0.108*	-0.101
	[0.0146]	[0.0121]	[0.0550]	[0.0511]	[0.0617]
Black	-0.156**	-0.135**	-0.116	0.129	0.325**
	[0.0240]	[0.0193]	[0.0863]	[0.0790]	[0.0888]
Latino	-0.0497†	0.0601**	-0.000748	0.0865	0.0346
	[0.0272]	[0.0232]	[0.0951]	[0.0897]	[0.110]
Asian	0.000733	-0.0291	-0.0805	0.187	0.214
	[0.0328]	[0.0285]	[0.140]	[0.129]	[0.146]
Other	-0.0454	-0.0501	-0.0131	-0.0578	-0.0164
	[0.0601]	[0.0458]	[0.193]	[0.189]	[0.229]
Tenure	0.0350**	0.0387**	0.0534**	-0.0476**	-0.0524**
	[0.00379]	[0.00345]	[0.0148]	[0.0129]	[0.0153]
Tenure (sq)	-0.00120**	-0.00132**	-0.00195**	0.00157**	0.00170**
	[0.000155]	[0.000148]	[0.000663]	[0.000548]	[0.000613]
Age	-0.00441**	-0.00120†	-0.00767**	0.00663*	0.00684*
	[0.000828]	[0.000676]	[0.00291]	[0.00266]	[0.00324]
Rating Group Size			0.0000295	-0.000145*	-0.000385**
			[6.87e-05]	[6.64e-05]	[8.65e-05]
Constant	2.956@	2.838@	-1.223!	0.0529	-0.973
	[0.118]	[0.0853]	[0.524]	[0.508]	[0.599]
Observations	9300	9300	9289	9276	9262
R-squared	0.136	0.154			

[a] Standard errors, in brackets, are clustered by individual. All analyses also include dummies for job, function, state, and year.

† p < .10; ** p < .05; ** p < .01

TABLE 3
Turnover, Advancement & Salary[a]

Variables	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11
	Logit	Logit	Logit	Logit	OLS	OLS
	Turnover12	Turnover24	Promotion24	Promotion36	Salary (ln)	Salary (ln)
Posting	-0.202*	-0.182*	-0.0949	0.128†	0.0383**	0.0376**
	[0.0986]	[0.0761]	[0.0645]	[0.0733]	[0.00256]	[0.00272]
Level 4	0.754	0.058	-0.0866	-0.526	0.258**	-0.0489
	[0.861]	[0.829]	[0.222]	[0.561]	[0.0498]	[0.0688]
Level 5	0.511	-0.546	-1.172**	-1.506**	0.167**	0.0159
	[0.467]	[0.426]	[0.148]	[0.553]	[0.0218]	[0.0526]
Level 6	0.539†	-0.365	-1.563**	-2.166**	0.221**	0.0331
	[0.311]	[0.340]	[0.361]	[0.445]	[0.0300]	[0.0559]
Same Dept	-0.0925	-0.259**	0.0402	0.0012	0.000872	0.00125
	[0.0959]	[0.0738]	[0.0651]	[0.0779]	[0.00270]	[0.00275]
Same Function	-0.0336	0.0874	-0.217**	-0.0758	0.0166**	0.0152**
	[0.0987]	[0.0671]	[0.0610]	[0.0756]	[0.00264]	[0.00270]
Promotion	-0.302**	0.0791	-0.274**	-0.279**	0.0960**	0.0865**
	[0.116]	[0.0954]	[0.0777]	[0.0892]	[0.00874]	[0.00890]
Female	-0.236**	-0.148*	-0.121*	-0.123†	-0.0101**	-0.00912**
	[0.0871]	[0.0648]	[0.0577]	[0.0666]	[0.00230]	[0.00235]
Black	0.0358	-0.0981	-0.269**	-0.302**	-0.00637*	-0.00126
	[0.131]	[0.109]	[0.0896]	[0.0962]	[0.00313]	[0.00331]
Latino	-0.116	-0.0186	-0.349**	-0.395**	0.000767	0.00714
	[0.165]	[0.111]	[0.101]	[0.125]	[0.00494]	[0.00514]
Asian	-0.0644	-0.0117	0.005	0.2	-0.00445	-0.00181
	[0.214]	[0.151]	[0.159]	[0.178]	[0.00406]	[0.00421]
Tenure	-0.104**	-0.0828**	-0.00392	0.0333†	-0.000281	-0.0009
	[0.0223]	[0.0159]	[0.0152]	[0.0187]	[0.000559]	[0.000588]
Tenure (sq)	0.00299**	0.00212**	0.0000181	-0.00150†	0.00000442	2.66E-05
	[0.000912]	[0.000625]	[0.000653]	[0.000882]	[2.07e-05]	[2.09e-05]
Age	-0.00115	0.0114**	-0.0144**	-0.0153**	-0.00153†	-0.00163†
	[0.00523]	[0.00316]	[0.00319]	[0.00365]	[0.000829]	[0.000873]
Last salary (ln)					0.851**	0.863**
					[0.00924]	[0.00893]
Last contribution						0.00860**
						[0.00256]
Last competency						0.00354
						[0.00353]
Constant	-6.111**	-2.416**	0.061	0.596	1.561**	1.342**
	[0.757]	[0.594]	[0.345]	[0.633]	[0.117]	[0.101]
Observations	7451	5056	5178	3302	9292	8017
R-Squared					0.955	0.959

[a] Standard errors, in brackets, are clustered by individual. All analyses also include dummies for job, function, state, and year.
† $p < .10$; ** $p < .05$; ** $p < .01$.

TABLE 4

Source of Internal Hires by Posting and Sponsorship

Source of Hire (Location of previous job within the organization)	Posting	Sponsorship	Statistical Significance
Different Function	40%	27%	$p < .01$
Different Department	64%	26%	$p < .01$
Different City	15%	4%	$p < .01$
Different Building	42%	8%	$p < .01$
Transfer (same job, different department)	10%	15%	$p < .01$
Expansion (same level, different job)	32%	43%	$p < .01$
Promotion (move up a level)	57%	42%	$p < .01$

TABLE 5

Performance, Turnover, Salary, and Advancement within Department[a,b,c]

Variables	Model 1 OLS Contrib.	Model 2 OLS Comp.	Model 3 Logit Top 25%	Model 4 Logit Bottom 50%	Model 5 Logit Bottom 25%	Model 6 OLS Turn12	Model 7 OLS Turn24	Model 8 Logit Prom24	Model 9 Logit Prom36	Model 10 OLS Salary (ln)
Posting	0.0474**	.0678**	0.160**	-0.127*	-0.165*	-0.284*	-0.151	-0.119	0.117	0.0468**
	[0.0171]	[0.0137]	[0.0609]	[0.0585]	[0.0740]	[0.123]	[0.0988]	[0.136]	[0.150]	[0.00325]
Level 4	0.0973	0.550**	-1.277	-0.215	-0.418	0.442	0.897	0.328	-0.0378	0.231**
	[0.0758]	[0.0645]	[1.505]	[0.638]	[0.890]	[0.897]	[0.763]	[0.499]	[0.524]	[0.0637]
Level 5	0.308	0.281†	-1.433	0.231	0.481	0.225	0.257	-2.087**	-1.967**	0.156**
	[0.239]	[0.153]	[1.444]	[0.287]	[0.394]	[0.520]	[0.229]	[0.334]	[0.388]	[0.0259]
Level 6	0.237	0.537**	0.199	0.00687	0.271	0.367	0.329	-2.541**	-2.888**	0.116**
	[0.249]	[0.162]	[0.220]	[0.231]	[0.335]	[0.381]	[0.360]	[0.845]	[0.782]	[0.0338]
Same Dept	0.152**	0.129**	0.319**	-0.389**	-.348*	-0.0509	-0.0527	0.267†	0.127	0
	[0.0190]	[0.0152]	[0.0688]	[0.0624]	[0.0765]	[0.119]	[0.0970]	[0.149]	[0.172]	[0]
Same Funct	0.0196	0.0480**	0.261**	-0.142*	-0.138†	0.145	0.0614	-0.355**	0.054	0.0106**
	[0.0175]	[0.0150]	[0.0696]	[0.0638]	[0.0807]	[0.127]	[0.0868]	[0.133]	[0.166]	[0.00336]
Tenure	0.0396**	0.0441**	0.0662**	-0.0569**	-.0637**	-0.105**	-.0875**	0.00176	0.0842*	-0.000655
	[0.00413]	[0.00376]	[0.0162]	[0.0146]	[0.0174]	[0.0250]	[0.0184]	[0.0348]	[0.0418]	[0.000650]
Tenure (sq)	-0.00138**	-.00149**	-.0023**	-.00183**	.00198**	.00315**	.00239**	-0.000855	-0.005	0.00000997
	[.000173]	[.000163]	[.000735]	[.000623]	[0.0007]	[.000991]	[0.0007]	[0.00153]	[0.00212]	[2.42e-05]
Age	-0.00470**	-.00153*	-.0085**	.00841**	.0101**	0.000178	.0110**	-.0311**	-.033**	-.00174†
	[.0000887]	[.000728]	[0.00317]	[0.00294]	[0.00360]	[0.00603]	[0.00383]	[0.00668]	[0.00760]	[0.00101]
Constant	2.830**	2.199**	-1.486**	0.202	-0.723	-5.912**	-3.468**	0.162	0.532	0.827**
	[0.0877]	[0.0738]	[0.548]	[0.528]	[0.638]	[1.115]	[0.566]	[0.746]	[0.707]	[0.134]
Obs	7568	7568	7559	7543	7505	5777	4044	4203	2720	7568
R-squared	0.138	0.161								0.966

[a] Standard errors, in brackets, are clustered by individual. All analyses also include dummies for job, function, state, year, ethnicity, and gender.

[b] Model 3, 4, and 5 contain additional controls for performance group size

[c] Model 10 includes additional controls for last salary, last competency rating, and last contribution rating

† p <.10; ** p < .05; ** p <.01

TABLE 6
Performance Instrumental Variables (Part 1)[a]

	Model 1	Model 2	Model 3	Model4		Model5	Model 6	
	OLS	OLS	2SLS	2SLS	1st stage	2SLS/Treatment	2SLS/Treatment	1st stage
Variables	Contribution	Competency	Contribution	Competency		Contribution	Competency	
Posting	0.0542**	0.0621**	0.259**	0.271**		0.227**	0.199**	
	[0.0155]	[0.0123]	[0.0934]	[0.0764]		[0.0765]	[0.0609]	
Same Department	0.208***	0.175**	0.296**	0.262**	-0.415**	0.283**	0.232**	-1.265**
	[0.0159]	[0.0126]	[0.0422]	[0.0343]	[0.01]	[0.0353]	[0.0281]	[0.0344]
Same Function	0.0316*	0.0751**	0.0387*	0.0871**	-0.068**	0.0366*	0.0824**	-0.194**
	[0.0149]	[0.0125]	[0.0164]	[0.0136]	[0.01]	[0.0164]	[0.0131]	[0.0379]
Promotion	0.00351	-0.0219	-0.0445	-0.0711**	0.216**	-0.0375	-0.0555***	0.636**
	[0.0216]	[0.0168]	[0.0300]	[0.0237]	[0.016]	[0.0264]	[0.0211]	[0.0483]
Female	0.0026	0.0233†	-0.00083	0.0222†	-0.00	-0.000927	0.0220†	-0.00499
	[0.0146]	[0.0121]	[0.0150]	[0.0124]	[0.01]	[0.0143]	[0.0114]	[0.0342]
Black	-0.156**	-0.135**	-0.148**	-0.130**	-0.040**	-0.149**	-0.133**	-0.135**
	[0.0240]	[0.0193]	[0.0245]	[0.0197]	[0.02]	[0.0218]	[0.0174]	[0.0507]
Latino	-0.0497†	0.0601**	-0.0469	0.0657**	-0.042*	-0.0483†	0.0627**	-0.141*
	[0.0272]	[0.0232]	[0.0286]	[0.0243]	[0.02]	[0.0247]	[0.0196]	[0.0579]
Tenure	0.0350**	0.0387**	0.0343**	0.0387**	0.00	0.0345**	0.0391**	0.0183*
	[0.00379]	[0.00345]	[0.00387]	[0.00340]	[0.00]	[0.00349]	[0.00278]	[0.00859]
Tenure (sq)	-0.00120**	-0.00132**	-0.00115**	-0.00128**	-0.00**	-0.00116**	-0.00131**	-0.00135**
	[0.000155]	[0.000148]	[0.000160]	[0.000144]	[0.00]	[0.000146]	[0.000117]	[0.000369]
Age	-0.00441**	-0.00120†	-0.00406**	-0.00062	-0.002**	-0.00415**	-0.000819	-0.00910**
	[0.000828]	[0.000676]	[0.000878]	[0.000720]	[0.00]	[0.000766]	[0.000610]	[0.00177]
IV: Other posting					0.307**			1.007**
					[.02]			[0.0670]
lambda						-0.102*	-0.0793*	
						[0.0455]	[0.0363]	
Constant	2.956**	2.838**				2.331**	2.061**	0.925*
	[0.118]	[0.0853]				[0.194]	[0.154]	[0.451]
Observations	9300	9300	8929	8929	8929	8929	8929	8929
R-squared	0.136	0.154						

[a] Standard errors, in brackets, are clustered by individual. All analyses also include dummies for job, function, state, and year.

† p < .10; ** p < .05; ** p < .01

TABLE 7
Performance Instrumental Variables (Part 2)[a]

Variables	Model 1 Logit Top 25%	Model 2 Logit Bottom 50%	Model 3 Logit Bottom 25%	Model 4 IV Probit Top 25%	Model 5 IV Probit Bottom 50%	Model 6 IV Probit Bottom 25%
Posting	0.129*	-0.133**	-0.149*	0.305	-0.720**	-0.572*
	[0.0548]	[0.0516]	[0.0634]	[0.209]	[0.204]	[0.227]
Same Department	0.392**	-0.439**	-0.495**	0.331**	-0.540**	-0.487**
	[0.0586]	[0.0531]	[0.0635]	[0.0938]	[0.0914]	[0.102]
Same Function	0.295**	-0.155**	-0.152*	0.192**	-0.141**	-0.120**
	[0.0591]	[0.0534]	[0.0644]	[0.0378]	[0.0364]	[0.0405]
Promotion	0.242**	-0.0874	0.0152	0.088	0.083	0.108
	[0.0820]	[0.0718]	[0.0857]	[0.0656]	[0.0627]	[0.0694]
Female	0.115*	-0.108*	-0.101	0.0726*	-0.0670*	-0.0577†
	[0.0550]	[0.0511]	[0.0617]	[0.0321]	[0.0311]	[0.0348]
Black	-0.116	0.129	0.325**	-0.0611	0.0682	0.178**
	[0.0863]	[0.0790]	[0.0888]	[0.0490]	[0.0475]	[0.0519]
Latino	-0.000748	0.0865	0.0346	0.0053	0.0266	-0.00066
	[0.0951]	[0.0897]	[0.110]	[0.0553]	[0.0538]	[0.0610]
Tenure	0.0534**	-0.0476**	-0.0524**	0.0319**	-0.0271**	-0.0300**
	[0.0148]	[0.0129]	[0.0153]	[0.00787]	[0.00756]	[0.00859]
Tenure (sq)	-0.00195**	0.00157**	0.00170**	-0.00113**	0.000815*	0.000941**
	[0.000663]	[0.000548]	[0.000613]	[0.000334]	[0.000318]	[0.000363]
Age	-0.00767**	0.00663*	0.00684*	-0.00379*	0.0023	0.00258
	[0.00291]	[0.00266]	[0.00324]	[0.00175]	[0.00169]	[0.00187]
pgsize	0.0000295	-0.000145*	-0.000385**	-0.000000173	-0.0000514	-0.000192**
	[6.87e-05]	[6.64e-05]	[8.65e-05]	[4.27e-05]	[4.22e-05]	[4.95e-05]
Constant	-1.223*	0.0529	-0.973	-0.482	-0.0919	-0.838
	[0.524]	[0.508]	[0.599]	[0.426]	[0.491]	[0.586]
Observations	9289	9276	9262	8925	8916	8885

[a] Standard errors, in brackets, are clustered by individual. All analyses also include dummies for job, function, state, and year.
† p < .10; ** p < .05; ** p < .01

TABLE 8
Turnover, Advancement, and Salary using Instrumental Variables[a]

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
	Logit	Logit	IV Probit	IV Probit	Logit	Logit	IV Probit	IV Probit	OLS	OLS	2SLS	2SLS
	Turnover12	Turnover24	Turnover12	Turnover24	Prom24	Prom36	Prom24	Prom36	Salary (ln)	Salary (ln)	Salary (ln)	Salary (ln)
Posting	-0.202*	-0.182*	-1.408*	-0.459	-0.0949	0.128†	-1.599†	3.060†	0.0383**	0.0376**	0.0443**	0.0430**
	[0.0986]	[0.0761]	[0.637]	[1.163]	[0.0645]	[0.0733]	[0.833]	[1.649]	[0.00256]	[0.00272]	[0.0157]	[0.0154]
Same Dept	-0.0925	-0.259**	-0.635*	-0.37	0.0402	0.0012	-0.604†	1.067†	0.000872	0.00125	0.0039	0.00368
	[0.0959]	[0.0738]	[0.291]	[0.499]	[0.0651]	[0.0779]	[0.358]	[0.617]	[0.00270]	[0.00275]	[0.00732]	[0.00736]
Same Func	-0.0336	0.0874	-0.0697	0.0811	-0.217**	-0.0758	-0.291**	0.041	0.0166**	0.0152**	0.0169**	0.0155**
	[0.0987]	[0.0671]	[0.111]	[0.0855]	[0.0610]	[0.0756]	[0.0767]	[0.120]	[0.00264]	[0.00270]	[0.00305]	[0.00312]
Promotion	-0.302**	0.0791	-0.0374	0.157	-0.274**	-0.279**	0.095	-0.795*	0.0960**	0.0865**	0.0935**	0.0819**
	[0.116]	[0.0954]	[0.191]	[0.280]	[0.0777]	[0.0892]	[0.207]	[0.319]	[0.00874]	[0.00890]	[0.0129]	[0.0133]
Female	-0.236**	-0.148*	-0.245*	-0.157*	-0.121*	-0.123†	-0.120†	-0.114	-0.0101**	-0.0912**	-0.110**	-0.00958**
	[0.0871]	[0.0648]	[0.0975]	[0.0664]	[0.0577]	[0.0666]	[0.0620]	[0.0836]	[0.00230]	[0.00235]	[0.00235]	[0.00241]
Tenure	-0.104**	-0.0828**	-0.103**	-0.0782**	-0.00392	0.0333†	0.0000092	0.0188	-0.000281	-0.0009	-0.00042	-0.00100†
	[0.0223]	[0.0159]	[0.0262]	[0.0183]	[0.0152]	[0.0187]	[0.0175]	[0.0231]	[0.000559]	[0.000588]	[0.000567]	[0.000602]
Last salary									0.851**	0.863**	-0.0181*	0.866**
									[0.00924]	[0.00893]	[0.0000844]	[0.00908]
Last contr										0.00860**	0.858**	0.00948**
										[0.00256]	[0.00886]	[0.00262]
Last comp										0.00354		0.00243
										[0.00353]		[0.00378]
Constant	-6.111**	-2.416**	-0.664	-2.26	0.061	0.596	1.448	-2.657	1.561**	1.342**	1.406**	1.091**
	[0.757]	[0.594]	[0.795]	[1.420]	[0.345]	[0.633]	[0.934]	[1.996]	[0.117]	[0.101]	[0.120]	[0.104]
	7451	5056	6415	4789	5178	3302	4989	3134	9292	8017	8923	7715
R-Squared									0.955	0.959	0.946	0.949

[a] Standard errors, in brackets, are clustered by individual. All analyses also include dummies for job, function, state, year, age and ethnicity.
† p < .10; * p < .05; ** p < .01

TABLE 9
Effect of External Candidates[a]

	Model 1 OLS	Model 2 OLS	Model 3 Logit	Model 4 Logit	Model 5 Logit	Model 6 OLS	Model 7 OLS
	Contribution	Competency	Top 25%	Bottom 50%	Bottom 25%	Salary (ln)	Salary (ln)
External Candidate	-0.039	-0.0535	-0.0588	-0.192	-0.186	-0.00683	-0.00537
	[0.0441]	[0.0377]	[0.171]	[0.170]	[0.247]	[0.00762]	[0.00706]
Level 4	-0.972**	-0.365†	1.005	-0.494	0.738	0.0533	0.242*
	[0.344]	[0.218]	[1.252]	[1.244]	[1.841]	[0.0377]	[0.105]
Level 5	-0.406	0.239	0.7	-0.313	1.535	0.106*	0.271*
	[0.452]	[0.248]	[1.131]	[1.106]	[1.573]	[0.0523]	[0.124]
Level 6	-2.000**	-0.855**	0.369	-0.783	1.026	0.177**	0.257**
	[0.360]	[0.233]	[0.716]	[0.778]	[1.074]	[0.0559]	[0.0704]
Same Department	0.137**	0.104**	0.577**	-0.366†	-0.278	0.0155*	0.0220**
	[0.0493]	[0.0393]	[0.187]	[0.188]	[0.282]	[0.00786]	[0.00775]
Same Function	0.0165	0.0582	0.0209	0.0503	-0.420†	0.0226**	0.0161†
	[0.0449]	[0.0385]	[0.189]	[0.185]	[0.250]	[0.00855]	[0.00878]
Advancement	0.0173	0.0394	0.00756	0.0149	0.117	0.0187	0.0311
	[0.0686]	[0.0567]	[0.267]	[0.278]	[0.420]	[0.0408]	[0.0424]
Female	0.00303	0.0419	0.228	-0.195	-0.323	-0.0104	-0.00521
	[0.0426]	[0.0346]	[0.169]	[0.168]	[0.241]	[0.00800]	[0.00832]
Black	-0.0867	-0.064	-0.16	0.136	0.593†	-0.0121	-0.0094
	[0.0733]	[0.0601]	[0.268]	[0.247]	[0.326]	[0.00876]	[0.00887]
pgsize			0.000636**	-0.000620**	-0.00110**		
			[0.000200]	[0.000197]	[0.000316]		
Constant	3.116**	2.265**	-2.869*	2.485†	0.991	1.568**	1.809**
	[0.301]	[0.156]	[1.385]	[1.332]	[1.934]	[0.405]	[0.522]
Observations	869	869	869	869	869	869	752
R-squared	0.168	0.178				0.955	0.96

[a] Standard errors, in brackets, are clustered by individual. All analyses also include dummies for job, function, state, year, and age.
† p < .10; ** p < .05; ** p < .01