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American Journal of Sociology, Volume 105, Issue 5 (Mar., 2000), 1288-1356.
DOI: 10.1086/210432

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American Journal of Sociology
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Wed Oct 3 12:51:43 2001

Social Capital at Work: Networks and Employment at a Phone Center[1]

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This article argues that a common organizational practice—the hiring of new workers via employee referrals—provides key insights into the notion of social capital. Employers who use such hiring methods are quintessential "social capitalists," viewing workers' social connections as resources in which they can invest in order to gain economic returns in the form of better hiring outcomes. Identified are three ways through which such returns might be realized: the "richer pool," the "better match," and the "social enrichment" mechanisms. Using unique company data on the dollar costs of screening, hiring, and training, this article finds that the firm's investment in the social capital of its employees yields significant economic returns.

There is by now a rich empirical literature on the role of social networks in labor markets (for a recent review, see Granovetter [1995], afterword). Almost all of these studies have focused exclusively on the supply side of the labor market, adopting the point of view of job seeker and their social contacts. Numerous studies compare the labor market outcomes of job seekers that obtained their jobs via personal contacts with job seekers that found their jobs by other means (e.g., Bridges and Villemez 1986; Granovetter 1995; Lin, Ensel, and Vaughn 1981). While the supply-side focus has yielded important theoretical and substantive insights, this line of research is incomplete because it largely ignores the demand side of the labor market. Whereas theoretical accounts of the job-person matching process have emphasized the importance of the demand side of the labor market (e.g., Granovetter 1981; Sørensen and Kalleberg 1981), empirical studies of the role of social networks from the employer's side of the labor

[1] We are grateful for financial support from the Citibank Behavioral Research Council and the Graduate School of Business at Stanford. We have benefited greatly from the comments and suggestions of Jim Baron, Maura Belliveau, Mark Granovetter, Herminia Ibarra, Rakesh Khurana, Maureen McNichols, Trond Petersen, Paul Resnick, Marc-David Seidel, Tony Tam, Ezra Zuckerman, and the *AJS* reviewers. Direct correspondence to Roberto Fernandez, Graduate School of Business, Stanford University, Stanford, California 94305. E-mail: fernandez_roberto@GSB.stanford.edu

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0002-9602/2000/10505-0002$02.50

market have been rare (for exceptions, see Fernandez and Weinberg 1997; Petersen, Saporta, and Seidel 1998).

In this article, we take an important step toward correcting this imbalance. We focus on the organizational processes at work on the employer's side of the job-person matching process. Specifically, we argue that social networks are deeply implicated in an organizational routine commonly used on the employer's side of the labor market, the practice of hiring new workers via employee referrals. Moreover, we contend that this practice distills elements of a key concept in economic sociology, the notion of social capital (Burt 1992; Coleman 1988).[2] By its very nature, hiring via referrals is a process that flows through employees' social networks. In seeking to leverage their workers' social networks for their own purposes, employers who use such hiring methods are quintessential "social capitalists." Furthermore, the fact that employers often pay monetary bonuses to their employees for successful referrals suggests that employers view workers' social connections as resources in which they can *invest,* and which might yield economic returns in the form of better hiring outcomes. Understanding the mechanisms at work in this common practice has important theoretical implications for economic sociology, potentially enriching theoretical debates on the embedded nature of economic processes (Granovetter 1985) and the means by which social capital garners returns (e.g., Lin et al. 1981).

Despite the theoretical importance of this common feature of organizational life, the precise social mechanisms at work in hiring via referrals remain obscure. In our current research, we seek to shed light on the referral-hiring phenomenon. We study a research setting that is unusually well suited for identifying and empirically isolating the social processes operating in hiring employee referrals. Within this setting, we analyze unique data on the pool of applicants for entry-level positions at a telephone customer service center of a large bank. We complement these fine-grained analyses by looking at a number of outcomes in several other settings within the bank.

We identify three competing explanations of the referral hiring process. They are the "richer pool" of applicants interpretation, the "better match" argument common within economics, and the "social enrichment" mechanisms emphasized by sociologists. We develop a set of falsifiable hypothe-

[2] The term "social capital" has been used in a number of ways. For example, Putnam (1993) uses the term to describe features of social organization, such as norms or trust, which facilitate coordinated action. Others (e.g., Burt 1992; Lin et al. 1981) use the term to reflect the instrumental value of social relationships (see Burt [1998] for a review). In this article, we build exclusively on the latter notion of social capital: we assess the instrumental advantages to the firm in using its employees' social networks.

ses that sharply delineate among these accounts. In order to address the richer pool argument, we use data on the pool of applicants to entry-level jobs and directly test whether referrals show evidence of being more appropriate for the job at the application stage. To test the better match interpretation of referral hiring, we study previously unexamined processes involved in screening applicants for entry-level jobs. Ours is the first study to identify theoretically crucial prehire links in the causal logic of the better match argument and to search for empirical evidence of these processes. Finally, we construct a critical test of the social enrichment explanation of recruitment via referrals by examining data on interdependence between referrals and referrers on posthire attachment to the firm.

We have a second important goal for this research. We think the time is right for scholars working in the area of economic sociology to be much more precise in our application of the term "capital" (see Baron and Hannan's [1994, pp. 1122–24] section, "A Plethora of Capitals"). We agree with Burt (1998) that the concept of social capital has become a metaphor for many disparate network processes. If the term "social capital" is to mean anything more than "networks have value," then we will need to demonstrate key features of the analogy to "real" capital. If "social" capital is like "real" capital, we should be able to concretely identify the value of the investment, the rates of return, and the means by which returns are realized. In this article, we offer the literature on social capital an unprecedented level of specificity with respect to the "capitalness" of an important social process by anchoring our analyses of the employee referral practice in *real dollar terms.* Using unique company data on the dollar costs of screening, hiring, and training, we identify the dollar investments that the firm has made by using referrals in their hiring process, we calculate the rate of return on this investment, and we partition the dollar returns across the various social mechanisms by which employee referrals may yield economic benefits to the firm.

WHY HIRE REFERRALS?

Recruiting new employees by means of referrals from current employees is a common practice. The National Organizations Study, a nationally representative sample of employers, shows that 36.7% of employers frequently use employee referrals as a recruitment method (Kalleberg et al. 1996, p. 138; also see Marsden 1994; Marsden and Campbell 1990). Nor is the practice new. Referral hiring was identified as common in the earliest systematic studies of labor markets (Myers and Shultz 1951; Rees and Shultz 1970). More recently, the practice has come to be accepted as a legitimate recruitment tool in the modern human resources/personnel management literature (see e.g., LoPresto 1986). In spite of the widespread

enactment of referral hiring, there is little agreement on how the process works or the ways it produces supposed benefits for employers.

At its most general level, referral hiring is a practice that leverages employees' social ties to provide benefits to the hiring firm. While the various theoretical treatments of the role of networks in hiring often blend these mechanisms (see below), there are five analytically distinct ways by which employers can realize benefits from their workers' networks to their own ends.[3]

Mechanism 1 is the expansion of the pool of applicants by referrals (Breaugh and Mann 1984; Schwab 1982; Fernandez and Weinberg 1997). According to this argument, relying on referrals has the consequence of expanding the firm's recruiting horizon and tapping into pools of applicants who would not otherwise apply (see Rees's [1966] discussion of "extensive" information). Mechanism 2 is based on the tendency for people to refer others like themselves. Since referral ties are likely to be homophilous (Ullman 1966; Myers and Shultz 1951; Rees and Shultz 1970; see also Granovetter 1995),[4] and since referring employees have survived a prior screening process, such homophily would lead the applicants referred by employees to be better qualified than nonreferred applicants. Indeed, the idea that there is "inbreeding bias" in the referring process is a key component of Montgomery's (1991) theoretical model of social networks in the labor market. Mechanism 3 is reputation protection. To the extent that employees think their reputations within the company will be affected by the qualities of the person they refer, they should only refer qualified applicants (Rees 1966; Rees and Shultz 1970; Saloner 1985; Ullman 1966).

All three of these mechanisms suggest that the pool of referred applicants should be more qualified and more readily hireable than nonreferral applicants (see e.g., Kirnan, Farley, and Geisunger 1989). To the extent that referred applicants constitute a richer hiring pool than nonreferrals, this suggests an important means by which employers can realize returns from using the social capital of their employees during recruitment. Irrespective of which of the three mechanisms are at work, if referrers deliver more appropriate applicants in terms of easily measurable characteristics (e.g., education or work experience), then it would take fewer screens to

[3] We are grateful to an anonymous reviewer for helping us to identify these mechanisms.

[4] This feature has led many to argue that referral hiring is inherently exclusionary (e.g., see LoPresto 1986; Petersen et al. 1998). In other work (Neckerman and Fernandez 1998), we have shown that the effect of referrer-referral homophily is to reproduce the composition of the workforce. In that case, the firm had a racially diverse workforce, and the referral program produced many racial minorities in the referral pool. While referral hiring cannot be counted on to introduce balance into a skewed workforce, it will maintain such balance once it has been achieved.

hire appropriate people from among a pool of referral applicants than it would nonreferral applicants. Since time and resources spent in recruiting are valuable, hiring from a richer pool of applicants reduces the employers' screening costs. We summarize this motivation for referral hiring as the richer pool argument (Fernandez and Weinberg 1997). Mechanisms 1–3 lead to our first hypothesis:

HYPOTHESIS 1.—*Referrals will present more appropriate applications than nonreferrals.*

While mechanisms 1–3 are analytically distinct, all three mechanisms could be operating simultaneously in our data, producing support for hypothesis 1. The reputation-on-the-line process does not rely on homophily: even underperforming employees should worry about risking their reputation with the firm when referring others (e.g., Saloner's [1985] model makes no reference to homophily as a process). Nor does the homophily argument require that referrers target their appeals on particular friends and acquaintances who will not reflect badly on the referrer, as is suggested by the reputation-on-the-line argument. While we do not have measures of the broadening of the recruitment horizon (mechanism 1) and reputation protection (mechanism 3) processes in this study, we can directly assess whether there is evidence of referrer-referral homophily (mechanism 2). The homophily argument leads to our second hypothesis:

HYPOTHESIS 2.—*Among initial applicants, human capital characteristics of referrers and referrals will display above-chance levels of homophily.*[5]

Mechanism 4 by which referral hiring might help employers focuses on the informational advantages of hiring via referrals (Rees and Shultz 1970; Ullman 1966). The information advantage theory of referral hiring argues that ties between people also provide a conduit for information to flow between the employer and the applicant. In addition to locating particularly appropriate potential candidates who otherwise might not apply (i.e., mechanism 1, Rees's [1966] "extensive" margin), the referrer adds information along the "intensive" margin (Rees 1966). In this model, the referrer passes on extra, hard-to-measure information about the worker's qualities to the employer (e.g., personality attributes or attitude). On the applicant's side, the referrer also deepens the applicant's information about the job (e.g., the informal rules governing performance) such that

[5] While many past studies have demonstrated a relationship between the characteristics of job contacts and people hired via networks (e.g., Lin et al. 1981; De Graaf and Flap 1988; Neckerman and Fernandez 1998), these studies have all looked at the degree of similarity between hires and their contacts. Such studies cannot control for possible selection biases involved in screening (see Fernandez and Weinberg 1997). To our knowledge, ours is the first study that addresses the question of prehire homophily, i.e., between applicants and their referrers.

referrals have a better sense than nonreferrals of "what they are getting into."[6] Since this information may not be available by any other means, such inside information has the effect of allowing both employers and applicants to make better, more informed decisions than nonreferrals. Advanced knowledge of what the job is like is alleged to reduce frictions between the worker and the job along these hard-to-measure dimensions, thereby improving the match between the person and the job. Studies in this tradition have suggested that referral hires should have higher starting wages (Simon and Warner 1992), slower wage growth (Simon and Warner 1992), and lower turnover (Corcoran, Datcher, and Duncan 1980; Datcher 1983; Simon and Warner 1992; Sicilian 1995) than nonreferrals. While there are a number of nuances regarding exactly how the extra information associated with referrals is harvested by the various actors involved in the hiring process (see hypotheses below), this information-improves-match mechanism is common to economic treatments of hiring via referrals (e.g., Rees and Shultz 1970; Simon and Warner 1992). We refer to this as the better match account of referral hiring.

Despite the fact that the better match argument's key causal mechanisms exclusively operate during the screening process, there has been no empirical work directly examining the information-related mechanisms posited to affect screening in the matching story. While there have been numerous theoretical models exploring the implications of assuming that various parts of the information exchange process work as described above (e.g., Montgomery 1991; Saloner 1985), empirical research on referral hiring in the matching tradition has "black boxed" the hiring process and has focused solely on the *posthire* implications of referrals' better matches. Instead of *inferring* the existence of extra information from posthire outcomes, we examine data on the hiring process for *direct* evidence of extra information associated with referrals.[7] We have assembled unique, fine-grained data on the screening and hiring process (see below) in order to empirically test for evidence of the information-related pro-

[6] Wanous (1980) is most explicit about this particular mechanism. He argues that the information that referrals pass on about the more tacit features of the job serve much the same functions as a "realistic job preview." Similarly, Jovanovic (1979; see also Mortensen 1988) has argued that jobs are "experience goods" in that it is hard to judge how much one would like a job before taking it.

[7] Although it constitutes less direct evidence of matching than the extra information mechanisms we focus on here, we will also report results for the traditional posthire indicators of referrals' better matches, i.e., higher starting wages (Simon and Warner 1992), slower wage growth (Simon and Warner 1992), lower turnover (Corcoran et al. 1980; Datcher 1983; Simon and Warner 1992; Sicilian 1995), and the time path of turnover. As we discuss below, these analyses will be useful for distinguishing among various versions of the matching argument.

cesses that are posited by the matching story to operate during screening. Ours is the first study to open this black box and directly test the prehire information predictions of the matching model. We examine whether referrals show evidence of having knowledge of key information about the job at various stages of the screening process. Such information has traditionally been treated as an unobservable part of the screening process. Moreover, we study the various ways that employers may get extra information about referral candidates. Since it is employers who design and execute such recruitment and screening processes, this analysis would provide key insight regarding exactly *how* employers leverage their employees' social capital during screening.

Beginning with the applicants' side of the process, if referrers deepen the candidate's information about the job, then potential applicants who are referred should be better able than nonreferrals to decide whether the job will be of interest and worth pursuing (see Rees and Shultz 1970; Granovetter 1995; Wanous 1980).[8] Consequently, among those who choose to apply, referral applicants should be particularly well informed about the nature of the job when compared with nonreferrals. This motivates our hypothesis 3:

HYPOTHESIS 3.—*At application, referrals will have more information about the nature of the job than nonreferrals.*

Especially if referrals have decided that the job is worth pursuing, referrers might provide referrals with inside information on how the hiring and screening process works at the company. Such information would lead applicants to change their application behavior so as to capitalize on this information. In particular, referrals might attempt to time their application for periods when the chances of being hired are more favorable (see Fernandez and Weinberg [1997] for another test of this hypothesis using different data from another unit of the same bank). This leads to hypothesis 4:

HYPOTHESIS 4.—*Referrals will better time their applications than nonreferrals.*

[8] This introduces the possibility that selection bias (Winship and Mare 1992) will affect our test of the better match theory. All of the people who applied to this firm are self-selected in the sense that they had enough interest in the firm to pursue a job there. However, to the extent that referrals have jobs explained to them, but opt out and decide not to apply for the job, then the survivors among the referrals may be more selected than the nonreferrals. Differential selectivity is predicated on the idea that, compared with nonreferrals, referrals have extra knowledge of the job given to them by their referrers. By focusing on survivors who actually apply in this case, differential selection bias would work in the direction of overestimating the extent to which referrals have extra knowledge of "what they are getting into." In this case, our conclusions are not threatened by this differential selection (see below).

Another consequence of referrers passing on extra information about the job to referrals is that referrals should be presold on the job (Ullman 1966). If the better match theory is correct, then referrals should show less equivocation about accepting job offers than nonreferrals. This leads to hypothesis 5:

HYPOTHESIS 5.—*Referrals will accept job offers at a higher rate than nonreferrals.*

Finally, if the better match account of referral hiring is valid, referrals should report having superior knowledge of the job content and tasks than nonreferrals at hire. This leads to hypothesis 6:

HYPOTHESIS 6.—*Referrals will report greater levels of understanding of job content than nonreferrals.*

In hypotheses 3–6, the emphasis is on testing for evidence of referrals having superior information about the job than nonreferrals. However, the matching story contends that similar processes should work on the employers' side as well. In order to get benefits from better match processes, employers, too, should show evidence of having and using better information about referrals than nonreferrals during screening.

There are two principal ways in which employers may harvest extra information about referral candidates. First, employers can rely on relatively indirect means of information gathering. Employers could utilize the "upstream" information that could be available via the tendency of people to refer others like themselves (the homophily principle; see hypothesis 2) during their screening decisions. Montgomery's (1991) theoretical model argues that employers are aware of homophily in referral networks and, consequently, use the characteristics of the referrer as an "upstream" signal of the qualities of the referred applicant (see also Miller and Rosenbaum 1997; Ullman 1966). This argument would predict that the *referrers'* characteristics should affect the firm's screening decisions, independent of the applicant's characteristics. This yields hypothesis 7:

HYPOTHESIS 7.—*Conditional on hypothesis 2 being supported, and controlling for applicant's human capital characteristics, recruiters should use the characteristics of referrers when screening referral applicants.*

However, employers can also turn to very direct methods of information gathering. More specifically, employers can inquire directly with the referrer about characteristics of the referral candidate. This yields hypothesis 8:

HYPOTHESIS 8.—*Recruiters should contact referrers when screening referral applicants.*

The key difference between the richer pool and better match theories lies in assumptions about the behavior of the referrer. This difference has very important implications for understanding how it is that employers can realize returns on social capital. If the richer pool process were the

only one to be operating, then referrers might produce applicants who are no better informed than nonreferrals about the more tacit features of the job but are more appropriate than nonreferrals in terms of easy-to-screen-for, formal qualifications for the job. If referrals' advantages were on easily screened, formal characteristics, then once recruiters apply their screen, we should see no differences between referrals and nonreferrals in their posthire behavior (e.g., turnover). This suggests that firms may save on screening costs, since it would take fewer screens on formal qualifications to fill jobs from the referral pool than the nonreferral pool; but referrals and nonreferrals would not show any posthire performance differences.

If the better match process operates, but not the richer pool process, then referrals might be better informed than nonreferrals about tacit features of the job but no better than nonreferrals in terms of formal qualifications. In this circumstance, there would not be any cost savings in screening, since it would take just as many screens to filter out formally unqualified referral applicants as nonreferral applicants. But, there would be savings on posthire consequences, namely lower turnover. Once candidates have been screened on formal qualifications, then among the survivors, referrals should be better informed than nonreferrals about the more informal characteristics of the job. Since referrals would have a better sense of what the job entailed than nonreferrals, fewer referrals than nonreferrals would conclude upon experiencing the job that the job is not for them and leave. The better match theory, then, posits a second source of returns to employers for their social capital investment: savings due to referrals' lower turnover (e.g., Halcrow 1988; Kirnan et al. 1989; Saks 1994; Wanous 1980).[9]

The last mechanism (mechanism 5) by which referral hiring yields ad-

[9] Some versions of the matching model have incorporated richer pool arguments as part of their matching explanations. For example, the homophily and reputation protection arguments have been used to infer that referrals are better matched to their jobs, under the presumption that referrer's search produces not only applicants who are higher quality on formal criteria, but also produces better matched applicants on the more tacit, hard-to-screen-for characteristics (Simon and Warner 1992). To the extent that referrals are higher quality on the hard-to-screen-for characteristics, then referral status acts as a signal: referral status is associated with superior posthire outcomes but is hard to mimic by those lacking those superior, hard-to-screen-for characteristics (Spence 1974). It is plausible that these processes often work together, since we would expect referrers to pay attention to both formal qualifications and more tacit skills when referring a worker. As we show below, the "referral status as signal" version of the matching story yields some predictions that are quite different from the richer pool argument. Although we are hampered by the fact that the better match models that incorporate the richer pool processes work in the realm of unobservable factors, we will attempt to distinguish between the better match models that rely on superior information (i.e., mechanism 4) from versions of the matching argument that fold in the richer pool processes (mechanisms 1–3).

vantages emphasizes social processes that occur post hire. In this model, the connection between the new hire and the job is enriched by the existence of a prior friend or acquaintance that might ease the transition to a new job setting. As such, referrers serve as a kind of naturally occurring mentoring system, aiding newcomers in the organizational socialization process (Reichers 1987; Sutton and Louis 1987). We call this the social enrichment argument for referral hiring.

While the social enrichment process would work independently of the better match process, it can produce similar posthire behavior by the referred hire. Both processes may lead to outcomes that are desirable from the firm's perspective, for example, lower turnover (Wanous 1980), lower absenteeism (Taylor and Schmidt 1983), and higher productivity (Swaroff, Barclay, and Bass 1985). However, there are important distinctions between these two accounts in the ways in which these benefits are realized. In the better match story, applicants are treated as socially isolated actors. Referrals yield benefits by improving the firm's ability to pluck the right individuals for the job from the pool of applicants. Likewise, the extra information about the job provided to referrals by referrers helps applicants to make better-informed decisions about whether to apply for the job than nonreferrals.

In contrast, the social enrichment account has referrers actively changing the relationship between the firm and the new hire. It is the presence of social ties that directly benefits the firm. Social relationships create new human capital in the referred person, post hire, via referrers' assistance with tacit aspects of the work environment and informal training on job tasks. The assistance that referrers offer can also improve new hires' firm-specific human capital since such assistance is occurring within the context of particular firms. Moreover, from the referred applicant's point of view, the relationship with the referrer may have value in itself, which improves the new hire's workplace experience. This can increase satisfaction, commitment, and attachment to the firm, saving the firm the expense of the costs of training of replacements due to turnover.

While the social enrichment process can work in a manner that is beneficial from the employer's perspective, it is also possible for this process to work *against* the interests of the employer. In contrast with the matching account where more information is unambiguously good from the employer's point of view, the social enrichment story suggests that employers might experience both costs and benefits when relying on referral hiring. For example, Blau (1985) showed that nurses who were socially integrated had poorer attendance records than socially isolated nurses. He interpreted this as reflecting a tendency for nurse's friends to cover for one another. Also, in Bailey and Waldinger's (1991) account of hiring in garment trades, the fact that workers would not help new hires with on-the-

job training *unless* the new hire was someone already known to the existing workers has the effect of severely limiting employer's hiring discretion. (See Grieco [1987] for another account, where employees' social networks do not necessarily work in the employer's interests). The fact that employers' returns via the social enrichment process are uncertain suggests that social capital in this form shares another feature with financial capital. As an investment with a downside potential, social capital involves *risk.*

The social enrichment account for referral hiring is mute on the subject of referrals' screening advantages. Evidence of either referrals being better at application (as predicted by the richer pool theory) or of extra information during screening (consistent with the better match theory) would not contradict the social enrichment account. The social enrichment account, however, emphasizes another reason why employers may hire via referrals: posthire relations between referrals and referrers affect newhires' attachment to the company. While the better match theory sees no role for posthire social relations in affecting referrals' behavior, the social enrichment model posits that there will be interdependence between the posthire attachment of the referrer and referral. This leads to our final hypothesis:

HYPOTHESIS 9.—*Referrals' turnover should be affected by the turnover of the referrer.*

If there is interdependence between posthire attachment to the firm for referrals and the people who referred them, then employers can anticipate and predict such posthire social processes. Such interdependence would constitute yet another mechanism by which employers might reap benefits from their workers' social capital. But as we noted above, the fact that such social processes are not totally under the employer's control implies that employers might experience costs as well as benefits from referral hiring. Like all forms of capital, social capital can be squandered or invested wisely.

RESEARCH SETTING

We studied the hiring process for an entry-level position at a large, midwestern phone center, within a large, globally diversified financial service institution. The job we study is the Phone Customer Service Representative (PCSR). This is a full-time, hourly position which duties consist of answering customers' telephone inquiries about their credit card accounts. New hires into this position are given two months of classroom and on-the-job training before working on the phone. PCSRs are trained in balancing the etiquette of customer service interactions with accuracy, speed, and efficiency while processing phone calls. PCSRs can expect to handle

up to 5,000 phone calls per month. Phone calls are often monitored by managers to insure that PCSRs' courtesy and accuracy goals are being met (see Attewell [1987] for a discussion of these surveillance technologies).

We studied records of the phone center's hiring activities during two years (from January 1995 through December 1996). The phone center's human resources department (hereafter PCHR) tracked more than 4,100 external employment inquiries for PCSR jobs over this two-year period. In order to address the posthire consequences of the recruitment practices, we also examined the turnover and wage histories of individuals hired during the two-year hiring window until January 1998.

The main focus of this study is this one site, but, where possible, we supplement these analyses with data from three of the bank's other phone centers located in different cities across the United States. These other sites do not keep the detailed data necessary to examine hypotheses regarding the prehire phase of recruitment. However, we utilize data on the posthire consequences of referral hiring (i.e., turnover and wage growth) at these other sites to replicate the analyses in the midwestern site. We can also replicate some portions of both the prehire and posthire analyses with similar data on entry-level positions collected from a unit of the retail bank (see Fernandez and Weinberg 1997). We report the results for these other sites at appropriate points in the article.

Because a major focus of this study is to unpack economists' better match theories of referral hiring, we have sought to mount a conservative test of such theories. Consequently, we have designed the study to approximate as closely as possible the economists' neoclassical labor market. First, we chose as our main study site a very competitive labor market. During the entire period of our study, the local unemployment rate remained below 4% (labor market conditions in other sites were somewhat less competitive but were also experiencing rapidly declining unemployment). Under such conditions, one would expect firms to seek economic advantages in the labor market in as many ways as possible, including exploiting any screening advantages associated with the use of referrals. Second, we studied entry-level jobs in order to observe the firm's screening behavior under conditions of maximum exposure to the external market. The strategy of studying lower-level employees has the added advantage of controlling on selection what would otherwise be a major competing argument for referral hiring. Some past studies (Pfeffer 1989; Ferris and Judge 1991) have argued that people often hire others who will support their agendas in political fights within the organization. As entry-level employees, these workers are very unlikely to be involved in organizational politics involving hiring. Other scholars (e.g., Marsden and Campbell 1990) have argued that personal contacts might matter more in hiring for higher-status rather than lower-status jobs. From this per-

spective as well, our study is a conservative test of the role of personal contacts in the hiring process.

The final theoretical advantage for looking at entry-level jobs in this setting is perhaps the most important. To work at a phone center, fielding up to 5,000 phone calls a month in a high-pressure, highly structured environment where work is closely scrutinized, demands a set of skills for which it is relatively difficult to screen. As one of the PCHR recruiters put it, "If you look at the paper requirements to do this job, they are not heavy. You don't need a degree to do this job. This job can be done by people with average intelligence. People rarely leave because they can't do the job. The real question is are you going to be able to deal with the work environment." More than most jobs, this job needs to be experienced in order to determine how well one will like it. According to the better match account, the information about the job that referrers provide referrals is especially valuable when more tacit aspects of the job are especially salient. By this reasoning, the environmental features of the PCSR job make this a setting in which we are very likely to observe better match processes at work.

In addition to these theoretical considerations, the phone center offered a number of practical advantages for this research. PCHR keeps virtually complete databases on recruitment for phone service representative jobs, which has allowed us to track applicants' movement through every phase of the hiring process. In addition to these computer databases, PCHR keeps paper files on each applicant, including a standardized application form and all material offered by the applicant in support of the applications (e.g., a resume). These paper files allow us to code crucial data on applicants' education, work history, and other human capital characteristics, as well as data on applicants' prior knowledge of the job.

This setting has several other features that make it ideal for addressing research on social networks and hiring. First, because PCHR traces employment inquiries from initial contact, through interview, to actual hire, we are able to treat hiring as a multistage process in which referral ties may play different roles at the various stages. Unlike studies that start with a set of hires, this design feature allows us to address the question of selection bias when studying the impact of referral ties in the hiring process (for a discussion of this issue, see Fernandez and Weinberg 1997). Hence, compared to existing research, we are in a much better position to identify the precise influence of referral ties at each step in the selection process for this job. Furthermore, the PCHR represents an exceptional location at which to study the effect of referrals on posthire processes as well. These data allow us to examine the duration of the employment and salary history of individuals who were hired during 1995 and 1996.

Second, these data contain information on key variables of interest at

application: the presence or absence of a referral tie, as well as the identity of the *referrer.* Unlike past research where data on the characteristics of the job contact are observed only among hires (e.g., Corcoran et al. 1980; Lin et al. 1981; Neckerman and Fernandez 1998), we are able to link referrers to job *applicants.* Consequently, we are in the unique position of being able to study the influence of referrers' characteristics on referrals' chances of being hired.

A third major advantage of this research is the fact that we have been able to learn PCHR's screening criteria (see the section on procedures below). Consequently, we can more precisely specify the set of appropriate individual control variables that affect labor market matching. We can therefore consider the extent to which an applicant's referral status is a proxy for other characteristics that might make the applicant desirable to the PCHR recruiters. Sparse controls for human capital and other characteristics raise the risks of biased assessments of the role of social contacts in the hiring process (Fernandez and Weinberg 1997).

Although we are studying only one firm, it is worth noting that our firm's hiring practices are not particularly distinctive. Specifically, this firm is unremarkable with respect to the screening and interview procedures it uses (see Kalleberg et al. 1996, p. 138). Furthermore, like our firm, firms that pay current employees for employee referrals appear to be following an accepted modern personnel practice (see, e.g., Halcrow 1988; LoPresto 1986; Stoops 1981, 1983). The question of generalizability of the results remains; however, we have taken some steps toward addressing this issue in this article by analyzing less complete posthire data in three other phone centers and in the retail bank located elsewhere in the United States. While all studies carry the burden of the time and place in which they have been conducted, it is important to realize that the comprehensive information on job matching we have available here is unique and is not available through any other study. Indeed, for many of the hypotheses developed below, no empirical evidence at all has ever been offered. It is impossible to distinguish among the different theoretical mechanisms through which social ties might work in the hiring process without the kind of fine-grained data we analyze here.

PROCEDURES

We combined data from a number of sources in order to address the hypotheses developed below. As a part of their standard operating procedures, PCHR professionals record in a computer database the recruitment source for every employment inquiry at initial contact with the bank, and they keep this information regardless of whether the prospective applicant proceeds to the next phase of screening or not. If the applicant survives

a paper screen by PCHR staff, they are contacted and briefly interviewed either in person or by phone. Applicants who survive this phase of the screening are then sent on for another interview with two hiring managers who have the final say about extending the candidate a job offer.

During 1995–96, PCHR received 4,165 external applications for PCSR positions, and 60.1% of those applicants were sent on for an interview with the hiring manager. Only 8.6% (357) of the applicants were offered a job, and 7.8% (327) of the original applicants were hired. In order to address posthire processes, we tracked 325 of these hires from hire until January 1998, when we ended the data collection.[10] Almost half (162 of 325) of the hires are right censored, that is, they were still with the company at the end of our study. For hires, the days of tenure with the phone center range from a minimum of 3 days up to a maximum 1,104 days, with a median of 480 and a mean of 528 days.

One of the most unique features of these data is the fact that we have been able to link referrers with their referrals at the application phase. More than one-third of the applications (37.1%, or 1,546) were referrals, and slightly less than two-thirds were nonreferrals (62.2%, or 2,594).[11] PCHR coded the name of the referrer in their tracking database.[12] 1,223 referrers produced these 1,546 referrals. From company data sources, we identified employment records for 97.5% (1,192) of the referrers. The number of referrals per referrer vary from 1 to 6, although the vast majority of these referrers referred only one (79.7%) or two (15.8%) individuals. We coded three key variables of interest for referrers: wage at the time they referred the applicant, tenure with the firm, and years of education.

We interviewed PCHR staff in order to determine their screening criteria. They informed us that they saw their main role as one of saving the hiring manager's time. They would "send [the hiring manager] people we know they will want to hire, as well as people we are not sure they will not want to hire" (field quotation from a PCHR recruiter).[13] With respect

[10] We dropped one case because we could not identify its recruitment source; we could not locate posthire records for the other case.

[11] We could not identify the recruitment source for 25 applications. We dropped these cases from all subsequent analyses.

[12] There is also a line on the employment application that explicitly asks the applicant to list the name of the referrer. Referring employees are paid $10 if the people they refer are interviewed and $250 if the referral is hired and survives a 30-day probation period. This creates an important incentive for referring employees to ensure that applicants list them accurately as their referrer. As we discuss below, this referral bonus also constitutes the firm's social capital investment in the social networks of their employees.

[13] Developments after the field period of our hiring window lend support to this conception. In an effort to further save recruiting time, PCHR staff have been given final authority to hire on behalf of line managers.

to screening criteria, the PCSR job involves a lot of customer interaction, so PCHR screen people based on verbal and "soft" interpersonal skills, which they glean from short interviews or phone interactions.[14] PCHR recruiters also place relatively high weight on an applicant's job history when screening applications. In light of the customer service aspects of the job, recruiters look particularly for people with prior customer service experience. They are also quite concerned about work attitudes and tend to look for applicants who they think will be reliable employees. This leads them to prefer applicants who are currently employed and who have had some previous work experience. Recruiters are also quite concerned about the costs of turnover, and, therefore, are less impressed by people who have changed jobs a lot during their work histories. In addition to these work history factors, PCHR recruiters look for evidence of basic keyboarding and computer skills on the application.

PCHR recruiters are also concerned about applicants who are "overqualified" for this entry-level position. More specifically, candidates who report higher wages in their previous job than the starting wage at the phone center are looked upon with some skepticism. As one PCHR recruiter put it, "Our past experience has shown us that, unless they have very special circumstances, [people with high wages in their previous jobs] are very likely to get dissatisfied. . . . They overestimate the extent to which they can handle the cut in pay, get dissatisfied, and leave on us." Consequently, applicants who report high wages are deemed *less* appropriate than are those who report wages more in line with those being offered at the phone center. Compared with work experience, PCHR recruiters place less weight on formal education for these entry-level jobs. Although preferred, a high school diploma is not necessary to continue to be given serious consideration. While they do not place much weight on educational criteria in general, PCHR recruiters are concerned that highly educated people might be using these jobs as a platform to look for better employment and, consequently, might leave abruptly. Similar to what we found in the western region of the retail bank (Fernandez and Weinberg 1997), PCHR recruiters say they consider very highly educated applicants as overqualified for these entry-level jobs.

[14] Because of the large number of these contacts, these interviews are not well tracked by PCHR. We know that a hiring manager has interviewed all candidates who receive job offers. We also know that everyone who has been interviewed by a hiring manager has been screened and interviewed by PCHR. For those candidates who are not sent to the hiring manager for an interview, we cannot be sure whether they simply failed a paper screen by PCHR or whether they were rejected after a short screening interview. Consequently, we are forced to treat the interview phase as a joint effort on the part of PCHR and the hiring manager. This is consistent with their own description of their role, in that they seek to mimic the screening decisions that hiring managers would make downstream.

There is one criterion that absolutely disqualifies applicants. The application form asks whether the applicant has ever been convicted of a "breach of trust"; applicants responding "yes" are eliminated from further consideration since regulatory agencies will not allow banks to hire such people into PCSR positions. Breaches of trust include shoplifting, embezzlement, forgery, fraud, and writing checks with insufficient funds. Even if the applicant has answered no to the breach of trust question, PCHR procedures are to repeatedly ask ("some would say badger"; field quote from PCHR recruiter) whether the applicant has been convicted of a breach of trust. All hires are required to undergo expensive fingerprinting and background checks. If they come back showing a conviction, the bank is required to let the new hire go. Especially in light of the very high costs of training new hires (see below), PCHR staff work diligently to screen out such individuals.[15] While there may be other features of an application that occasionally catch a recruiter's eye, these factors are the ones for which PCHR recruiters systematically screen.

We coded the paper files to reflect PCHR's concerns. We located paper files for 97.2% (3,998) of the 4,115 applications for which we could identify a recruitment source and that did not report a breach of trust. Based on our review of the paper files, we recorded a number of variables that measure applicants' human capital. We coded years of education, months of experience in the financial services industry, months of experience outside the banking industry, and, more relevant to the particular position, months of customer service experience. We also coded a dummy variable for whether the person was employed at application. As measures of turnover propensity (recall that stability is of great concern to PCHR recruiters), we coded the number of previous jobs listed on the application, months of tenure with the last firm, and wages of the last job. We looked for evidence of computer experience among the application materials and created a dummy variable for the presence of these skills (the applications had a line specifically asking applicants to supply such information). Finally, as a control, we coded gender from the names listed on the application for use as a control variable. A few records (28, or 0.7%) had ambiguously gendered names; we coded these as missing on gender.

For hires, we coded the dependent variables in the posthire analysis: duration in the company (with exact dates for those who were terminated) and salary changes during their tenure with the firm. We also obtained questionnaire data on a sample of 233 (71.2%) of the hires that occurred

[15] Out of the 4,165 applications for PCSR jobs during our study, we found only 25 applications that had checked "yes" to the breach of trust question, and none of these were interviewed, offered a job, or hired. Because they have no chance of progressing through the hiring process, we have dropped these 25 cases.

during our hiring window.[16] These data were collected during the second week of training and contain important information regarding what applicants know about the PCSR job. The survey asked new PCSR hires to rate their understanding of what the position responsibilities and job content (for PCSR job) was *prior* to accepting the position (see below).

ANALYSES

We address these hypotheses by examining empirical evidence on the hiring process at the midwestern phone center. Wherever possible, we present evidence based on multiple measures when addressing the hypotheses. Where appropriate, we supplement the analyses of the PCHR with data collected from three other phone centers.

Mechanisms 1–3: Referrals Present More Appropriate Applications

Hypothesis 1 posits that mechanisms 1–3 would lead referrals to present more appropriate applications than nonreferrals. Using PCHRs suggestions of what they screen for, we examined nine variables measuring applicant's work history, computer skills, and education from the paper applications to test this prediction.

We begin by comparing the means for referrals and nonreferrals on individual variables (table 1). Univariate F-tests for differences in means show that referrals are more likely to be employed at the time of application, show longer tenure with their previous employer,[17] and are more likely to have had fewer jobs (one-tailed tests, $P < .001$, $P < .01$, and $P < .05$, respectively). Referrals also have had more months of customer service experience, although this difference misses being significant at the 5% level ($P < .059$, one-tailed test). Differences between referrals and nonreferrals on months of experience in financial services, months of experience outside financial services, and computer skills are not statistically reliable in the univariate tests.

Because recruiters avoid "overeducated" and "overpaid" applicants, we needed to develop measures of overqualification on these dimensions. In

[16] The survey responses were made anonymously, and, consequently, cannot be matched to other data we have on these individuals.

[17] Small numbers of applicants reported being new labor market entrants who have never had a job before, i.e., 2.4% of nonreferrals and 1.7% of referrals. We coded tenure on the last job and wage on the last job as zero for people who have not had a previous job. Therefore, the tenure and wages differences in the MANOVA (reported below) are conditional on the number of previous jobs being one or greater. None of the substantive results change if we exclude those who have never had a job from the analyses we report here.

TABLE 1

MEAN BACKGROUND CHARACTERISTICS OF REFERRED AND NONREFERRED APPLICANTS

	MEANS		UNIVARIATE
	Referrals	Nonreferrals	*F*-TEST
Months of:			
Customer service experience	35.073	32.445	2.436
Banking experience	2.014	2.126	.041
Nonbanking experience	66.592	65.394	.262
% overeducated (greater than 16 years)	2.324	3.409	2.862
Computer skills	.790	.786	.062
Working at time of application	.630	.469	76.041***
Number of previous jobs	3.230	3.304	3.739*
Tenure on last job (in days)	759.012	675.701	4.484**
% high wages on last job (greater than $8.25)	24.220	27.070	2.989*
N	1,119	1,936	
Wilks's lambda value[a]	.971		
Multivariate *F*-test	10.157***		
df	9 and 3,045		

[a] Tenure on the last job and wage on the last job are coded as zero for people who have not had a previous job. The substantive results do not change if we exclude those who have never had a job from the MANOVA.

* $P < .05$.

** $P < .01$.

*** $P < .001$, one-tailed test.

preliminary analyses, we compared the distributions of education and wages on last job for referrals and nonreferrals. When measured at the mean, referrals appear to be slightly less educated than nonreferrals (13.700 vs. 13.893), a difference which is not in the predicted direction. However, this is due to the education distribution for nonreferrals having a long right tail of highly educated people since the medians for the two groups are identical (14 years). This is consistent with referrals having fewer "overqualified" candidates than nonreferrals. To examine this overqualification difference, we compared the rates at which referrals and nonreferrals reported greater than 16 years of education. Only very small percentages of such candidates applied to either pool. While there are fewer overeducated applicants in the referral than nonreferral pool (2.3% vs. 3.4%), the univariate test shows that this difference is not statistically reliable at the 0.05 level ($P < .091$, one-tailed test).[18]

[18] In preliminary analyses, we experimented with various nonlinear specifications of the education variable (education-squared, various splines; see n. 28) to look for evidence of overeducation. While referrals are somewhat less overeducated than nonre-

With respect to wages on the previous job, referral applicants earned lower wages on their last job than nonreferrals when the difference is measured at the mean ($7.18 vs. $7.47; $P < .01$, one-tailed test). The median wage for both groups, however, is identical: $6.50. Here, too, nonreferrals have a longer right tail of overqualified applicants than referrals. This is seen clearly in figure 1, which plots the percentile distribution of wages on last job for nonreferrals against the percentile distribution for referrals. The 45-degree line shows a baseline of what the plot would look like if referrals and nonreferrals were to have identical wage distributions. The distributions for referrals and nonreferrals for the observed data closely track the 45-degree line up to $8.00, which marks the 73rd percentile for both nonreferrals and referrals. However, above that point, the line for the observed data begins to diverge upward from the 45-degree line. This indicates that the nonreferral pool contains a greater proportion of highly paid applicants than does the referral pool. As a conservative definition of overqualification with respect to wages on their last job, we coded the percentages of referrals and nonreferrals that reported wages greater than the non-negotiable starting wage for PCSRs, $8.25 per hour.[19] Of referrals, 24.2% were overqualified in this way, compared with 27.1% of nonreferrals, a difference that is statistically significant in univariate tests ($P < .042$, one-tailed test).

Hypothesis 1 implies that these variables will form two distinct profiles, one for referrals and one for nonreferrals. While the last column of table 1 showing univariate F-tests is informative, looking at each variable separately is inconsistent with the notion of a profile. In order to test hypothesis 1, we also reported the multivariate test of whether application source (referral vs. nonreferral) is statistically independent of the application profile. We find strong support for hypothesis 1: recruitment source significantly distinguishes between the joint distribution of the nine measures of applicant's background ($P < .0001$; Wilks's $\lambda = .971$; F-test $= 10.157$; $df = [9, 3{,}045]$). While we did not have access to background data as rich as we have available here, these findings replicate those of the entry-level jobs we studied in a retail bank (for details, see Fernandez and Weinberg [1997]).

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ferrals when using these nonlinear education measures, these patterns are never statistically reliable in univariate tests.

[19] From the perspective of hypothesis 1, this definition is conservative because the distributions for referrals and nonreferrals diverge *more* dramatically the further one goes into the tails of the distributions. We experimented with definitions of overqualification, which required a more extreme departure from $8.25 (i.e., $9.00–$15.00); as fig. 1 reveals, setting the overqualification threshold higher increases the extent to which nonreferrals are overqualified compared with referrals.

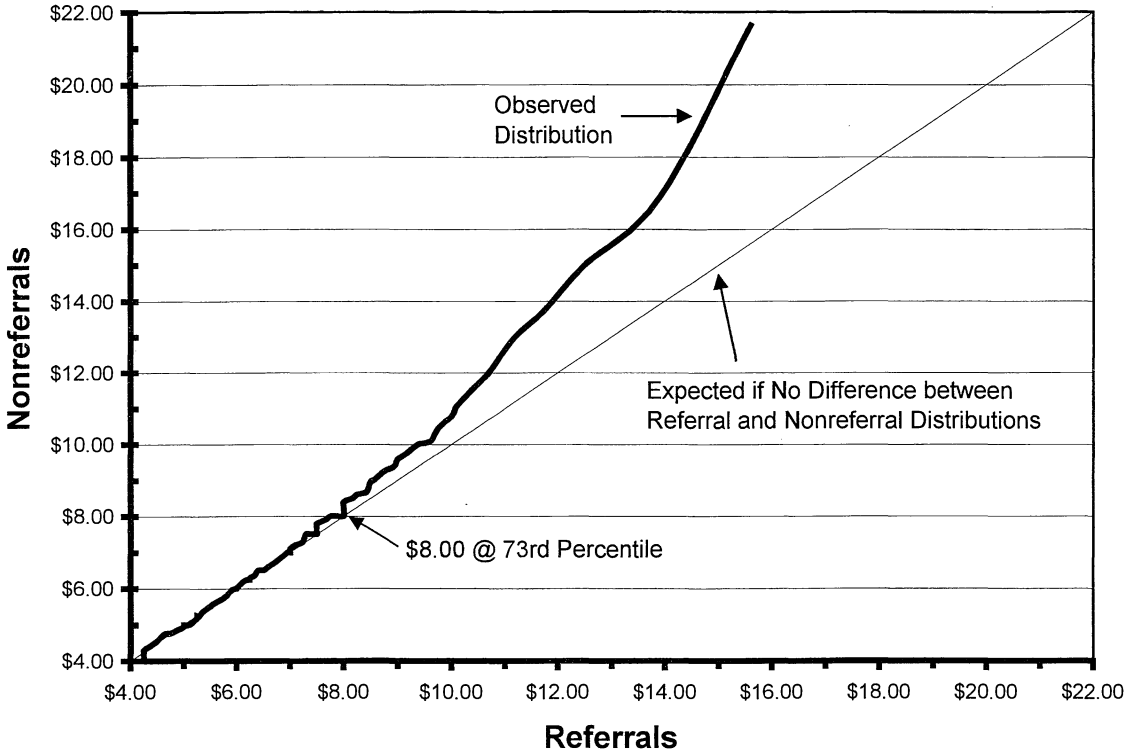


FIG. 1.—Percentile distribution of applicants' wages on their last job by referral status

Mechanism 2: Homophily

We address hypothesis 2 by selecting three characteristics that are likely to reflect referrer's human capital and success with the company, and therefore, are most likely to offer the employer upstream information about the quality of the applicant. We measured referrer's years of education, hourly wage, and days of tenure with the firm, all at the time they made the referral. We also coded the sociodemographic characteristic that is easily discernible from the applications: gender. For referrals, we coded the applicant's gender, years of education, hourly wages, and days of tenure with their current employer. If the applicant was unemployed, we used their wages and tenure from their last job. For the purposes of the homophily tests, we excluded applicants who had never been employed.

As we mentioned above, ours is the first study to address the question of homophily between *applicants* and their referrers. As a standardized measure of homophily across different characteristics, we calculated the Pearson correlation between referrer's characteristics and the characteristics of the referral. We also calculated an unstandardized measure of the magnitude of the variation between referrers and referrals by computing the mean of the absolute value of the difference (hereafter MAVD) between referrers' and referrals' values on each of the four variables.[20] Because larger numbers indicate greater differences, the MAVD is a negative measure of homophily.

The first column of table 2 reports the homophily measures. Consistent with the idea that people tend to refer people like themselves, the correlations for all four background variables are positive. However, all four correlations are quite modest, especially the correlation on past wages. While small in magnitude, the large number of dyads (see table 2, col. 2) insures that all of these correlations are statistically reliable when assessed by traditional significance tests. For tenure, education, and gender, the P-value is less than .001; for wages, $P < .011$ (one-tailed tests). The size of the correlation on wages is understandable when we consider that there is likely to be limited dispersion among applicants since the PCSR job is an entry-level job and is unlikely to attract many highly paid people (indeed, recruiters expressed skepticism of highly paid applicants for this job). The MAVD measures show the magnitudes of the differences between referrers and referrals in the metric of each of the background variables. For tenure, referrers and their referrals differ by an average of 1,376 days, while their average difference on wages is \$3.96. Referrer-referral dyads differ by 1.77 years of education; 33% of these dyads are cross-gender.

[20] We are grateful to an anonymous reviewer for this suggestion.

TABLE 2

TESTS OF HOMOPHILY IN REFERRER-REFERRAL DYADS FOR FOUR CHARACTERISTICS

	EXPECTED VALUES BASED ON RANDOM BASELINE[a]					TESTS VERSUS RANDOM BASELINES[b]		
	Observed Homophily[c] (1)	Number of Dyads (2)	All Applicants (3)	Nonreferrals (4)	Referrals (5)	All Applicants (6)	Nonreferrals (7)	Referrals (8)
Tenure (in days):								
Correlation	.112	1,108[d]	0	0	0	$P < .001$	$P < .002$	$P < .002$
MAVD	1,376		1,440	1,446	1,436	$P < .018$	$P < .009$	$P < .026$
Wages (in $):								
Correlation	.062	1,296[d]	0	0	0	$P < .024$	$P < .022$	$P < .022$
MAVD	3.957		4.131	4.174	4.044	$P < .019$	$P < .006$	$P < .100$
Education (in years):								
Correlation	.111	1,482	0	0	0	$P < .001$	$P < .001$	$P < .001$
MAVD	1.772		2.013	2.093	1.881	$P < .001$	$P < .001$	$P < .007$
Gender (1 = male):								
Correlation	.182	1,431	0	0	0	$P < .001$	$P < .001$	$P < .001$
MAVD	.331		.420	.428	.406	$P < .001$	$P < .001$	$P < .001$

[a] Average correlations and MAVDs generated in 1,000 samples randomly matching referrers with all applicants, nonreferrals, and referrals.

[b] The lowest level of probability attainable with 1,000 replications is $P < .001$.

[c] "Correlation" is the Pearson correlation between referrers' and referrals' values on each variable; MAVD is the mean of the absolute value of the difference between referrers' and referrals' values on each variable.

[d] Excludes referral applicants who reported never having had a previous job.

Our strategy for testing hypothesis 2 is to compare these observed measures of homophily against "asocial" baselines, which could also produce some degree of homophily in our data. Since one would expect people who are interested in a similar employment situation to share many characteristics, the fact that applicants are more like those already hired might also produce homophily between applicants (either referrals or nonreferrals) and referrers. According to this argument, simple self-selection on the part of applicants will produce a pool that looks like those who are already employed at the firm. If this self-selection process were to account for the levels of homophily we observed, it would call into question the interpretation of the homophily as reflecting a social link between particular pairs of individuals, that "people tend to refer people like themselves."[21]

Using the logic of bootstrapping (see Efron and Tibshirani 1993), we developed a counterfactual test for determining whether self-selection on the part of applicants could account for the level of homophily we observed. If simple attraction to the firm were to be causing the observed levels of homophily, random pairing between people who applied and referrers should often produce as much homophily as the levels we observe here. We drew 1,000 random samples (with replacement) from the pool of applicants and randomly matched them to referrers. We then calculated homophily measures between referrers' characteristics and the randomly matched applicant for each sample. This procedure simulates how much homophily we would expect to see in our data if the specific social tie between each referrer and their referral were to have no special role in producing homophily.

The third column of table 2 shows the expected values of the homophily measures produced by this exercise. As would be expected by random pairings, for all four variables, the average of the correlations is zero. The average of MAVD measures reveals the levels of homophily one would expect based on applicant self-selection alone in the metric of each variable. For all four variables, the difference between referrers and randomly matched referrals is greater than that observed in actual referrer-referral dyads. However, for tenure and wages, these differences are quite modest: random pairings produce MAVDs that are about 5% greater than the observed values of the MAVD (1,440 vs. 1,376 days of tenure, and $4.13 vs. $3.96 in wages). In contrast, the MAVDs for the random baselines on

[21] The fact is we do not directly observe referrer's recruitment efforts, so we do not know whether "people refer others like themselves." We only observe recruitment attempts where the referral actually applies. Strictly speaking, these data can only test the proposition that "people produce referral candidates who are like themselves."

education and gender are considerably larger than the observed MAVD values, 14% and 27%.

While random pairings produce less homophily than that observed in these data on average, the question of statistical significance remains to be addressed. Using a bootstrapping logic (Efron and Tibshirani 1993), we test hypothesis 2 by examining how often in 1,000 trials the randomly generated levels of homophily meet or exceed the observed levels of homophily. The sixth column of table 2 reports the results of these tests. For three of the four characteristics, the randomly generated correlations *never* meet or exceed the observed correlations between referrers and referrals. For the smallest observed correlation (wages), the occurrences are rare (23 out of 1,000 samplings), rare enough to yield confidence above traditional levels of statistical significance ($P < .024$). When using the correlation as a homophily measure, hypothesis 2 is supported.

Turning to the MAVD measures, we examine how often the MAVD scores are less than or equal to the observed MAVD. Figure 2 illustrates the logic of the statistical test we developed using the data for tenure. It presents a histogram of the MAVD scores for tenure from the 1,000 random replications. Although rare, scores as low as the observed MAVD score of 1,376 days do occur in 1,000 samples where referrers are randomly matched to applicants (17 out of 1,000 draws). Therefore, the chance that the observed level of homophily on tenure (i.e., 1,376) is due to simple self-selection on the part of applicants is less than 18 out of 1,000 ($P < .018$). The P-values for the other variables in column 6 also yield comfortable levels of statistical confidence. For education and gender, random pairing of referrer with referrals never produce MAVDs that are less than equal to the observed MAVD scores in 1,000 trials. For wages—the variable showing the lowest correlation between referrers and referrals—only 18 of 1,000 random replications produce MAVD scores as low as the observed MAVD of $3.96. Therefore, the results of the tests using the MAVD also support hypothesis 2.

While we think that the analyses just reported constitute fair tests of hypothesis 2, it occurred to us that there might also be another somewhat less naive baseline against which we might compare the observed data. In addition to attraction to this firm, referrals that come into this pool of applicants might also share a preference for informal job search, since referrals are people who, by definition, looked for work by informal means, and these applicants might also be similar to referrers who, by definition, are also involved in informal job searches. Random pairings between informally searching applicants and referrers, then, might often yield levels of homophily as high as those we observed. We drew 1,000 random samples of referral applicants (with replacement), randomly paired them with referrers, and calculated homophily measures between

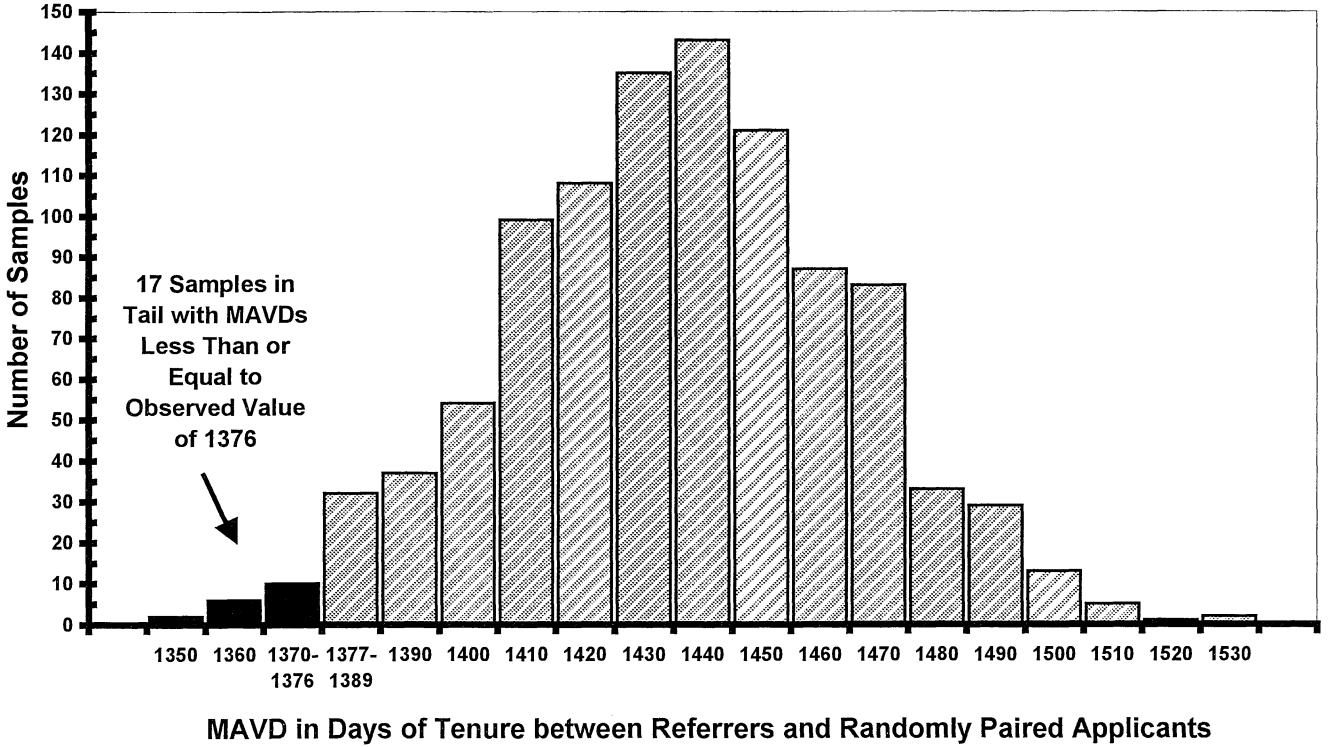


FIG. 2.—Distribution of mean absolute value of difference (MAVD) in days of tenure for 1,000 random pairings of referrers and applicants.

the characteristics of the referrer and the referral. Columns 5 and 8 of table 2 report the results of tests against this alternative baseline.

As with the baselines reported in column 3, the correlations in column 5 are all zero. As shown in column 8, the randomly generated correlations never exceed the correlations observed between referrers and referrals for two of the four characteristics. Even for the least robust of these correlations—wages—these occurrences are also rare (21 out of 1,000 samplings) and yield a comfortable level of statistical significance ($P < .022$). The results in the MAVD show that random pairings between referrers and randomly paired referrals are more similar than random pairings of referrers and applicants (see cols. 3 and 5). The statistical tests (col. 8) show that random pairings of referrers with referrals never produce MAVD scores as low as the observed values for education and gender (yielding a $P < .001$) and only once for tenure ($P < .002$). The result for wages is the least reliable but is still significant at the 10% level: 99 out of 1,000 samples yielded MAVD less than or equal to the observed MAVD ($P < .100$). We have no evidence that self-selection on the basis of informal job search (in addition to self-selection in application to the firm) can explain the degree of homophily we observe. Consequently, asocial processes of self-selection at application cannot explain our evidence supporting hypothesis 2. When considered against all the baselines (all applicants, referrals, and nonreferrals),[22] people do appear to *produce* referral applications from people like themselves.

Mechanism 4: Referrals Possess Better Information of the Job

The results so far support the richer pool argument. Referrals present more appropriate applications in terms of easily measured characteristics. Although we have not been able to rule out mechanism 1 (expanded recruitment horizon) and mechanism 3 (reputation protection) processes, we have offered positive evidence in favor of mechanism 2 (homophily). We now turn to mechanism 4, the idea that the referral tie serves as an information conduit. As we discussed above, this process is a key component of at least some versions of economists' better match models of recruitment via referrals.

[22] For completeness, we also performed a set of homophily tests randomly pairing referrers with nonreferrals (table 2, cols. 4 and 7). This baseline describes how much homophily we would expect from applicants who do not use informal means for job search. The statistical tests (col. 7) show that the observed levels of homophily cannot be accounted for by attraction to the firm *sans* informal job search. Column 4 shows that on average the nonreferral applicant pool is less like referrers than the pool of referral applicants; this is consistent with the idea that referrals are better at application than nonreferrals (hypothesis 1).

TABLE 3

SUMMARY OF EMPIRICAL TESTS OF THE "BETTER-MATCH" HYPOTHESIS

	Prediction	Data Source
Applicant side:		
Hypothesis 3*a*	Referrals have extra knowledge of full-time policy	Application forms
Hypothesis 3*b*	Referrals have extra knowledge of temp policy	Application forms
Hypothesis 3*c*	Referrals have less nonresponse on expected wage	Application forms
Hypothesis 3*d*	Referrals have more accurate wage expectations	Application forms
Hypothesis 4	Referrals have better-timed applications	Applicant tracking records
Hypothesis 5	Referrals have higher acceptance rate of job offers	Applicant tracking records
Hypothesis 6	Referrals have better understanding of job content	Survey of new hires
Employer side:		
Hypothesis 7	Employers use referrers' characteristics as an indirect screen	Applicant tracking records
Hypothesis 8	Employers directly contact referrers	Interviews with recruiters

Hypotheses 3–6 test whether referrals have extra information passed on to them by referrers at various stages of the screening process (see the applicant-side portion of table 3). If referrers were doing more than simply expanding the pool of formally qualified candidates (via mechanisms 1–3), then we would expect referrals' applications to show better knowledge of more tacit features of the job and the employer. Especially since referrers are paid for successful referrals, referrers have an incentive to take the time to pass on such information to referrals. Our strategy, then, is to use the application forms to identify important features of the job, which referrers would be highly likely to explain to their referrals. To the extent that information is generally available to both referrals and nonreferrals (e.g., via job advertisements), the better match model predicts that referrals have more of such information.

We develop four tests of hypothesis 3 by studying a number of important features of the firm's staffing policies with respect to the PCSR job (see hypothesis 3*a*–3*d* in table 3). We learned from our interviews with PCHR recruiters that, as a matter of policy, the firm only hires PCSRs as full-time, nontemporary employees. There is a line on the application

that asks people to check their employment preferences. The question reads: "Do you prefer" and is followed by a checklist with four boxes: "Full-Time," "Part-Time," "Temporary," and "Nights." Applicants can check all that apply. Hypothesis 3 implies that referrals should present applications that are more in line with the firm's policy. That is, referrals should be more likely to check "full-time" and less likely to check either "part-time" or "temporary."

We find no evidence of referrals having better information about hiring full-time versus part-time workers for this job. If we consider strictly incorrect answers (i.e., checking only the part-time box), referrals are not better informed than nonreferrals. Referrals and nonreferrals are equally likely (2.2%) to check only "part-time" from among "part-time" and "full-time" boxes. Virtually equal percentages of referrals and nonreferrals checked both "full-time" and "part-time" (9.6% vs. 8.4%), a difference that is in the wrong direction. The distribution of strictly correct answers (i.e., checking full-time only) is less extreme for the applicant pool overall (87.2% fall into this pattern). However, referrals and nonreferrals do not differ in their propensity to check only the "full-time" box on the application. For nonreferrals, 86.7% fall into this pattern, compared with 88.2% for referrals. Here, too, the difference is not statistically significant ($P < .163$; LR $\chi^2 = 1.942$; $df = 1$). Clearly, information on the staffing policy with respect to hours is well known by applicants and does not differ by recruitment source. We find no reliable evidence of referrals having better information of this key feature of the job; hypothesis *3a* is not supported.

However, referrals were less likely than nonreferrals to check the "temporary" box on the application (.8% vs. 1.9%; $P < .005$; LR $\chi^2 = 7.734$; $df = 1$). Since the firm does not hire temps into the PCSR job, this is consistent with referrals having better information on the firm's hiring policies. However, it is hard to reconcile the idea that referrals have better information about the firm's policy on hiring temps with their apparent lack of extra knowledge of the policy of only hiring full-time employees. An alternative explanation for this pattern may be that referrals tend to come from a more stable applicant pool than nonreferrals and, therefore, are less prone to apply for temporary jobs. Although this is speculation, we do find support for this alternative explanation in our analyses of hypothesis 2 where referrals display more stable work histories. Nevertheless, by this measure, we do find support for hypothesis *3b*.

We also examined referral/nonreferral differences in knowledge about another prominent feature of the PCSR job: wages. Knowledge of wages is crucial for labor economists. Indeed, no single piece of labor market information conveys more to job seekers than the wage a job pays. One model of personal networks in the labor market (Mortensen and Vishwa-

TABLE 4

TESTS OF REFERRALS DISPLAYING BETTER KNOWLEDGE THAN NONREFERRALS OF THE STARTING WAGE POLICY USING RESPONSES TO THE ITEM ON EXPECTED WAGES

	Referrals (*N*)	Nonreferrals (*N*)	Significance Test
Hypothesis *3c:* referrals show less nonresponse on expected wage:			
% nonresponse	42.3 (1,481)	42.6 (2,491)	LR $\chi^2 = .031$ ($df = 1$) $P < .861$
Hypothesis *3d:* referrals show more accurate wage expectations:			
% exactly \$8.25	17.5 (855)[a]	15.6 (1,431)[a]	LR $\chi^2 = 1.495$ ($df = 1$) $P < .221$
Mean absolute value of difference from \$8.25	\$0.88 (855)[a]	\$0.94 (1,431)[a]	$t = 1.470$ ($df = 1$; 2,284) $P < .071$ (one-tailed)

[a] Excludes cases who did not respond to the question on expected wage.

nath 1994) is explicitly driven by the idea that job seekers get better information on offered wages through personal contacts than they do via formal means. Applicants are asked to fill in a blank for "starting salary expected." Here, too, the firm has a strict policy. With no exceptions, the PCSR job has a starting wage of \$8.25 per hour throughout the entire period of our study. If referrals have better information about the job than nonreferrals, they should provide more accurate wage expectations on the application form. We studied this issue from two perspectives. First, we examined whether referrals are any less likely than nonreferrals to have left this question blank on the application (hypothesis *3c*). Second, for those who did supply a starting wage, we examine whether referrals are any more accurate than nonreferrals (hypothesis *3d*).

Table 4 presents the tests of hypotheses *3c* and *3d*. With respect to patterns of nonresponse, we find no evidence that referrals are better informed than nonreferrals: 42.3% of referrals and 42.6% of nonreferrals chose not to fill in a starting salary. To the extent that nonresponse to this item indicates ignorance of the starting wage policy, then the data in table 4 clearly do not support the notion that referrals are better informed. Neither is there evidence supporting hypothesis *3d*. If we look at the percentages responding exactly \$8.25, 17.5% of referrals versus 15.6% of nonreferrals gave the precisely correct response of \$8.25, a difference that is not

statistically significant.[23] We also tested whether referrals' starting salary responses were any more accurate than nonreferrals' responses by calculating the mean absolute value of the difference between their expected starting salary and $8.25. Unlike the percentage giving the precisely correct response of $8.25, this test incorporates quantitative information from throughout the distribution. On average, referrals' responses deviated from $8.25 by $.88, whereas nonreferrals' responses deviated $.94. Here, too, the difference is not statistically significant. By all these measures, we find no evidence that referrals are better informed about the firm's wage policies than are nonreferrals.

As a final check of hypotheses *3c* and *3d,* we closely compared expected wages for referrals and nonreferrals across their entire distributions and found only minor differences distinguishing them. The median wages for referrals and nonreferrals are identical at $8.00, and the $.08 difference in mean wages ($7.76 vs. $7.84) is not statistically significant ($P < .066$, one-tailed test; $t = 1.513$). To the extent there is a difference, it appears to be due to the fact that the expected wage distribution for nonreferrals has a somewhat longer right tail than that of referrals (see fig. 3). Across most of the distribution, the plot of the percentile distribution for referrals versus nonreferrals closely tracks the 45-degree baseline in figure 3. The only consistent exception to this pattern occurs after $9.08, the 95th percentile point for both distributions.

This latter pattern is not likely to be due to referrals being better informed than nonreferrals. If uninformed applicants—whether referrals or nonreferrals—think that reporting high past wages can influence the size of the wage offer, then formerly highly paid applicants would tend to report higher expected wages. Since more nonreferrals than referrals are drawn from jobs that pay substantially more than $8.25 an hour (recall the pattern in fig. 1), this bargaining behavior would produce the observed result where nonreferrals show a longer right tail than referrals even if referrals and nonreferrals were equally uninformed. The data show significant support for this line of reasoning. Consistent with the idea that high wage applicants report high expected wages, there is a significant correlation (.308) between wages on last job and expected wages among applicants overall. If referrals were to be better informed about the strict starting wage policy than nonreferrals, then fewer referrals than nonreferrals would cite high expected wages, and this should result in a lower correlation between expected wages and wages on last job for referrals than nonreferrals. The pattern observed in these data, however, is the

[23] Recalculating percentages on the base of all applicants (for respondents and nonrespondents) does not change this conclusion: 10.1% of referrals and 9.0% of nonreferrals fill in precisely correct responses for starting wage ($P < .221$; LR $\chi^2 = 1.496$; $df = 1$).

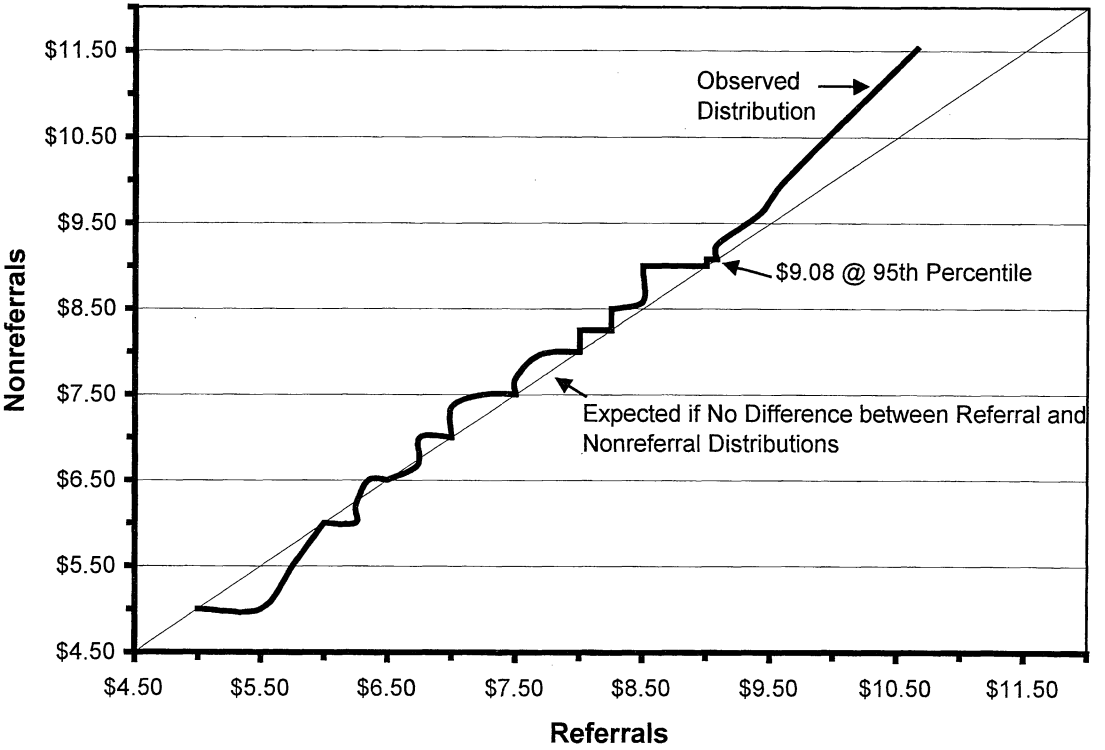


FIG. 3.—Percentile distribution of expected wages by referral status

exact opposite of this: the correlation between wage on last job and expected wage among referrals is *higher* than it is for nonreferrals (.326 vs. .298). Although this difference is not statistically significant,[24] the fact that the direction of the contrast is in the wrong direction casts serious doubt on the idea that referrals' shorter right tail is due to referrals' better information regarding PCHR's policy on starting wages. More plausibly, it is the fact that nonreferral applicants are drawn from jobs with higher wages than that of referrals that accounts for their displaying a longer right tail in figure 3.

In hypothesis 4, we conjectured that, if referrals were being passed systematically better information about the company's hiring needs, they might use this information to time their applications such that they would be applying when it would be comparatively easier to be successful and be hired (Fernandez and Weinberg 1997). Especially in light of referrers' financial stake in having their referrals make it through the screening process, we might expect referrers to pass on this sort of information. We tested this proposition by comparing the average state of the market for referrals and nonreferrals. For each application, we coded the number of job openings and applications on the date the person applied. We found no support for this process. Referrals applied on days when there were *fewer* job openings than did nonreferrals (17.4 vs. 18.6). Referrals did apply on days when there were slightly fewer applicants than nonreferrals (19.5 vs. 20.2), but the difference was not statistically significant ($P < .109$, one-tailed test; $t = 1.213$). Nor was there evidence of referrals better timing their applications when we examined the ratio of the two variables. The difference was not in the predicted direction: applicants per opening averaged 1.83 on days that referrals applied versus 1.75 on days that nonreferrals applied. We also experimented with various leads (where referrals might be applying in anticipation of openings) and lags (the number of job openings the previous week and month). Similar to Fernandez and Weinberg (1997), we found no support for hypothesis 4 using these alternative formulations. Overall, hypothesis 4 is not supported.

Thus far, we have examined whether referrals possess superior information about various facets of the job than nonreferrals using data from the application stage of recruitment. The last two tests of the better match

[24] In OLS regressions predicting expected wage, we tested for an interaction between referral status and wage on the last job and found that it was insignificant. Indeed, referral status is not significantly related to expected wage, either individually or in concert with wage on last job. In models including only the dummy variable for referral, the t-value for referral is -1.513; in models with the main effects of last wage and referral, the t-value is $-.494$. The final model, which includes the interaction between referral and last wage, yields a t-value of .608 for the interaction and a t-value of $-.743$ for the referral dummy.

TABLE 5

MEAN RESPONSE ON JOB INFORMATION ITEM FOR REFERRED AND NONREFERRED HIRES

	REFERRALS				
	Job Explained by Referrer	Job Not Explained	All Referrals	NONREFERRALS	TOTAL
Mean response[a]	4.41	4.07	4.31	4.28	4.30
No. of cases	96	40	136	97	233

[a] Responses to the questionnaire item: "Rate your understanding of what the position responsibilities and job content would be prior to accepting this position" (from 5 = very good understanding to 1 = very poor understanding).

mechanism involve later stages in the screening process. Another inference that flows from referrals' being better informed than nonreferrals is that referrals should be presold on the job and hesitate less than nonreferrals in accepting job offers (Ullman 1966). Consequently, referrals should be more likely to accept job offers once they have been extended. Given a job offer, the acceptance rate for referrals was 94.0%, compared with 90.1% for nonreferrals. This difference is not statistically significant ($P < .175$; LR $\chi^2 = 1.839$; $df = 1$). Here, too, we do not find statistically reliable support for hypothesis 5. We found a similar pattern in a retail bank: 90% of both referrals and nonreferrals accept job offers (Fernandez and Weinberg 1997).

As a final test of the applicant's side of the better match story, we look for evidence of referrals' extra information among hires. During training sessions at the beginning of their second week of employment, PCHR collected anonymous survey data from new hires. Both referrals and nonreferrals were asked: "Rate your understanding of what the position responsibilities and job content would be prior to accepting this position." The answers were recorded on a five-point Likert scale (from 5 = very good understanding to 1 = very poor understanding). Prior to this question, respondents were asked whether they were a referral ("Were you referred by a [NAME OF FIRM] employee?"). People identifying themselves as referrals were also asked, "Was this job explained to you by this person?" Thus, these unique data allow us to develop a relatively direct test of the mechanism that referrers are passing "extra" job information on to referrals during screening.

Table 5 shows that the clear majority of referrals (70.1%) report having had the job explained to them by the referrer. As might be expected, having the job explained by the referrer results in respondents reporting a higher level of understanding of the job: mean of 4.41 for referrals who

had the job explained versus 4.07 for referrals who did not have the job explained.[25] However, a sizeable percentage of referrals (29.2%) are being hired without the benefit of referrers explaining the job to them, and nonreferrals also report very high levels of understanding of the job. Indeed, nonreferrals' level of understanding is virtually identical to that of the population of all referrals (4.28 vs. 4.31, a difference that is not statistically significant). This is contrary to the better match theory's prediction that referrals on average will have extra information vis-à-vis nonreferrals. Consequently, hypothesis 6 is not supported.[26]

Mechanism 4: The Employer Possesses Better Information on Referrals

Hypotheses 7 and 8 address the employers' side of the better match theory. We start by considering the evidence with respect to the indirect means by which employers may harvest information about referrals. While our findings with respect to hypothesis 2 (homophily) suggest that information on applicants is available from considering referrers' characteristics, we do not know if recruiters are actually using this information. In order to test hypothesis 7, we look for evidence that recruiters are using "upstream" information (i.e., information garnered from the characteristics of referrers) when making screening decisions (see the employer-side section of table 3).

Among referral applicants, 64.8% are granted interviews with hiring managers compared to 57.5% of nonreferrals, a difference that is statistically very reliable ($P < .0001$; LR $\chi^2 = 21.905$; $df = 1$). Referrals also

[25] This is the only contrast in table 5 that is statistically reliable ($P < .007$; t-test of 2.72; $df = 1{,}133$).

[26] We should make one final point with respect to our tests of the applicants' side of the better match hypotheses (hypotheses 3–6). All of the people who applied to this firm are self-selected in the sense that they had enough interest in the firm to pursue a job there. However, to the extent that referrals have jobs explained to them by referrers, and decide not to apply for the job, then the survivors among the referrals may be more selected than the nonreferrals. Differential selectivity is predicated on the idea that, compared with nonreferrals, referrals have extra knowledge of the job given to them by their referrers. The fact that superior information can be used as a basis for deciding not to apply for a job at the firm suggests that there is a possibility of selection bias in our assessment of the better match theory (Winship and Mare 1992). In this case, however, selection bias cannot explain this pattern of results. To the extent that survivors among the referrals are more selected than the nonreferrals, it is referrals with extra knowledge of the job that will be overrepresented at later stages of the hiring process. Consequently, differential selection in this case would work in the direction of finding differences between referrals and nonreferrals on knowledge of the various job features we study. To have found such little evidence of extra information in a context that is biased in the direction of finding such differences adds to our confidence that the mechanism 4, "referrals have superior information," process is not at work in this environment.

receive job offers at much higher rates than nonreferrals. Conditional on interview, referrals are offered jobs at a rate that is over 1.5 times the nonreferrals' rate (18.3% vs. 11.6%). Here, too, this difference is highly significant ($P < .0001$; LR $\chi^2 = 21.584$; $df = 1$). Referrals' advantages at each stage compound. When the job-offer rate is calculated on the base of all applicants (as opposed to interviewees), 11.9% of referrals receive job offers compared with only 6.7% of nonreferrals ($P < .0001$; LR $\chi^2 = 32.180$; $df = 1$).

While referral candidates clearly enjoy advantages over nonreferrals at each stage in the hiring process, these advantages do not necessarily imply that recruiters are using information garnered from the characteristics of referrers when making screening decisions. These differences could simply be due to referrals being more appropriate applicants (hypothesis 1). Before concluding that referrals are using "upstream" information on the referrer during screening, we examine whether recruiters use these referrers' characteristics in screening. Our strategy for testing hypothesis 7 is to model recruiters' screening decisions and to see whether adding referrers' characteristics significantly improves the fit of the model.

We divide these analyses to reflect the two phases of screening: interview and offer. Table 6 presents descriptive statistics for the interview and job-offer models. For both models, we include the nine factors for which PCHR says they screen as predictors. Here, too, we coded tenure on the last job and wage on the last job as zero for people who had not had a previous job, so that the tenure and wages effects are conditional on the number of previous jobs being one or greater. However, we also add a number of variables to the model in order to replicate as closely as possible our analyses of hiring in another unit of the bank (Fernandez and Weinberg 1997). Because the unit of analysis is the application, and some people applied multiple times, we include a dummy variable to distinguish repeat applicants from first-time applicants (1 for repeat applicants, 0 otherwise; for a similar procedure, see Fernandez and Weinberg [1997]). The maximum number of applications from individuals is three. Of the original 4,165 employment inquiries, 388 (9.3%) were from individuals who had applied twice, and only 12 (0.3%) applied three times. Work in the human capital tradition (e.g., Mincer 1974) argues that the value of work experience declines over time. We capture this effect by entering a squared term for months of nonbank experience.[27] Although they did

[27] In preliminary analyses, we examined a number of specifications of the experience variables. In particular, we tested whether there was evidence of diminishing returns on the various experience measures. We found no evidence of diminishing returns to months of banking or customer service experience. In all these tests, the t-values on the relevant coefficient were always less than one. We present the model with linear

TABLE 6

MEANS AND STANDARD DEVIATIONS FOR VARIABLES IN THE INTERVIEW AND JOB-OFFER MODELS

	INTERVIEW MODEL		JOB-OFFER MODEL	
	Mean	SD	Mean	SD
Independent variables:				
Gender (1 = male)	.334	.472	.311	.463
Repeat application (1 = yes)	.096	.294	.093	.290
Skills:				
Computer	.788	.409	.823	.382
Language	.201	.401	.188	.391
Years of education	13.818	1.800	13.949	1.777
Experience:				
Months of bank experience	2.110	14.752	2.521	16.183
Months of nonbank experience	65.638	59.026	70.723	61.630
Nonbank experience, squared	7,791.197	17,391.139	8,798.011	19,187.734
Months of customer service	33.533	45.086	37.192	48.721
No. of previous jobs	3.279	1.046	3.296	1.053
Works at time of application	.528	.499	.562	.490
Tenure in last job (in days)	706.193	1,051.016	787.682	1,145.258
Wage in last job	7.368	3.047	7.387	2.895
Application behavior:				
No. of applications	18.992	15.537	18.510	14.797
No. of job openings	19.131	10.972	21.125	11.851
Application source:				
External referral	.352	.478	.381	.486
Referrer's characteristics at time of referral application:				
Tenure	1.520	3.130	1.640	3.192
Wage	3.643	5.718	3.879	5.574
Years of education	4.386	6.001	4.763	6.120
Dependent variables:				
Interviewed	.617	.486	...	...
Received job offer	...	...	.136	.343
No. of cases	2,987		1,843	

not say that they screen for these variables in this setting, we also add dummy variables for evidence of foreign language skills (applications had a line asking for such information) and gender (1 = male) as controls. In addition, we also control for the state of the market in these analyses, that is, the number of job openings and the number of applications on the date the candidate applied.

effects of bank, nonbank, and customer service experience, and a squared effect for nonbank experience because it is the best fitting specification.

Table 7 shows results of probit models predicting interview among applicants.[28] The first model reports the effects of the various background factors without controlling for referrals versus nonreferrals. Considering first the work experiences variables, recruiters are more likely to grant interviews to applicants who are employed at the time of applications. Candidates reporting more months of customer service experience and work experience outside the financial services sector are also more likely to be granted interviews, although the squared term on the nonbank experience variable shows that there are diminishing returns to nonbank experience. Candidates reporting longer tenure on their last job are also more likely to be interviewed.

However, two of the variables measuring work history did not emerge as significant predictors, although their coefficients had the expected sign. The number of previous jobs that candidates report on their applications is not significantly related to being granted an interview. Nor is experience in the financial services sector a significant predictor of being interviewed. This is not due to multicollinearity among the various experience measures. Even when the other experience measures are removed, bank experience is not significantly related to interview. Inspection of the mean for months of bank experience in table 6 shows the likely reason why this is the case. The average number of months of bank experience in this pool of applicants is only two months, compared with over five years for nonbank experience and more than two and half years of customer service experience.

We also find that more highly educated candidates and applicants reporting computer skills are more likely to be interviewed.[29] Applicants with foreign language skills, however, are *less* likely to be interviewed than applicants without such skills. While we can only speculate, this effect could be a by-product of recruiters' screening on verbal and "soft" interpersonal skills, which they glean from phone calls or short interviews. As one recruiter put it: "They [candidates] have to speak English." Because all customer interactions are conducted over the telephone, PCSRs

[28] In preliminary analyses, we tested whether the models predicting interview and job offer (tables 7 and 8) differ for referrals and nonreferrals. We found no evidence of statistically significant interactions with referral status for these models.

[29] In preliminary analyses, we broke the education variable into a series of splines (less than 9 years, 9–12 years, 13–16 years, and more than 16 years) in order to test whether very highly educated applicants are being treated as "overqualified" and are less likely to be interviewed. Although the spline for applicants with over 16 years of education shows that the probability of interview is lower than for other candidates, this effect is not statistically reliable (the other splines show very linear increases in the probability of interview). This is probably due to there only being 122 such cases.

TABLE 7

COEFFICIENTS FOR THE PROBIT REGRESSION PREDICTING JOB INTERVIEW FOR CUSTOMER SERVICE REPRESENTATIVE JOB ON SELECTED INDEPENDENT VARIABLES

INDEPENDENT VARIABLES	MODEL 1		MODEL 2		MODEL 3	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Constant	−1.419***	.208	1.547***	.211	−1.559***	.211
Gender (1 = male)	−.150**	.053	−.145**	.053	−.147**	.053
Repeat application (1 = yes)	−.023	.082	−.035	.082	−.040	.083
Skills:						
Computer	.292***	.060	.289***	.060	.290***	.061
Language	−.163**	.061	−.173**	.061	−.176**	.061
Years of education	.063***	.015	.067***	.015	.067***	.015
Experience:						
Bank experience	.001	.002	.002	.002	.002	.002
Nonbank experience	.004***	.001	.004***	.001	.004***	.001
Nonbank experience, squared	−.000009**	.000003	−.000009**	.000003	−.000009**	.000003

Customer service experience	.002**	.001	.002**	.001	.002**	.001
No. of previous jobs	−.009	.026	−.007	.026	−.008	.026
Works at time of application	.159***	.049	.128**	.049	.127**	.049
Tenure on last job	.000101***	.000032	.000095**	.000032	.000095**	.000032
Wage on last job	−.028***	.009	−.027**	.009	−.026**	.009
Application behavior:						
No. of applications	−.000079	.001561	.000082	.001565	.000095	.001566
No. of job openings	.030***	.002	.031***	.002	.030***	.002
Application source:						
External referral			.223***	.052	.029	.429
Referrer's characteristics at time of referral application:						
Tenure					.003	.012
Wage					−.022*	.010
Years of education					.033	.035
χ^2 (df)	324.717*** (15)		343.088*** (16)		349.185*** (19)	
Improvement χ^2 (vs. previous model)			18.371*** (1)		6.097 (3)	

NOTE.—No. of cases = 2,987.
* $P < .05$.
** $P < .01$.
*** $P < .001$, two-tailed test.

cannot have heavy accents; this foreign language effect could be picking up recruiters' screening on such phone skills. The final human capital variable we consider is candidate's last salary on the job. Controlling other things, we find applicants who report a higher wage on their last job as being *less* likely to be granted interviews. As we mentioned above, recruiters worry that such candidates might be overqualified and more likely to leave.[30]

If we consider the two controls, repeat applicants are no more likely to be interviewed than are first-time applicants. However, controlling other factors, males are less likely to be interviewed than females. PCHR recruiters speculate that females have a better sense of how to conduct customer service interactions and that this may come across in screening. Females do report significantly more months of customer service experience than do males (37.1 vs. 28.5). However, we could not find any statistically reliable evidence of interactions between gender and other variables in preliminary analysis.

The second model in table 7 adds a dummy variable distinguishing between referrals and nonreferrals. The probit coefficient for referral is statistically significant and remains about the same magnitude as the coefficient with no controls (point estimates of .223 with controls vs. .212 without controls). Although referrals appear to be more appropriate candidates for the PCSR job (see the evidence with respect to hypothesis 1), referrals' advantages at the interview stage cannot be explained by the individual background control variables. Moreover, the introduction of the referral variable does not change the pattern of the other effects (see models 1 and 2), indicating that whatever is leading recruiters to prefer referrals at this stage, it is relatively independent of the background factors. While it is plausible that we would find this pattern if recruiters were using referrer's "upstream" information in their screening decisions, this pattern is also consistent with the notion that referrals are more desirable than nonreferrals in other unmeasured ways.

The third model in table 7 seeks to provide evidence of recruiters using upstream information in their recruiting by adding three key referrers' characteristics to the equation. For each referral, we coded referrers' wage, tenure with the company (in years), and years of education, all measured at the time the referral was made. For nonreferrals, these variables are coded as zero. Hence, the effects of referrers' characteristics are conditional on the applicant being a referral. In the better match story, these variables measure different aspects of referrers' quality as an employee. Wage is a measure of the referrer's value to the firm, whereas longer ten-

[30] As with the experience and education effects, we experimented with various nonlinear specifications and found that the simple linear effect of last wage is the best fitting.

ure should be associated with lower turnover, and referrer's education is a measure of the referrer's human capital. The chi-square comparing model 3 with the model with just the dummy variable (model 2) shows that these three measures do not significantly improve the fit of the interview model ($P < .107$; LR $\chi^2 = 6.097$; $df = 3$). Moreover, the coefficient on referrer's wage is in the wrong direction: referrals from high-wage referrers are *less* likely to be granted interviews than referrals from low-wage referrers. At the interview phase, hypothesis 7 is not supported.[31]

Table 8 reports the results of a similar analysis predicting job offer among candidates who received interviews.[32] Across all three columns,

[31] Another approach to testing hypothesis 7 is to study only referrals (i.e., excluding the nonreferrals) and to add referrers' characteristics to a baseline model that has only individual background variables. The results using this method are identical to those we present here. We prefer the models including nonreferrals because they have increased statistical power over models using only referrals (recall that we found no evidence that the effects are different for referrals vs. nonreferrals); the models distinguishing referrals and nonreferrals with a dummy variable (i.e., model 2 of tables 7 and 8) will become important later when we discuss a version of the better match process (see below).

[32] The fact that the cases analyzed in table 8 are all survivors of the interview stage introduces the possibility that selection bias may affect our assessment of hypothesis 7 at the job offer stage. In preliminary analyses, we attempted to control for such selection bias using a bivariate probit model with selection, which is the appropriate statistical procedure when both the ultimate dependent variable (job offer) and the selection criterion (interview) are dichotomous. In contrast with a study of the western region (Fernandez and Weinberg 1997), we were less than wholly successful in this case. When working with the full model where all of the variables in column 3 of tables 7 and 8 are included in both the interview and job offer equations, we could not get the model to converge. Such estimation problems are common with this model, since it is only weakly identified (off of the nonlinearity of the selection effect). In order to obtain estimates, we needed to define "instruments"—variables that, by assumption, affect the selection stage but not the substantive stage. We were able to obtain estimates if we dropped the number of jobs and number of applicant's variables from the job offer equation (but not the interview equation). This is tantamount to arguing that PCHR recruiters worry about the state of the market when deciding whom to interview but that line managers have delegated concerns about the state of the market to PCHR when deciding job offers. Under this model of the process, the results from the two phases look very similar to one another, and we find no evidence of selection bias accounting for our findings with respect to hypothesis 7. We need to point out that the hiring process at the phone center is organized in such a way to make it very difficult to identify selection bias. To the extent that PCHR recruiters are successful in mimicking the behavior of the hiring manager, PCHR's actions become indistinguishable from those of the hiring manager. In the limit, one can consider them becoming hiring managers. To the extent the stages meld into one, it makes no sense to control for selection. This would be like trying to study the predictors of some dependent variable, after controlling for the same dependent variable. The fact that PCHR recruiters were granted such hiring authority after our field period suggests that the hiring process we study might have been approaching this limit.

TABLE 8

COEFFICIENTS FOR THE PROBIT REGRESSION PREDICTING JOB OFFER FOR CUSTOMER SERVICE REPRESENTATIVE JOB ON SELECTED INDEPENDENT VARIABLES

	MODEL 1		MODEL 2		MODEL 3	
INDEPENDENT VARIABLES	Coefficient	SE	Coefficient	SE	Coefficient	SE
Constant	−.976**	.342	−1.182***	.348	−1.145***	.350
Gender (1 = male)	−.248**	.088	−.247**	.089	−.255**	.090
Repeat application (1 = yes)	−.154	.137	−.170	.138	−.156	.138
Skills:						
Computer	.146	.103	.162	.104	.150	.105
Language	−.071	.101	−.090	.102	−.097	.102
Years of education	−.007	.023	−.003	.023	−.006	.023
Experience:						
Bank experience	.000032	.002346	.000022	.002346	.000046	.002339
Nonbank experience	.004**	.002	.004**	.002	.005**	.002
Nonbank experience, squared	−.000012*	.000005	−.000012*	.000005	−.000012*	.000005

Customer service experience	.001	.001	.001	.001	.001	.001
No. of previous jobs	−.055	.039	−.048	.039	−.051	.040
Works at time of application	.327***	.079	.280***	.080	.295***	.081
Tenure on last job	.000051	.000041	.000049	.000041	.000050	.000041
Wage on last job	−1.074	.016	−.011	.016	−.010	.016
Application behavior:						
No. of applications	−.007*	.003	−.007*	.003	−.006*	.003
No. of job openings	−.009**	.003	−.009**	.003	−.009**	.003
Application source:						
External referral			.317***	.077	−.258	.532
Referrer's characteristics at time of referral application:						
Tenure					−.036*	.017
Wage					.008	.014
Years of education					.051	.043
χ^2 (df)	69.619*** (15)		86.548*** (16)		93.759*** (19)	
Improvement χ^2 (vs. previous model)			16.929*** (1)		7.211 (3)	

NOTE.—No. of cases = 1,843.
* $P < .05$.
** $P < .01$.
*** $P < .001$, two-tailed test.

none of the skill measures emerge as statistically reliable predictors of job offer. Among the experience variables, only nonbank experience, its squared term, and the dummy variable for working at the time of application remain as statistically significant predictors. The pattern of effects for the application behavior variables changes compared to the interview equation. Conditional on interview, both the number of applications and the number of job openings on the day the candidate applied are negatively associated with being offered a job. We do not see a substantive explanation for why this should be the case. However, when paired with our experiences trying to control for selection bias (see n. 32), we suspect that these sign reversals are due to the fact that all the cases in the offer equation have been interviewed.

The second model in table 8 shows the same pattern as table 7: controlling other factors, line managers are more likely to offer jobs to referrals. However, similar to the model predicting interview, including referrer's characteristics does not improve the fit of the model. Moreover, the effect of the referrer's tenure variable is in the wrong direction. Here, too, hypothesis 7 is not supported. To the extent we have been able to control for its influence, this finding is robust to selection bias (see n. 32).

Employers can also learn more about referrals than nonreferrals by directly contacting referrers and asking them about the referral. We addressed hypothesis 8 by interviewing the PCHR personnel responsible for recruiting for the PCSR job. After completing the other analyses for this article, we asked the people whose job it would be to contact referrals questions about how they screened referrals.[33] We asked the following direct question: "When an application from a referral comes across your desk, do you contact the person who referred them?" The PCHR personnel involved in screening for the PCSR job all answered unequivocally, "No, never." We next asked: "Do you look up any of the characteristics of the referring person—such as their tenure with the company or their salary—in your HR database?" The answer was again an emphatic, "No, never." These responses are clearly contrary to the predictions of the better match story. Hypothesis 8 is clearly not supported. Moreover, the fact that recruiters never contact referrers also explains why we saw no support for hypothesis 7.

[33] Prior to this point, PCHR personnel's answers to our questions about how they recruited had been that they "treated referrals the same as everyone else." Since we knew referrals were being interviewed and hired at higher rates than nonreferrals (see above), we were concerned that these responses revealed more about their ideology than their actions. Only after completing the analysis of their interviewing and offering behavior did we feel that we could usefully probe them on the specifics of what they do.

We asked these recruiters to elaborate on why they did not contact the referrer or look up information on them. While PCHR personnel understood the ideas of "upstream information" and that "people tend to refer people like themselves," they explained that they simply do not have the time to do these things. In failing to invest time in these relatively easy procedures when hiring referrals, we suggest that the PCHR department is revealing in its actions that it does not place much stock in the better match theory. Indeed, one individual recruiter's impression was that referrals were *less* well matched than nonreferrals, post hire. She explained, "Referrals are worse; I think they have higher turnover rates than people we get from a newspaper ad. You would think that people would not refer just anybody since it would reflect on them if the person were not any good. But the other side of this is that I know people who would refer their dog if they can get a $250 bonus." While this recruiter shows a clear understanding of the reputation protection argument in this quote, she also expresses skepticism that the $250 referral bonus is likely to decrease turnover via the better match mechanism. We heard similar sentiments expressed by other human resources personnel across a number of different units of the bank.[34]

Although we did not raise these to the level of hypotheses, we also checked whether there is evidence of the various posthire predictions of the better match theory. More than just idle curiosity motivated us to perform these checks. As we mentioned above (see n. 9), some versions of the better match story argue that better matches could occur for referrals *without* the referrer passing on any explicit information to the referral or the employer (e.g., Simon and Warner [1992] make no reference to referrers passing on information in his model). According to these arguments, all that is required for better matches is that there be homophily between the referrer and the referral (mechanism 2) and that referral applicants be more likely to apply (mechanism 1). These models, in essence, claim that, since referrers bring in people with more desirable hard-to-observe characteristics, the richer pool process should be enough to yield better

[34] According to these people, referral bonuses are counterproductive since people who are referring others for money will not refer the best people. In essence, these recruiters are saying that bonuses are oversufficient justification (Lepper and Greene 1978) for referring others, that bonuses replace what should be the intrinsic rewards of helping to recruit for the bank (e.g., a sense of participation in the running of the bank) with extrinsic rewards. As a recruiter in another unit put it: "[Referrers] should be doing it for the company. If they are only doing it for the money, [the referral] can't be good for us. And the thing with bonuses is that it is a slippery slope. Before you know it, you will find yourself having to offer people bonuses just to do their job. If we continue down this path, before long we are going to have to offer bonuses for people picking up the phone to call a client."

posthire outcomes for referrals. In the face of the evidence we have found for referrer-referral homophily (hypothesis 2), and evidence that referrals constitute a richer pool at application in terms of easily observed characteristics (hypothesis 1), posthire evidence of better matches would support this "mechanism 1 + mechanism 2" version of the better match theory. This would suggest that referrer's search produces not only applicants who are more appropriate on formal criteria, but also more appropriate on the more tacit, hard-to-screen-for characteristics. Recruiters would then use referral status as a signal of referral's posthire superiority. According to this interpretation, the effects of the dummy variables for referral status in tables 7 and 8 would be due to recruiters using referral status as a signal of these hard-to-screen-for characteristics.

On the other hand, if referrals are not better matched than nonreferrals, post hire, then there would be no signal value in referral status. Such a pattern would support the notion that what referrers are doing is delivering applicants with characteristics that are more appropriate for the job on formal criteria for which it is relatively easy to screen. Not finding evidence of referrals being better matched post hire would lead us to conclude that the "referral status as signal" version of the matching account is also lacking in this setting. In this case, the effects of the dummy variables for referral status in tables 7 and 8 should not be interpreted as evidence of a signaling process, since there is no posthire value in the signal. In this scenario, the dummy variable effects of referral status would reflect the absence of variables that we as analysts have not been able to control in the model but that recruiters do notice and use in their screening decisions.

We inspected the data from the phone center to see if we could find any evidence of these posthire implications. If referrals are better matched to their jobs than nonreferrals, then referrals should have higher starting wages (Corcoran et al. 1980; Simon and Warner 1992), slower wage growth (Simon and Warner 1992), lower turnover than nonreferrals (Corcoran et al. 1980; Datcher 1983; Simon and Warner 1992; Sicilian 1995), and flatter time paths of turnover than nonreferrals (Ullman 1966).[35] The evidence on wages contradicts the better match account. For *all* new hires

[35] It has been argued that turnover in general should show a pattern of time dependence. Bad matches should dissolve quickly, leaving only better matches intact as turnover unfolds over time. Consequently, survivors should be more likely to stay on the job the longer they are on the job (Tuma 1976; Jovanovic 1979; Lane and Parkin 1998). The matching story predicts that turnover chances should decline more precipitously for nonreferrals than referrals over time (Ullman 1966). This is because the extra information that referrals and employers exchange should lead to fewer early bad matches, which dissolve among referrals and not among nonreferrals.

into the PCSR job, the starting wages are $8.25 per hour. This would suggest there is little reason to expect patterns of wage growth to differ and, indeed, the patterns of wage growth for referrals and nonreferrals are statistically indistinguishable.[36] Nor do we find statistically reliable evidence of referrals having a lower turnover rate. We performed several test statistics (i.e., Log-Rank and Wilcoxon tests) to compare the Kaplan-Meier estimates of the survivor function for referrals versus nonreferrals (see the first column of table 9). Here, too, the differences between referrals and nonreferrals are never statistically significant ($P < .1292$).[37]

We also tested for differences in turnover rates between referrals and nonreferrals after controlling for a number of covariates (see col. 2 of table 11). Results do not change across a variety of parametric transition rate models (the Cox model, the proportional exponential model, or the proportional Weibull model). Lastly, we examined the time path of turnover hypothesis. Using parametric models of time dependence (the nonproportional Weibull models, and various piecewise-Weibull and piecewise-exponential models using one-month intervals to examine nonmonotonic patterns), we never found evidence that the (always insignificant) effect of referral changes over time. In models using the covariates listed in column 2 of table 11, referrals do not differ from nonreferrals in their time paths of turnover. *None* of the posthire predictions of the better match story are borne out in this setting.

Skeptics might question whether the sample of hires at the phone center provides sufficient power to deliver fair tests of the posthire predictions of the better match story. We addressed this issue by replicating the wage, wage growth, turnover, and time path of turnover analyses across a number of sites. We collected posthire data on 936 hires (293 referrals and 643 nonreferrals; see second column of table 9) from three other phone centers located in different cities. We performed these replications both by pooling the data across the three sites and then again separately by site. Where possible, we repeated these analyses using data on hires from a very different setting in the bank, four entry-level jobs in the western region of the retail bank.

[36] In analyses not presented here, we estimated wage growth equations in order to test whether referrals and nonreferrals have different patterns of wage growth. We estimated growth models separately for censored and uncensored cases and then with a Heckman (1979) selection correction for being censored versus not censored (see Winship and Mare 1992). None of these analyses show statistically reliable evidence of referrals showing lower wage growth.

[37] We also performed these tests separately for voluntary (quitting) vs. involuntary (fired or laid off) turnover and found no reliable differences. Most of the turnover was voluntary: only 18 (11%) of the overall job terminations were involuntary.

TABLE 9

SURVIVAL RATES OF REFERRALS AND NONREFERRALS AT FOUR PHONE CENTERS

	City 1[a]	Total Cities 2–4	City 2	City 3	City 4
1 month:					
Referrals	97.06	99.66	98.86	100.00	100.00
Nonreferrals	98.06	99.53	97.67	99.63	100.00
3 months:					
Referrals	93.53	99.32	97.73	100.00	100.00
Nonreferrals	90.97	98.60	95.35	98.51	99.65
6 months:					
Referrals	86.47	97.61	95.45	100.00	97.89
Nonreferrals	81.94	95.80	90.70	96.64	96.54
9 months:					
Referrals	74.71	93.79	90.65	98.41	93.66
Nonreferrals	74.19	93.28	90.70	93.28	94.09
1 year:					
Referrals	70.57	90.32	84.64	95.24	91.36
Nonreferrals	66.39	90.55	89.16	89.55	92.16
18 months:					
Referrals	66.09	83.94	72.02	87.00	87.95
Nonreferrals	55.87	88.12	82.74	86.46	90.93
2 years:					
Referrals	53.71	70.67	72.02	72.78	73.42
Nonreferrals	47.82	77.92	75.85	77.98	79.16
N (referrals)	170	293	88	63	142
N (nonreferrals)	155	643	86	268	289
χ^2 ($df = 1$)	2.30	2.21	.64	.67	2.47
$P <$	.1292	.1375	.4233	.4119	.1160

NOTE.—Data is uncensored at sites 1 to 4 until 347, 242, 410, and 263 days, respectively. The censored data extends to 1,104, 1,690, 1,545, 1,670 days, respectively.

[a] City 1 is the Midwestern site.

A lack of statistical power does not appear to account for our findings. All three phone centers had rules regarding starting pay being the same for all new hires, thus the simple wage predictions are not supported in any of those sites. Even in the western region where starting wage policies are more flexible, we did not find statistically reliable differences between referrals' and nonreferrals' starting wages. Across all replications of the wage growth models, we found no statistically reliable support for the wage growth predictions of the matching theory. Nor did we find support for the turnover predictions of the matching story (see cols. 2–5 in table

9).[38] This was true both with and without a number of covariates.[39] Our replication of the various parametric models of time dependence (the piecewise-Weibull and piecewise-exponential models) in the alternative sites does not conform to the theory's predictions either. In sum, in these other settings as well, we find no support for the posthire predictions of the matching story. At least with respect to posthire outcomes, the "referral as signal" of posthire turnover version of the matching story does not appear to be operating in this company.

While referral status does not appear to act as a signal of posthire superiority, it is still possible that referral status is being used as a signal of hard-to-observe quality factors in a prehire match story.[40] As illustrated in figure 4 with the turnover outcome, while posthire differences between referrals and nonreferrals might be nil, this could be because the prehire screening process does a good job of winnowing out bad matches, while passing on good matches who survive to be hired. Thus, it might be that referrals are better matched than nonreferrals, but at an early phase of the hiring process.[41]

[38] In these replications, we repeated the different specifications of the transition rate models, i.e., the Cox, the exponential, and Weibull models. We also performed tests separately for voluntary versus involuntary turnover and found no significant differences by referral status. As with the midwestern site, most of the turnover was voluntary: the corresponding numbers of fires are 5, 16, and 10 for each of the phone center sites. In the retail bank as well, we did not find differences in voluntary, involuntary, or overall turnover by referral status using any of the different specifications of the transition rate models.

[39] For the alternative sites, we did not have access to all the variables we collected in the midwestern site. The models in the alternative sites only included covariates for gender, minority versus nonminority, age, marital status, and education.

[40] We thank an anonymous reviewer for pointing this out.

[41] The argument here is that prehire screening *substitutes* for the posthire turnover matching mechanism. An implication of this story is that referrals' superiority would manifest itself post hire if we were to eliminate various phases of the screening process. This can be demonstrated by moving the *y*-axis in fig. 4 to the left: the further back one pushes the axis, the more apparent referrals' advantage over nonreferrals would become in terms of lower turnover. Referrals' superiority would be at its maximum in the limit where hires were being made from each applicant pool on a random basis. Therefore, selection bias introduced by the screening process explains why referrals do not look any better than nonreferrals in posthire analyses. Ostensibly, running selection-corrected models would generate estimates of what referral/nonreferral differences in turnover (or wage growth) would be if we were to eliminate all prehire screening. We found no evidence for the substitution argument in preliminary analyses. The posthire results we reported above do not change after controlling for selection biases introduced by hiring. For turnover, we estimated a bivariate probit model with selection where the ultimate dependent variable was uncensored turnover (i.e., up to 347 days past hire), and the first stage was hired versus not hired using the factors listed in table 6. For the wage growth model, we corrected for selection (hired

While referrals are clearly preferred over nonreferrals in prehire screening, this could also be due to referrals having more appropriate screenable characteristics than nonreferrals (i.e., the richer pool of hypothesis 1) and would also yield the pattern depicted in figure 4. The crucial issue distinguishing the richer pool and the prehire better match accounts is the observability of the screening criteria. If the characteristics being screened for are easy to measure, then there is no independent benefit to the company in preferring referrals once recruiters apply their screen. In this scenario, knowing whether an applicant is a referral or nonreferral adds no new information once applicants have been screened. But if referrals' advantages go beyond screenable characteristics, then the prehire better match argument would predict that the company would get some additional benefit from preferring referrals, even after recruiters have applied their screen. Referrals would have more of the hard-to-measure factors that impress recruiters and make them more hireable than nonreferrals. If a new technology were to come along and make these formerly hard-to-measure characteristics easily and cheaply observable, recruiters would screen on those criteria instead of using referral status as a signal. If referrals have more of these factors than nonreferrals, then referrals would constitute a richer hiring pool in precisely the way posited in hypothesis 1. Indeed, if all screening criteria were easily observable to recruiters, the prehire better match theory becomes identical to the richer pool model. As an anonymous reviewer pointed out, a prehire better match account is also a richer pool argument, but one where the referral pool is richer than the nonreferral pool in *unobservable* factors. Thus, choosing between richer pool (hypothesis 1) and the prehire version of better match process comes down to whether the referral applicant pool is richer than the nonreferral pool in observables (hypothesis 2) or unobservables (hypotheses 3–6).

As is always the case in arguments involving unobservables, factors that are posited to be unobservable to screeners are also likely to be unobservable to us as analysts. This raises the issue of our specification of the models in tables 7 and 8. If there are factors that are easily observable to recruiters, but that we do not observe (or measure poorly) in our models, then the dummy variable for referral status in tables 7 and 8 will pick up the effect of the omitted factor. Since we can never be sure that we have included all the relevant factors in our models, we will be at risk of confounding richer pool and prehire better match processes.

Recruiters do appear to prefer referrals even after controlling the ob-

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versus not hired) using the Heckman (1979) model. Controlling selection does not introduce significant differences between referrals and nonreferrals in either turnover or wage growth.

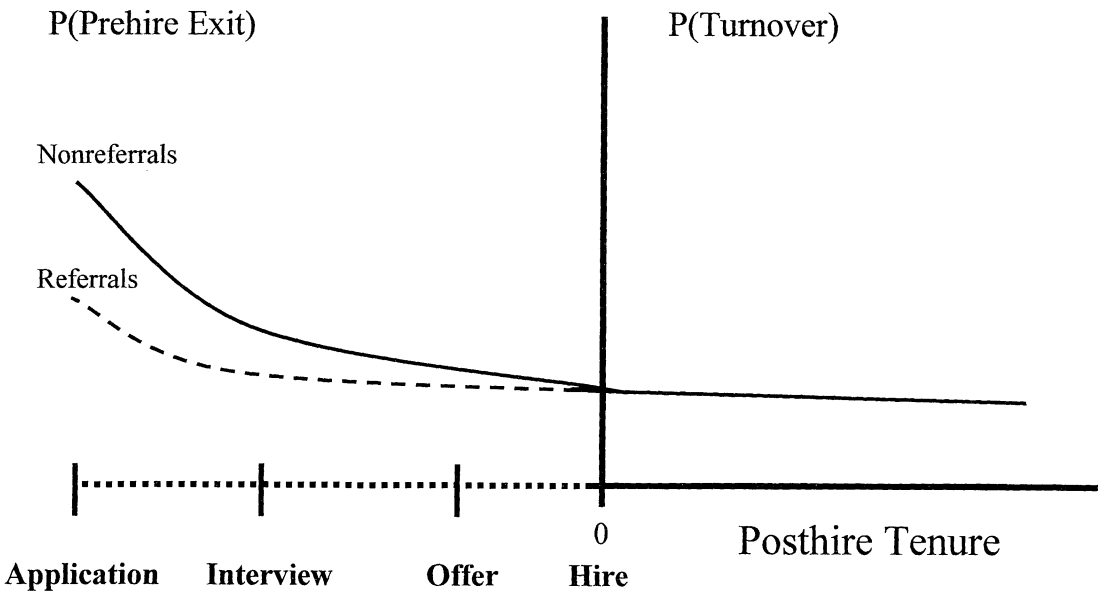


FIG. 4.—Graphical representation of turnover in a prehire better match theory

servable factors in model 2 of tables 7 and 8). This is consistent with a key tenet of a prehire better match account: that referrals are superior to nonreferrals on hard-to-observe characteristics. However, we also think that it is plausible that we have omitted a key variable from these models. Although the evidence is indirect, the data suggest that referrals interview better than nonreferrals (for evidence of this in a retail bank, see Fernandez and Weinberg [1997, pp. 895–98]). At application, referrals are 1.1 times more likely to receive interviews than nonreferrals (64.8% vs. 57.5%). However, referrals' advantages are most manifest post interview. Among interviewees, referrals are over 1.5 times more likely to receive a job offer than are nonreferrals (18.3% vs. 11.6%). Performance during interviews is something recruiters say they place greater emphasis on during screening, but we cannot control for that in these models. Therefore, we think it plausible that the significant coefficients for referral status in both the interview and offer equations reflect a referral advantage in "soft" interviewing skills (on "soft-skills," see Kirschenman and Neckerman [1991]).[42]

While we cannot easily dismiss the prehire version of the better match story, it is worth noting that our results do place some limits on how such an account could work in this setting. Figure 4 implies that referrals' advantages in terms of observables and unobservables should be greater at earlier rather than later phases of the hiring process. Yet, in our prehire analyses of hypotheses 3–6, we found no evidence that referrals' knowledge advantage over nonreferrals is greater at earlier rather than later stages of the screening process. While we clearly have not exhausted the list of possible unobservable factors, the information differences we did study include ones that would be commonly discussed as "unobservables" in a typical posthire study. To the extent that referrals have better "unobservables," at least in this setting, we can eliminate from consideration the factors listed in table 3. Also, in light of the evidence that PCHR makes no attempt to gather upstream information from the referrer (hypotheses 7–8), we can also eliminate from consideration one of the most important paths through which typically "unobserved" factors are presumed to affect the hiring process.

While we may have narrowed the list of possible omitted unobservable factors in this study, the conservative conclusion to draw is that referral status is proxying things that are unmeasured by us but observable to recruiters (i.e., omitted factors), as well as factors that are unobservable to recruiters. While the question of whether the pool is richer in observables or unobservables might be of theoretical interest, it is important to

[42] Recall that PCHR often conducts short interviews before deciding whether to pass on candidates to the hiring manager.

TABLE 10

KAPLAN-MEIER SURVIVAL ESTIMATES AT THE MIDWESTERN SITE FOR REFERRERS' STATUS

	Nonreferrals (1)	All Referrals (2)	Referrer Stays (3)	Referrer Leaves (4)
1 month	98.06	97.06	96.79	100.00
3 months	90.97	93.53	93.50	90.00
6 months	81.94	86.47	86.55	80.53
9 months	74.19	74.71	77.14	52.56
1 year	66.39	70.57	73.41	49.06
18 months	55.87	66.09	69.26	43.74
2 years	47.82	53.71	57.99	31.45
N of terminations	87	75	57	18

NOTE.—Log-rank test col. 1 vs. 2: $\chi^2 = 2.30$; $df = 1$; $P < .1292$. Log-rank test col. 1 vs. 3 vs. 4: $\chi^2 = 7.96$; $df = 2$; $P < .0187$. Log-rank test col. 3 vs. 4: $\chi^2 = 7.37$; $df = 1$; $P < .0066$. Log-rank test col. 1 vs. 3: $\chi^2 = 4.37$; $df = 1$; $P < .0422$. Log-rank test col. 1 vs. 4: $\chi^2 = 1.61$; $df = 1$; $P < .2045$.

realize that the mechanism that generates social capital returns to the firm are identical in either case. Whether referrals' advantages are manifest to recruiters (on observables) or operate behind their back (via unobservables), both imply that fewer screens are required to hire referral than nonreferral applicants. Both of these processes will yield the firm returns in the form of savings on recruiting costs. Consequently, we will suppress the distinction between the "mechanism 1 + mechanism 2" prehire better match account and the richer pool model when we discuss the company's return on social capital via savings in screening costs.

Mechanism 5: Posthire Social Processes

The social enrichment account of referral hiring argues that referral ties are a means by which referring employees seek to improve their social environment on the job. In this model, the connection between the new hire and the job is enriched by the existence of a prior friend or acquaintance that might ease the transition to a new job setting. We argued that to the extent that referring relationships have a social component, we should find interdependence between referrers' and referrals' chances of turning over (hypothesis 9).

We tested hypothesis 9 by examining whether the chances of referrals leaving increase when their referrer terminates employment at the company. We first used descriptive methods (examining Kaplan-Meier survival functions) to test whether the survival function for referrals whose referrer leaves is the same as that for referrals whose referrer has stayed with the company (table 10). We then introduced a number of controls

and estimated Cox models predicting the rate of termination (table 11).[43] For all these analyses, we coded the "referrer termed" as a time varying variable so that referrals whose referrers have not yet left are coded as 0 until after the referrer leaves (coded as 1). Therefore, the forth column of table 10 reports the Kaplan-Meier estimates of the referrals' survival chances at one month, three months, six months, nine months, and so on after the referrer leaves the firm.

Overall, referrals and nonreferrals do not differ significantly in their propensity to terminate (see the first and second columns of table 10; $P < .1292$; $\chi^2 = 2.30$; $df = 1$). Comparing columns 1 and 3 shows that referrals whose referrers stay are likely to survive longer than nonreferrals ($P < .0422$; $\chi^2 = 4.37$; $df = 1$), although the survival functions of nonreferrals and referrals whose referrer leaves (cols. 1 and 4) are not statistically different from one another ($P < .2045$; $\chi^2 = 1.61$; $df = 1$). However, distinguishing between the third and fourth columns shows statistically reliable evidence of interdependence between referrals' and referrers' turnover. Consistent with hypothesis 9, referrals whose referrer has left show a lower survival rate than referrals whose referrer has stayed ($P < .0066$; $\chi^2 = 7.37$; $df = 1$).

Table 11 presents several Cox models. The first column shows that referrals are not significantly different from nonreferrals in their propensity to turn over. The model in the second column adds a number of individual controls to show that the lack of a referral effect is not due to suppressors. Consistent with hypothesis 9, model 3 shows that referrals whose referrer has termed are more likely to terminate than nonreferrals (the reference category), and that referrals whose referrer has stayed are less likely to leave the company than nonreferrals ($P < .05$). Model 4 tests whether these effects are consistent after introducing several control variables. Supporting hypothesis 9, referrals whose referrer has terminated are significantly more likely to leave the firm than nonreferrals. However, after adding controls, the tendency for referrals whose referrers have stayed with the company to stay longer than nonreferrals is no longer statistically reliable. We reran model 5 with "referral whose referrer stays" as the omitted category in order to test whether referrals whose referrer has left show a lower survival rate than referrals whose referrer has stayed. Similar to the results in table 10, we found that the actions of the referrer significantly distinguish among referrals: referrals whose referrer has left show

[43] In preliminary analyses, we estimated other survival-time specifications (e.g., exponential survival time, Weibull, and piecewise-exponential models). The results reported here are consistent across these various specifications.

a significantly higher propensity to turn over than referrals whose referrer has stayed with the firm during our study; hypothesis 9 is supported.

It is clear that referral ties continue beyond the hiring process and have effects later on attachment to the firm. While we have found evidence of social enrichment, any or all of three social mechanisms could operate. (1) Referrers who leave may convey information about external job opportunities back to referrals. (2) The leaving of the referral in itself may be a piece of information prompting the referral to re-evaluate her own satisfaction with the current job. (3) The referrer's exit may reduce the quality of the work environment to an unsatisfactory level. In light of the evidence that a referrer's staying does not reduce turnover relative to nonreferrals (table 11, col. 4), the latter explanation of altering the work environment seems to be a weak candidate. Distinguishing between the first two explanations remains a task for future research.

We looked at the reciprocal effect that referrals had *upstream* on their referrers' turnover. If the social environment is enriched for referrals, it stands to reason that the referrers might also derive a benefit and that the loss of this benefit might prompt turnover. We explored the data for evidence of an upstream effect—referral turnover increasing the chances of referrer turnover (see table 11, cols. 5 and 6). Unfortunately, the study design hampers our ability to mount a robust test of this effect. In order to avoid problems of left censoring, we only looked at referrers who were themselves hired in our two-year hiring window ($N = 82$). Of the 119 referrals these people made, only 18 were hired, and of these, only 7 terminated. Models 5 and 6 add time-varying covariates—one for whether the referred person was hired and one for whether the referral terminated. Although these results are not statistically reliable, the results of these models are suggestive. Despite the lack of statistical power, the effect of the referral terminating in both models is in the predicted direction and approaches acceptable levels of statistical significance ($P < .08$, one-tailed test).

As a final bit of evidence regarding the social enrichment process in this setting, we interviewed PCHR personnel about what they thought were important posthire determinants of retention. PCHR staff are aware of the potential benefits of social enrichment processes. Prior to our study, they had been considering introducing a formal "buddy" system, where long-time employees are paired with new hires as a means of reducing turnover. The underlying theory is identical to that of the social enrichment process. As one trainer put it, "In our culture, it really matters that you have a friend on the job. It really helps in making the job more comfortable." This trainer did not specifically say that she thought the referrer might play an important role in this process. But when we probed about

TABLE 11

COX REGRESSION MODELS PREDICTING TERMINATION AT MIDWEST SITE

	1	2	3	4	5	6
Referral	−.238	−.081	−.348*	−.227	−.080	−.224
	(.157)	(.181)	(.167)	(.196)	(.182)	(.196)
Referrer terms[a]			.690*	.691*		.684*
			(.281)	(.296)		(.301)
Gender (1 = male)		.113		.091	.121	.099
		(.238)		(.240)	(.240)	(.240)
Marital status (1 = married)		−.360*		−.400*	−.360*	−.398*
		(.189)		(.192)	(.189)	(.192)
Education (1 = BA)		−.315		−.364	−.314	−.367
		(.280)		(.287)	(.276)	(.285)
Computer experience (1 = yes)		.225		.197	.209	.182
		(.246)		(.248)	(.245)	(.248)
Foreign language (1 = yes)		.503*		.527*	.506*	.531*
		(.235)		(.235)	(.235)	(.235)
No. of previous jobs		.037		.032	.040	.035
		(.077)		(.077)	(.077)	(.078)

Customer service experience (in months)		−.003		−.003	−.002	−.002
		(.002)		(.002)	(.002)	(.002)
Bank experience (in months)		.007*		.009*	.006	.008*
		(.004)		(.004)	(.004)	(.004)
Nonbank experience (in months)		−.008*		−.007*	−.008*	−.007*
		(.004)		(.004)	(.004)	(.004)
Nonbank experience, squared		.000027*		.000025*	.000027*	.000025*
		(.000008)		(.000009)	(.000008)	(.000008)
Working at application		.102		.056	.110	.059
		(.215)		(.218)	(.219)	(.222)
Last wage		−.030		−.024	−.029	−.023
		(.043)		(.044)	(.043)	(.044)
Referred person hired[a]					−.502	−.408
					(.645)	(.654)
Referred person terms[a]					1.136	1.106
					(.744)	(.739)
χ^2	2.30	26.19	7.60	29.38	31.61	35.16
df	1	13	2	14	15	16
$P <$	.1292	.0160	.0224	.0093	.0073	.0038
N	325	270	318	267	270	267
Terminations	163	132	161	130	132	130

NOTE.—SEs are given in parentheses.

[a] Time-varying covariate.

* $P < .05$, one-tailed test.

the possibility that the referrer might be acting as an informal "buddy," she said that this was "probably right."

THE RETURNS TO SOCIAL CAPITAL

Our analyses to this point have identified the paths through which the firm's investment in the social contacts of its employees operates in the hiring of new employees. We have found evidence of both the richer pool and social enrichment processes, but very little evidence of the posthire better match explanation of referral hiring at work in this firm. We now turn to the question of the dollar returns associated with these processes.[44]

We obtained cost estimates of various recruiting and training activities from PCHR personnel. PCHR social capital investment is $10 for each referral who is interviewed and $250 for each referral who is hired and remains with the firm 30 days. This is a net investment, since PCHR does not reduce any of their other recruiting activities due to the fact that the referral program is in place.[45] Although the number of PCSR job openings may vary over time, PCHR is constantly advertising for and screening PCSR candidates.

PCHR accounts for their screening expenses as follows. Each applicant screen (paper screening plus short telephone interview) costs $7.00. Each interview (conducted by one person from PCHR plus two line managers) costs $110. For a referral, the interview cost is $120, reflecting an additional $10 paid as a bonus to the referrer. Offering a job, including administrative cost, background check, and drug check, costs $200. PCHR accounts for advertising costs at the hire stage. Ads cost $800 per hire, and administrative costs add an additional $400 per hire. All new hires are required to go through seven weeks of classroom training and two weeks of on-the-job training. The wages and benefits paid to each new hire during training, $3,930, plus the cost of training—materials and trainers' time—$1,012, for a total of $4,942.

The richer pool arguments predict that employers will save on screening costs due to the fact that referrals are more appropriate candidates at application. This implies that fewer screens will be required to produce

[44] As an anonymous reviewer pointed out, a full analysis of social capital returns would require us to compare the returns generated under the current program with a hypothetical null program that paid zero, something we cannot do here. Our goal in this exercise is more limited. The cost accounting numbers we report below traces the expenses that PCHR experiences under its current practices. While we cannot compare these expenses to other hypothetical systems, we can compare the costs and benefits associated with hiring referrals and nonreferrals under their current arrangement and cost-allocation scheme. For what it is worth, this is the standard that PCHR managers use in judging whether their money was well spent.

[45] This is important for establishing the baseline cost figures.

TABLE 12

DOLLAR SAVINGS IN SCREENING COSTS ASSOCIATED WITH HIRING VIA THE "RICHER POOL" MECHANISM FOR EACH STAGE OF THE HIRING PROCESS

	Referrals	Nonreferrals	Savings
Application screening:			
Cost per screen	7.00	7.00	...
Screens per candidate interview	1.547	1.744	...
Cost per candidate interview	10.83	12.21	1.38
Interview:			
Cost per interview	120.00	110.00	...
Interviews per candidate offer	5.494	8.645	...
Cost per candidate offer	659.34	950.99	291.65
Offer:			
Cost per offer	200.00	200.00	...
Offers per candidate hire	1.064	1.110	...
Cost per candidate hire	212.87	221.94	9.07

NOTE.—All costs are given in dollar amounts.

one hire among referrals than nonreferrals. In calculating the firms' return on investment, we first decompose the savings into the screening, interview, and offer stages (table 12). Beginning with the screening stage, 64.8% of referrals are granted interviews, compared with 57.5% of nonreferrals, a difference that is statistically significant (see discussion of hypothesis 7 above). This implies that 1.547 (1/.648) screens are required to produce one interview for referrals, compared with 1.744 (1/.575) screens for nonreferrals. At an average cost of $7.00, referrals cost $1.38 less than nonreferrals to produce one interview. This suggests that PCHR is losing money at the application screening stage: the $1.38 savings due to referrals being from a richer pool of applicants does not outweigh the additional outlay of $10 to the referrer. In contrast, referrals show a considerable advantage at the interview stage. Among interviewees, referrals are offered jobs at a significantly higher rate than nonreferrals: 18.2% versus 11.6%. In terms of interviews required to produce one offer, among referrals, 5.494 interviews are required versus 8.645 interviews for nonreferrals. It costs $291.65 less to find a hireable person among referral than nonreferral interviewees. Virtually all offers are accepted, but the statistically insignificant difference between referrals' and nonreferrals' acceptance rate (94.0% vs. 90.1%) leads to referrals being $9.07 less expensive per hire.

While it is instructive to see the cost savings by stage, these numbers cannot simply be added to yield overall cost savings in hiring because they are not expressed in the same units. In table 13, we recalculated the

TABLE 13

PER HIRE DOLLAR SAVINGS ASSOCIATED WITH HIRING REFERRALS VIA THE "RICHER POOL" MECHANISM FOR EACH STAGE OF THE HIRING PROCESS

	Referrals	Nonreferrals	Savings
Application screening:			
Cost per screen	7.00	7.00	...
Total screens per hire	9.043	16.735	...
Total screening cost per hire	63.33	117.15	53.82
Interview:			
Cost per interview	120.00	110.00	...
Total interviews per hire	5.846	9.596	...
Total interview cost per hire	701.75	1,055.29	355.54
Offer:			
Cost per offer	200.00	200.00	...
Total offers per hire	1.064	1.110	...
Total offer cost per hire	212.87	221.94	9.07
Total costs per hire	977.95	1,394.37	416.43
Referral bonus (investment)	250.00	...	...
Total costs	1,227.95	1,394.37	166.43*

NOTE.—All costs are given in dollar amounts.
* Net benefit = 66% return on investment.

screening, interview, and offer costs on a per-hire basis. For referrals, the screening costs per hire are $63.33, interview costs are $701.75, and offer costs are $212.87, for a total of $977.95 per hire. The corresponding figures for nonreferrals are $117.15, $1,055.29, and $221.94, for a total cost per hire of $1,394.37. The total difference between referrals and nonreferrals is $416.43 per hire; 85% of the savings are associated with the interview stage. The $416.43 difference yields a 66.6% return on the firm's $250 incremental outlay in the form of the referral bonus. Thus, the firm's social capital investment is justified based on the prehire richer pool process.

We next consider the posthire better match process. As we argued above, to the extent that there are returns associated with better posthire matches, they should manifest themselves in referrals showing lower turnover rates in this setting.[46] Although posthire turnover outcomes show no significant differences between referrals and nonreferrals, we examined the cost implications of the statistically insignificant difference of 4.2%.[47]

[46] While we have not examined performance outcomes, PCHR personnel are convinced that turnover costs would dominate any performance differences by recruitment source.

[47] In all these calculations, we are using the one-year Kaplan-Meier point estimates from table 10.

PCHR calculates its posthire costs (consisting of advertising, administrative, and training costs) to be $6,142. For every 100 people hired in each category, 29.4 referrals and 33.6 nonreferrals will not survive to one year. Thus, the annual per person costs of replacing these losses is $1,808 for referrals (.294 × $6,142) and $2,064 (.336 × $6,142). This yields cost savings of $257 in favor of referrals. So, our best estimate of turnover differences associated with recruitment source shows no practical or statistically reliable return on the $250 investment vis-à-vis the better match mechanism. In fact, the data for the other phone centers (table 9) show that the return via this process could easily be negative: two of the other phone centers show lower turnover rates for *nonreferrals* at one year.

In contrast, there are much larger financial differences associated with the social enrichment process. Referrals do not differ from nonreferrals in turnover, but there is significant heterogeneity among referrals in turnover depending on the behavior of their referrer. Our estimate of the difference in turnover probability between referrals whose referrer stays versus goes is 24.3% (73.4 vs. 49.1; table 10). This implies that referrals whose referrer leaves have an annual replacement cost of $3,129, not including the cost of replacing the referrer. Referrals whose referrer stays have an annual replacement cost of $1,633. For every new hire that can be converted from the "referrer leaves" to the "referrer stays" column of table 10, PCHR can save $1,496 in replacement costs. However, it is important to note that these are *potential* savings: the bank does not currently realize them. The $1,496 figure, however, does show that the bank has a large incentive to try to change the behavior of referrers because of the downstream social effects on referrals' turnover propensity. Moreover, this is probably a conservative estimate since downstream effects may extend beyond referral chains of length one. Indeed, we found that 43 referral hires became referrers themselves, successfully producing 5 referral hires in our two-year hiring window.

We conclude this discussion of the returns to social capital by considering the practical implications of our findings. Much as basic knowledge of capital markets allows one to design investment instruments that produce financial returns, we should be able to craft investment strategies for those seeking to trade in social capital. Indeed, the extent of our understanding of these processes is likely to be revealed in our ability to offer such concrete policy recommendations. In light of the large unrealized returns we document above, we focus our suggestions on the social enrichment process.

At the most general level, in attempting to use the social enrichment process for its own ends, PCHR should find ways to increase the referrer-referral relations that cut in its favor. First, the bank could bias their

hiring of referrals in favor of referrers who are likely to stay with the bank, for example, by giving special preference to referrals from long-time employees. This could have two effects, a direct effect of decreasing turnover propensity via the better match mechanism, and an indirect effect of increasing the social support available to the referral. Of course, looking upstream at the characteristics of the referrers will increase the screening cost of hiring referrals. Whether the benefits from reduced turnover via these processes would justify the added costs is an empirical question.

Second, the line managers could be more responsive to the sentiments of referrers, people who are likely to improve the working environment of those they have referred. Our findings suggest that efforts at improving referrers' attachment to the firm will likely pay dividends in the form of reduced downstream turnover. And, to the extent that referrers are originators of referral chains, their opinions are likely to have a disproportionate effect on others.

Third, management could change the timing and structure of the payout to the referrer. One crude change would be lengthening the period the referral must stay before the referrer receives the payout from the current one month. Whether changes along this margin will significantly affect referrers' behavior is an empirical question. Alternatively, the firm's management might seek to fine-tune the payout. Referrers could receive a bonus for every month that the referred person stays with the company. This would have the effect of rewarding those social enrichment actions (e.g., "buddying") that result in higher retention. Another option would exploit the fact that referrals tend to refer others. Modeling the sales practices of some direct sales organizations (see Biggart 1990), PCHR might pay referrers an additional small bonus based on the retention of referrals made by the people they refer. Of course, administering such a system would no doubt add to the cost of hiring from the referral pool and, therefore, will come at the expense of the savings due to the richer pool mechanism.

Finally, managers could try and stem the downstream effects of referrers who leave. Managers could identify and then target retention efforts at referrals that are at high risk of turnover because their referrers have left. In contrast to the strategies (discussed in this article) where the firm harnesses employees' existing social connections for its own ends, this strategy amounts to investing in the selective *breaking* of social ties. While this is certainly a way of managing social capital for the firm's benefit, it must be recognized that such attempts to reshape their employees' social networks run the risk of being perceived by organizational participants as having gone beyond the line of legitimate management activities.

SUMMARY AND CONCLUSION

We argued that a common organizational practice—the hiring of new workers via employee referrals—provides key insights into the notion of social capital. Employers who use such hiring methods are quintessential "social capitalists," viewing workers' social connections as resources in which they can invest in order to gain economic returns in the form of better hiring outcomes. We identified three ways through which such returns might be realized: the richer pool, the better match, and the social enrichment mechanisms. We developed a set of falsifiable hypotheses that distinguish among these accounts. Using unique data on hiring from a bank's credit card phone center, we found support for the richer pool process. However, we have found scant evidence for the posthire better match story, which explains referral hiring as due to improving the firm's ability to pluck socially isolated individuals from the pool of applicants. We did, however, find evidence supporting the social enrichment process. Consistent with our prediction, we observed interdependence of turnover between referrers and referrals, a process that is not predicted by the socially atomistic better match theory.

We asserted that if social capital is to be more than a metaphor, analysts must identify the investment costs, the rate of return, and the means by which returns are realized. Using unique company data on the dollar costs of screening, hiring, and training, we found that the firm's investment in the social capital of its employees yields significant economic returns. These returns are realized by savings in screening costs due to referrals being more appropriate for the job at application (i.e., the richer pool mechanism). The firm's $250 investment (in the form of a referral bonus) yields a return of $416 in reduced recruiting costs, a rate of return of 67%. While there is clear evidence of a net benefit to the firm in recruiting referrals via the richer pool process, we found very little evidence consistent with the better match account. Referrals have no better information about the job than do nonreferrals, and recruiters have no better information about referral than nonreferral applicants. Also, contrary to the predictions of the better match theory, nonreferrals are no more likely to turn over than referrals. Consequently, the better match process does not produce significant returns to the firm's social capital investment.

Nor did we find returns associated with the social enrichment process. Although referrals and nonreferrals do not differ on average in their propensity to turn over, referrals recruited by employees who stay with the firm are more likely to stay with the company than referrals whose referrer leaves the company. To the extent that the firm can manage this interdependence between referrers and referrals, we estimate that the potential returns to the firm are very large. However, in this case, the firm does not

realize these returns. While this firm has clearly missed an opportunity, we suggested ways in which the firm might better manage the interdependence between referrers and their referrals in order to realize returns via the social enrichment process.

This article has made a number of important contributions to the theoretical bases of economic sociology. First, we see this work as an important contribution to the literature on the socially embedded nature of economic processes (Granovetter 1985). We have sought to clarify the various competing explanations of the referral-hiring phenomenon in a fair, dispassionate, and interdisciplinary manner. We suggest that such comparisons are required if we are to make progress clearing away the theoretical ambiguities in discussions of the socially embedded nature of economic life. Much has been written regarding the relationship between the disciplines of sociology and economics (see Baron and Hannan 1994; Hirsch, Michaels, and Friedman 1987). Economists have tended to adopt a "clean model" approach focusing on the logical implications of theory, while sociologists have been guided by a "dirty hands," more empirically grounded approach to theory. As we see it, both approaches have serious limitations unless there is genuine engagement across the disciplinary divide. Especially in the context of a burgeoning field of economic sociology, empirical research without reference to economists' explanations runs a serious risk of preaching only to the choir of the sociological faithful and forgoes the potentially valid insights of the disfavored outgroup. Sociologists can do better when considering economists' theories of labor market processes (see Baron and Hannan 1994). In this article, we have given serious consideration to economists' favored explanation—the better match account—of the referral hiring phenomenon. We offer this article as a "high road" attempt at interdisciplinary engagement with labor economics.

For our economist colleagues, we would like to argue for the benefits of an empirically grounded, case-study approach for shedding light on concrete organizational processes. While the pure theory approach may have the advantage of simplifying phenomena in order to render them more easily understandable, ungrounded theories can blind one to empirically important competing processes. One of the earliest proponents of the better match theory missed clear traces of the social enrichment process in his own data. Ullman (1966) noted that some employers avoid hiring via referrals because of "problems with cliques." The possibility that "problems with cliques" might indicate that posthire social processes between referrers and referrals are not guaranteed to work in the employers' favor did not occur to Ullman. Ullman chose to focus on the turnover implications of referral hiring, "black-boxing" the information transfer process at the heart of the better match process, and to ignore "problems with cliques." The fact is that the discipline of economics has been blind

to the implications of "problems with cliques" for referral hiring. And in the 30 years of research after Ullman published his paper, our research is the first to open up the information transfer processes that have been black boxed by their better match theory and to empirically address competing models of the referral hiring phenomenon. We suggest that it is only by close study of a particular case that we have been able to sharpen the theoretical implications of the various theories to the point that they can be distinguished analytically.

The second major theoretical contribution we offer is with respect to the literature on social capital. In this article, we have sought to take the concept of social capital out of the metaphorical realm. We accomplished this goal by tracing the levels of both investment and returns in real dollar terms and by associating these with concrete social processes occurring during hiring and employment. Further, we drew out the implications for practice by examining a number of ways in which the firm might garner returns via the social enrichment process. As such, this article moves the concept of social capital to an unprecedented level of theoretical clarity and empirical specificity, thus raising the bar for future work employing the idea of social capital.

Finally, this work also has important methodological implications for future research. We have significantly advanced understanding of the important phenomenon of referral hiring by surfacing the role of hitherto neglected features. While we cannot address the generalizability of these findings with our approach, it is important to realize that for many of the hypotheses we test here, *no empirical evidence has ever been offered.* Especially in a crowded field like economic sociology where the competing theories often yield similar predictions, it is only by close study of particular cases that we will be able to sharpen the theoretical implications of the various theories to the point that they can be distinguished analytically. Therefore, we argue that for this area the most productive research strategy is one that has as its goal *depth* of knowledge of particular cases, before pursuing questions of the *breadth* of knowledge, that is, the generalizability of these processes across settings. While we would expect that there will be some contingency in the ways the referral hiring process works in different settings, findings from this research will be very useful in focusing the kinds of information we should pursue in broad-gauge research designed to represent populations of organizations. For example, when studying hiring using organizational surveys, our research suggests that asking recruiters whether they contact referrers would shed light on the better match process. Likewise, for labor market–side surveys, it would be theoretically beneficial to ask referrals whether referrers explained the job to them. For surveys of hired workers, asking referrals what they expect from referrers, and whether anyone (including referrers)

may have helped them in a new job, would be helpful for measuring post-hire social enrichment. Thus, our empirically grounded, case-study approach has also served to illuminate directions for future research. By shedding light on the concrete organizational processes by which firms may harness their employees' social networks, we suggest that this article should stand as a model for the further theoretical development in the field of economic sociology.

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