The Contingent Value of Social Capital

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I present argument and evidence for a structural ecology of social capital that describes how the value of social capital to an individual is contingent on the number of people doing the same work. The information and control benefits of bridging the structural holes—or, disconnections between nonredundant contacts in a network—that constitute social capital are especially valuable to managers with few peers. Such managers do not have the guiding frame of reference for behavior provided by numerous competitors, and the work they do does not have the legitimacy provided by numerous people doing the same kind of work. I use network and performance data on a probability sample of senior managers to show how the value of social capital, high on average for the managers, varies as a power function of the number of people doing the same work.●

Some people enjoy higher incomes than others. Some are promoted faster. Some are leaders on more important projects. The human capital explanation is that inequality results from differences in individual ability. The usual evidence is on general populations, as is Becker's (1975) pioneering analysis of income returns to education, but the argument is widely applied by senior managers to explain who gets to the top of corporate America—managers who make it to the top are smarter or better educated or more experienced. But, while human capital is surely necessary to success, it is useless without the social capital of opportunities in which to apply it.

Social capital can be distinguished in its etiology and consequences from human capital (e.g., Coleman, 1990; Bourdieu and Wacquant, 1992; Burt, 1992; Putnam, 1993; Lin, 1998). With respect to etiology, social capital is a quality created between people, whereas human capital is a quality of individuals. Investments that create social capital are therefore different in fundamental ways from the investments that create human capital (Coleman, 1988, 1990). I focus in this paper on consequences, a focus in network analysis for many years (Breiger, 1995). With respect to consequences, social capital is the contextual complement to human capital. Social capital predicts that returns to intelligence, education, and seniority depend in some part on a person's location in the social structure of a market or hierarchy. While human capital refers to individual ability, social capital refers to opportunity. Some portion of the value a manager adds to a firm is his or her ability to coordinate other people: identifying opportunities to add value within an organization and getting the right people together to develop the opportunities. Knowing who, when, and how to coordinate is a function of the manager's network of contacts within and beyond the firm. Certain network forms deemed social capital can enhance the manager's ability to identify and develop opportunities. Managers with more social capital get higher returns to their human capital because they are positioned to identify and develop more rewarding opportunities.

I begin with an introduction to the network structure of social capital and evidence of social capital's effect on manager success. Given baseline evidence of social capital's value to

the average manager, I turn to the issue of how its value to individual managers is contingent on the number of people doing the same work.

THE NETWORK STRUCTURE OF SOCIAL CAPITAL

Structural hole theory gives concrete meaning to the concept of social capital. The theory describes how social capital is a function of brokerage opportunities in a network. The following is a brief synopsis sufficient to set the stage for arguing contingency (see Burt, 1992, for detailed discussion). The structural hole argument draws on several lines of network theorizing that emerged in sociology during the 1970s, most notably, Granovetter (1973) on the strength of weak ties, Freeman (1977) on betweenness centrality, Cook and Emerson (1978) on the power of having exclusive exchange partners, and Burt (1980) on the structural autonomy created by network complexity. More generally, sociological ideas elaborated by Simmel (1955) and Merton (1968), on the autonomy generated by conflicting affiliations, are mixed in the structural hole argument with traditional economic ideas of monopoly power and oligopoly to produce network models of competitive advantage. In a perfect market, one price clears the market. In an imperfect market, there can be multiple prices because disconnections between individuals, holes in the structure of the market, leave some people unaware of the benefits they could offer one another. Certain people are connected to certain others, trusting certain others, obligated to support certain others, dependent on exchange with certain others. Assets get locked into suboptimal exchanges. An individual's position in the structure of these exchanges can be an asset in its own right. That asset is social capital, in essence, a story about location effects in differentiated markets. The structural hole argument defines social capital in terms of the information and control advantages of being the broker in relations between people otherwise disconnected in social structure. The disconnected people stand on opposite sides of a hole in social structure. The structural hole is an opportunity to broker the flow of information between people and control the form of projects that bring together people from opposite sides of the hole.

Information Benefits

The information benefits are access, timing, and referrals. A manager's network provides access to information well beyond what he or she could process alone. It provides that information early, which is an advantage to the manager acting on the information. The network that filters information coming to a manager also directs, concentrates, and legitimates information received by others about the manager. Through referrals, the manager's interests are represented in a positive light, at the right time, and in the right places.

The structure of a network indicates the redundancy of its information benefits. There are two network indicators of redundancy. The first is cohesion. Cohesive contacts—contacts strongly connected to each other—are likely to have similar information and therefore provide redundant information benefits. Structural equivalence is the second indicator. Equivalent contacts—contacts who link a manager to the

same third parties—have the same sources of information and therefore provide redundant information benefits.

Nonredundant contacts offer information benefits that are additive rather than redundant. Structural holes are the gaps between nonredundant contacts (see Burt, 1992: 25–30, on how Granovetter's, 1973, weak ties generalize to structural holes). The hole is a buffer, like an insulator in an electric circuit. A structural hole between two clusters in a network need not mean that people in the two clusters are unaware of one another. It simply means that they are so focused on their own activities that they have little time to attend to the activities of people in the other cluster. A structural hole indicates that the people on either side of the hole circulate in different flows of information. A manager who spans the structural hole, by having strong relations with contacts on both sides of the hole, has access to both information flows. The more holes spanned, the richer the information benefits of the network.

Figure 1 provides an example. James had a network that spanned one structural hole. The hole is the relatively weak connection between the cluster reached through contacts 1, 2, and 3 and the cluster reached through contacts 4 and 5. Robert took over James's job and expanded the social capital associated with the job. He preserved connection with both clusters in James's network but expanded the network to a more diverse set of contacts. Robert's network, with the addition of three new clusters of people, spans ten structural holes.

Figure 1. Illustrative managers' networks.*
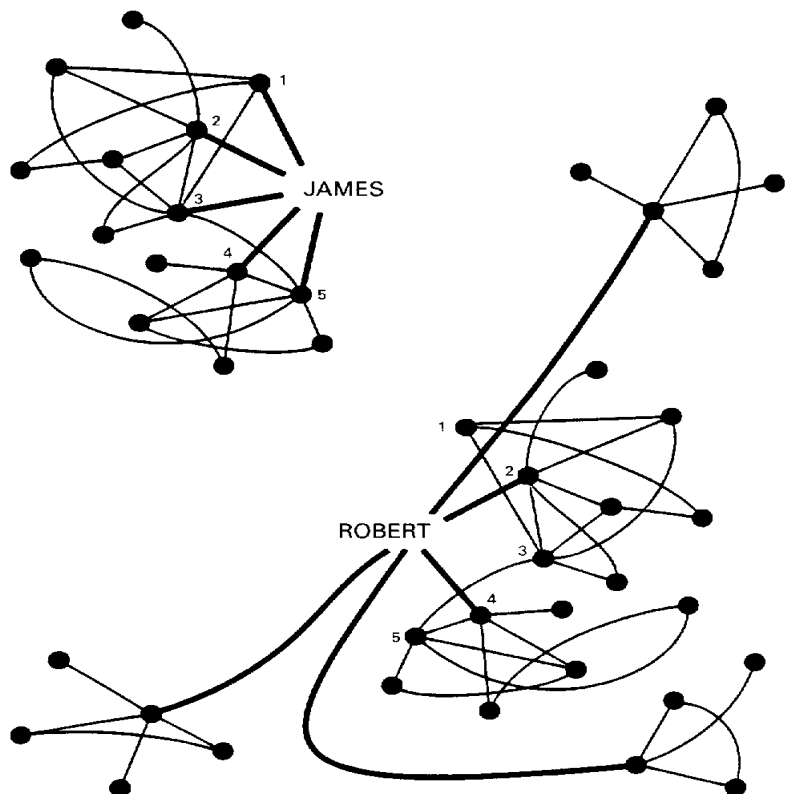
*Thick lines represent a manager's direct contacts.

Information benefits in this example are enhanced in several ways. The volume is higher in Robert's network simply because he reaches more people indirectly. Also, the diversity of his contacts means that the quality of his information benefits is higher. Each cluster of contacts is a single source of information because people connected to one another tend to know the same things at about the same time. Nonredundant clusters provide Robert with a broader information screen and, therefore, greater assurance that he will be informed of opportunities and impending disasters (access benefits). Further, since Robert's contacts are only linked through him at the center of the network, he is the first to see new opportunities created by needs in one group that could be served by skills in other groups (timing benefits). He stands at the crossroads of social organization. He has the option of bringing together otherwise disconnected individuals in the network when it would be rewarding. And because Robert's contacts are more diverse, he is more likely to be a candidate for inclusion in new opportunities (referral benefits). These benefits are compounded by the fact that having a network that yields such benefits makes Robert more attractive to other people as a contact in their own networks.

Control Benefits

The manager who creates a bridge between otherwise disconnected contacts has a say in whose interests are served by the bridge. The disconnected contacts communicate through the manager, giving the manager an opportunity to adjust his or her image with each contact, which is the structural foundation for managerial robust action (Padgett and Ansell, 1993). Simmel and Merton introduced the sociology of people who derive control benefits from structural holes: The ideal type is the *tertius gaudens* (literally, "the third who benefits"), a person who benefits from brokering the connection between others (see Burt, 1992: 30–32, for review). As the broker between otherwise disconnected contacts, a manager is an entrepreneur in the literal sense of the word—a person who adds value by brokering the connection between others (Burt, 1992: 34–36; see also Martinelli, 1994). There is a tension here, but not the hostility of combatants. It is merely uncertainty. In the swirling mix of preferences characteristic of social networks, where no demands have absolute authority, the *tertius* negotiates for favorable terms. Structural holes are the setting for *tertius strategies,* and information is the substance. Accurate, ambiguous, or distorted information is strategically moved between contacts by the *tertius.* The information and control benefits reinforce one another at any moment in time and cumulate together over time.

Networks rich in structural holes present opportunities for entrepreneurial behavior. The behaviors by which managers develop these opportunities are many and varied, but the opportunity itself is at all times defined by a hole in the social structure around the manager. In terms of the structural hole argument, networks rich in the entrepreneurial opportunities of structural holes are entrepreneurial networks, and entrepreneurs are people skilled in building the interpersonal bridges that span structural holes.

Predicted Social Capital Effect

Managers with contact networks rich in structural holes know about, have a hand in, and exercise control over the more rewarding opportunities. They monitor information more effectively than it can be monitored bureaucratically. They move information faster, and to more people, than memos. These entrepreneurial managers know the parameters of organization problems early. They are highly mobile relative to people working through a bureaucracy, easily shifting network time and energy from one solution to another. More in control of their immediate surroundings, entrepreneurial managers tailor solutions to the specific individuals being coordinated, replacing the boiler-plate solutions of formal bureaucracy. There is also the issue of costs: entrepreneurial managers offer inexpensive coordination relative to the bureaucratic alternative. Managers with networks rich in structural holes operate somewhere between the force of corporate authority and the dexterity of markets, building bridges between disconnected parts of the firm where it is valuable to do so. They have more opportunity to add value, are expected to do so, and are accordingly expected to enjoy higher returns to their human capital. The prediction is that in comparisons between otherwise similar people like James and Robert in Figure 1, it is people like Robert who should be more successful.[1]

Evidence of the Predicted Effect

Three lines of empirical evidence emerged in sociology during the 1970s to support the prediction. First, laboratory experiments have been used to show that resources distributed through a small-group exchange network accumulate in people with exclusive exchange relations to otherwise disconnected partners (e.g., Cook and Emerson, 1978; Cook et al., 1983; Markovsky, Willer, and Patton, 1988). Second, census data have been used to describe how producer profit margins increase with structural holes in the producer network of transactions with suppliers and customers. Burt (1983) described the association in 1967 with profits in American manufacturing markets, defined at broad and detailed levels of aggregation, and extended the results into nonmanufacturing through the 1960s and 1970s (Burt, 1988, 1992). Burt, Yasuda, and Guilarte (1996) extended the results through the 1980s. Using profit and network data on markets in other countries, similar results have been found in Germany during the 1970s and 1980s (Ziegler, 1982; Burt and Freeman, 1994), Israel during the 1970s (Talmud, 1994), Japan in the 1980s (Yasuda, 1993), and Korea in the 1980s (Jang, 1997).

Third, and most relevant to the evidence to be presented here, survey data have been used to describe the career advantages of having a contact network rich in structural holes. The earliest and most widely known study is Granovetter's (1973, 1995) demonstration that white-collar workers find better jobs faster through weak ties that bridge otherwise disconnected social groups. Lin worked with several colleagues to present evidence of the importance of ties to distant contacts for obtaining more desirable jobs (e.g., Lin, Ensel, and Vaughn, 1981; Lin and Dumin, 1986; Lin, 1998).

[1]
I focus on rewards to the individual manager (Brass, 1992; Lazega, 1994; Breiger, 1995, review related works). I assume that managers with entrepreneurial contact networks add value to their firm and therefore receive from the firm compensation, in one form or another, that is above average. The more general argument describes how the firm is shaped by managers searching for early information to resolve corporate and market uncertainties (see Stinchcombe, 1990).

Similar empirical results appear in Campbell, Marsden, and Hurlbert (1986), Marsden and Hurlbert (1988), and Flap and De Graaf (1989). Moving to the top of organizations, Burt (1992) and Podolny and Baron (1997) presented survey evidence from probability samples of managers showing that senior managers with networks richer in structural holes are more likely to get promoted early. Working with more limited data, Gabbay (1996) showed how promotions occur more quickly for salespeople with strong-tie access to structural holes (cf. Meyerson, 1994; Pennings, Lee, and Witteloostuijn, 1997), and Sparrowe and Popielarz (1995) innovatively reconstructed past networks around managers to estimate an event-history model of how structural holes in yesterday's network affect the likelihood of promotion today. The benefits that accrue to individuals aggregate to the management teams on which they serve. Studying quality management teams in several midwestern manufacturing plants, Rosenthal (1996) showed that the teams composed of employees with more entrepreneurial networks were significantly more likely to be recognized for their success in improving the quality of plant operations (cf. Krackhardt and Stern, 1988, on higher group performance with cross-group friendships between students, and Fernandez and Gould, 1994, on organizations in broker positions within the national health policy arena being perceived as more influential).[2]

There is a process element missing in the above studies that can be seen in other styles of analysis. Gargiulo and Benassi (1993) directly measured what they termed "coordination failure" as the extent to which the people with whom a manager consults are not the people relevant for the manager's assigned projects. With data on managers in a research consulting unit of a large Italian firm, they showed that coordination failures are significantly more likely for managers with small, dense, hierarchical networks. For rich detail on the brokerage process, historical accounts of individual entrepreneurs offer a glimpse of the process by which brokers have built bridges across structural holes (e.g., DiMaggio, 1992: 129–130; Padgett and Ansell, 1993). Direct observation offers the richest detail. Kotter's (1982) cases illustrate the information and control advantages of an entrepreneurial network in performing the two tasks of the successful general manager: reading the organization for needed business policy and knowing which people to bring together to implement the policy. Mintzberg (1973) is similarly rich in case material on the central importance to managers of getting their information live, through personal discussions rather than through official channels. Sutton and Hargadon (1996) and Hargadon and Sutton (1997) describe a firm, IDEO, that relies on brainstorming to create product designs. The firm's employees work for clients in diverse industries. In the brainstorming sessions, technological solutions from one industry are taken to solve client issues in other industries where the solutions are rare or unknown. The firm profits from brokering the flow of technology between industries (cf. Allen and Cohen, 1969, on gatekeepers). Sutton and Hargadon's evidence on IDEO offers process detail that corroborates the more authoritative but static survey evidence of the social capital value of structural holes.

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These results are consistent with Coleman's (1988, 1990) use of a network metaphor to motivate his social capital explanation of why certain children perform better in school. Children perform better if they have a constrained network in which friends, teachers, and parents are all strongly connected to one another so as to eliminate entrepreneurial opportunities for the child to play contacts against one another. The imagery is the same as in structural hole theory: a small network of interlocked relations constrains action. Constraint from parents and teachers has positive long-term consequences for children, forcing them to focus on their education (cf. Hirschi, 1972, on the negative consequences of network constraint from delinquent friends). At some point on the way to adulthood, however, the child shaped by the environment takes responsibility for shaping the environment. Constraint, positive for the child, is detrimental to adults, particularly adults charged with managerial tasks at the top of their firm (see Portes and Landolt, 1996, for more diverse examples).

Contingent Value

The argument explaining why structural holes are valuable as social capital implicitly defines when and where they are valuable. The key context variable is number of peers. A number of people can do the same work as any given manager in an organization. These are the manager's peers. The manager could have a large number of peers, a few, or none, if he or she is the only person doing a particular kind of work.

Number of peers and the value of social capital are connected through competition and legitimacy (Belliveau, O'Reilly, and Wade, 1996, on the significance of relative social capital among peers). Having many peers affects the manager's freedom to define his or her job and the firm's response to the manager's definition. First, the many peers create a competitive frame of reference. Their aggregate behavior indicates how the manager should perform, and peer competition keeps the manager tuned to peers' job performance. Beyond informal pressures to conform, the firm is likely to provide guidelines for jobs held by a large number of employees. Second, legitimacy is established by many people doing the same work. The way in which the job is performed is legitimate because many people perform it that way (e.g., economists in a business school).

The two conditions are reversed for a manager who has few peers: First, there is no competitive frame of reference. It would be inefficient for the firm to define how a job peculiar to a few employees should be performed, and there are no peers for informal guidance. The manager has to figure out for him- or herself how best to perform the job (see Kohn and Schooler, 1983, on occupational self-direction). Second, legitimacy does not come with the job; it has to be established. With few people doing the work, establishing the legitimacy of a manager's job performance depends on getting others to accept his or her definition of the job (e.g., sociologists in a business school).

Social capital is more valuable to the manager with few peers. The information and control benefits of structural holes position managers better to read the diverse interests in their organization to define needed policy and to know who can be brought together productively to implement policy. The ability to identify and develop opportunities is essential to the manager evaluating how best to fulfill his or her job responsibilities in a way valued by the firm and the market. That has little value to a manager whose work is defined by corporate convention or the boss. In short, the value of social capital to a manager should be contingent on the number of the manager's peers.

The contingency argument is both structural and ecological. Structural holes among people who are similar allow outsiders to play the people against one another, which erodes the value of whatever social capital they hold (Burt, 1992: 44–45). A manager's ability to develop entrepreneurial opportunities is constrained by the presence of one or more peers in a position to undercut or denigrate the manager's proposals. The contingency argument is also analogous to ecological arguments describing the competition and legitimacy conse-

quences of an increasing number of organizations in a market (Hannan and Freeman, 1989: 131–141; Burt, 1992: 215ff.; Han, 1993, 1994). I focus on the network implications of numbers here, but the competition and legitimacy mechanisms are familiar from research in organization demography (e.g., Pfeffer, 1983; Haveman and Cohen, 1994). I study the contingency effect within an ecological framework because the framework provides a concrete measure of constraint—number of peers—but remain mindful of the structural argument. Number of peers per se does not affect the value of social capital. The causal variables are competition and legitimacy, which are correlated with number of peers. The contingency prediction is that peers erode the value of social capital to the extent that disorganization among peers intensifies competition between the peers and elicits behavioral guidelines from higher authority. Ceteris paribus, number of peers should be an acceptable indicator.

METHOD

I use two kinds of evidence to make my case for the contingent value of social capital. First, I use network and performance data on a probability sample of managers drawn from the senior ranks of a large electronics firm. The partial correlation between performance and a network measure of social capital, holding background variables constant, establishes a baseline average value of social capital. The stronger the correlation, the higher the value of social capital for the average manager in the study population. In the baseline results below, I show associations between social capital and early promotion in manufacturing, and then I use a different data set on bank officers to show a similar association with large bonuses. Second, I use data on the manufacturing managers to compare managers with different numbers of peers to show how the value of social capital varies with number of peers. If the contingency argument is correct, then the value of social capital should be lower for managers with more peers.

Data

I collected network, background, and performance data on 170 men in senior positions at the end of 1989 with one of the largest American firms in electronic components and computing equipment. The firm employed more than 100,000 people at the time. The 170 men analyzed here are a probability sample of the 2,500 men in the three ranks just below the rank of vice president (women are a minority at 12 percent of this study population and are analyzed elsewhere, in Burt, 1997b). Although the managers are all employed in the same firm, they are a heterogeneous sample in the sense that they are scattered across the country, with zero to 30 years in the firm's diverse corporate functions.The data come from company personnel records and a short network survey. The company personnel records provided each manager's rank (three levels defined by the firm), when he was promoted to his current rank, when he entered the firm, the function in which he works (defined by the firm as sales, service, manufacturing, information systems, engineering, marketing, finance, and human resources), and the usual personnel-file variables such as gender, family, income, and

so on. The sampling and network survey items are described in detail elsewhere (Burt, 1992: 118–131). On the survey, each manager described his network of key contacts within and beyond the firm: Contacts were identified with nine name-generator questions on diverse kinds of relations, such as informal discussion and socializing, political support, critical sources of buy-in for projects, authority relations with supervisor and promising subordinates, and so on (see Burt, 1997a, on content distinctions between the kinds of relations; cf. Podolny and Baron, 1997). Network size varied from a minimum of 7 contacts to a maximum of 22, with an average of 12.6 contacts. Relations with and between contacts were scaled to vary from 0 to 1 with emotional closeness (Burt, 1992: 287–288). Some managers had sparse networks of disconnected contacts (minimum density is .07). Others had dense networks of interconnected contacts (.82 maximum density). On average, the networks were as dense as observed in other studies (e.g., .47 average density for the 170 managers, versus .42 average density for Americans with more than a high school education in the 1985 General Social Survey).

Social Capital Measured by Network Constraint

I measured social capital in terms of network constraint. The network around a manager constrains entrepreneurial action to the extent that the network is directly or indirectly concentrated in a single contact. More constraint means fewer structural holes and, so, less social capital. The network constraint index C varies with three network conditions (see Burt, 1992: 50ff., 1995, 1997b, for details): network size (larger networks are less constraining), density (networks of more strongly interconnected contacts are more constraining), and hierarchy (networks in which all contacts are exclusively tied to a single dominant contact are more constraining). The index begins with a measure of the extent to which all of manager i's network is directly or indirectly invested in his or her relationship with contact j:

$c_{ij} = (p_{ij} + \Sigma_q p_{iq} p_{qj})^2$, for $q \neq i,j$, where p_{ij} is the proportion of i's relations invested in contact j. The sum $\Sigma_q p_{iq} p_{qj}$ is the portion of i's relations invested in contacts q who are in turn invested in contact j. The total in parentheses is the proportion of i's relations that are directly or indirectly invested in the connection with contact j. The sum of squared proportions, $\Sigma_j c_{ij}$, is the network constraint index C. I multiply constraint scores by 100 so that I can discuss social capital effects per point of constraint. The range of scores to be discussed is illustrated by the difference between Robert and James in Figure 1. Network constraint is 20.0 for Robert's network, 53.6 for James's.

BASELINE EVIDENCE

The test for social capital effects begins with a human capital model: $R = \beta(T, S)$. The rewards, R, that managers receive for their work are a function of assigned tasks (T, typically rank and function variables) and human capital skills they bring to the tasks (S, typically education and experience). Social capital adds covariates to the human capital model: $R = \beta(T, S) + [\gamma + \lambda(T, S)] (C)$, where C is network constraint. The social capital effect γ is negative to the ex-

tent that the information and control benefits of structural holes are valuable. Effect adjustments, λ, measure the extent to which the value of social capital is contingent, such that value γ is higher for certain kinds of people doing certain kinds of work.

Early Promotion

Figure 2 contains baseline evidence for the analysis of contingent value. On the vertical axis of Figure 2 is early promotion, the performance variable in this study. Because income in the study population is too closely tied to job rank to measure the relative success of individual managers, time to rank is a better performance variable (Burt, 1992: 196–197). Whether promoted internally or hired from the outside, people promoted to senior rank in large organizations have several years of experience preceding their promotion. A period of time is expected to pass before people are ready for promotion to senior rank (see Merton, 1984, on socially expected durations). How much time is an empirical question, the answer to which differs with individual managers. Some managers are promoted earlier than others. Early promotion is the difference between when a manager was promoted to his current rank and a human capital baseline model predicting the age at which similar managers are promoted to the same rank to do the same work: $E(age)$ – age. Expected age at promotion, $E(age)$, is the average age at

Figure 2. Social capital matters: Negative association between network constraint and early promotion.
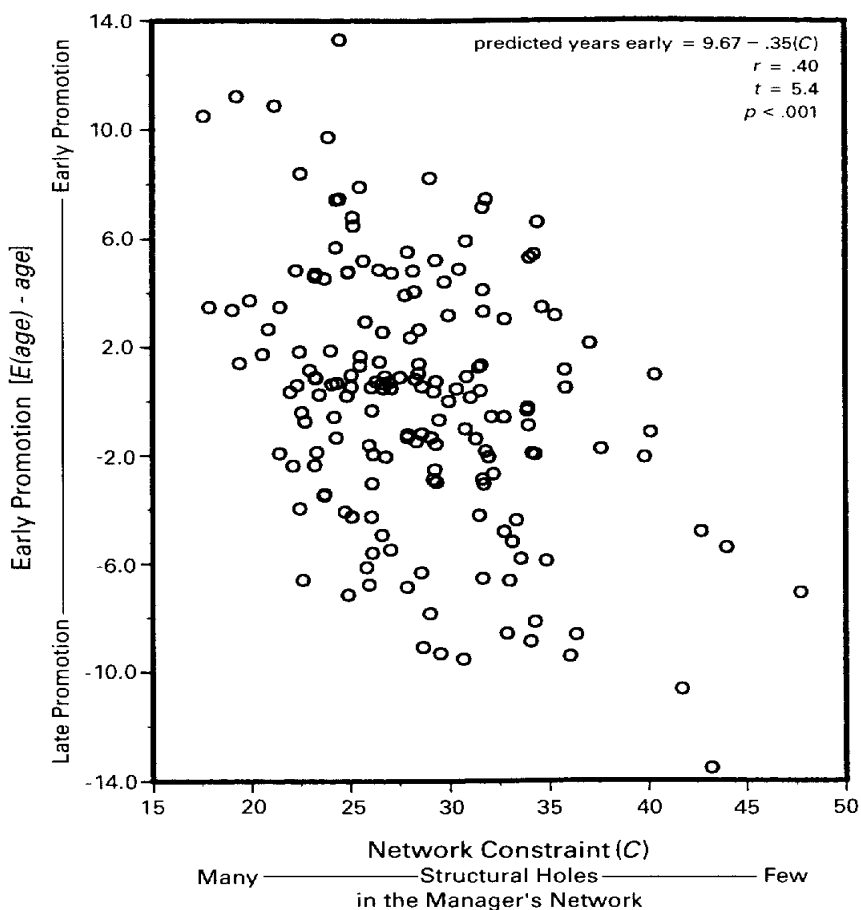
which managers with specific personal backgrounds (education, race, gender, and seniority) are promoted to a specific rank within a specific function (rank, function, and plant location). For example, a score of -5.5 indicates a manager was promoted five and a half years behind similar managers promoted to the same job. Twelve percent of the variance in promotion age is predicted by the baseline model, and residuals are distributed in a bell curve around expected promotion age (Burt, 1992: 126–131; 1995).

The negative association between early promotion and network constraint in Figure 2 shows that early promotions go to managers with more social capital. Managers promoted early tend to have low-constraint networks (left side of the graph). Managers promoted late tend to have high-constraint networks (right side of the graph). The $-.35$ estimate of the slope γ means that each point of additional constraint is associated with an average promotion delay of four months (-5.4 t-test, $p < .001$).

Large Bonus: Corroborating Other Evidence with Clear Causal Order

The structural hole argument gives a causal role to social structure. Consistent with the argument, I assume the primacy of social structure for theoretical and heuristic purposes. I am limited to assuming the primacy of social structure because the data I collected in the manufacturing firm are cross-sectional and so offer no evidence of causation (see Burt, 1992: 173–180, for discussion). It is difficult to gather survey network data, wait for the relative success of managers to emerge over time, then gather performance data.

I therefore use other data here to corroborate the baseline social capital effect displayed in Figure 2. The other data describe all senior men in the investment banking division of a large American financial organization. The data were obtained as part of a consulting project on the firm's compensation system. All of the data and data categories, including the network data, are from company personnel records. These data provide more than a replication of the social capital effect shown in Figure 2 because there is a clear time order of six months between the network and performance data. The organization gathers network data on its senior officers in one year in preparation for the distribution of bonuses the next year. Each year, officers are asked to identify people with whom they had substantial or frequent business dealings during the year and to indicate how productive it was to work with each person. The firm uses the average of these peer evaluations in bonus deliberations, but there is a network structure implicit in the evaluations that, according to structural hole theory, has implications for an officer's performance, which in turn is a key determinant of his bonus (see Eccles and Crane, 1988: chap. 8). To analyze these data, I identified the people cited as productive contacts by each senior man, then looked at the evaluations by each of his contacts to see how each contact evaluated the other contacts. I use the form of analysis I used for Figure 2 to communicate the evidence in these data without getting into details that might violate confidentiality.

Figure 3 shows the predicted social capital effect on bo-
nuses. The criterion variable on the vertical axis at the top of
Figure 3 measures relative success in terms of bonus com-
pensation, adjusted for human capital variables. I use bonus
compensation rather than salary because salary is almost
entirely determined by the human capital variables. Of many
human capital variables I tested for association with compen-
sation (including all of the variables used to define early pro-
motion in the manufacturing sample of managers), rank and
seniority (officer rank, years with the firm, and years in cur-
rent job) accounted for 73 percent of the variance in bonus
compensation (versus 95 percent of variance in salary com-
pensation). An individual officer's bonus can be higher or
lower than the bonus predicted by his rank and seniority. To
measure relative bonus, I regressed dollars of bonus across
seniority within each rank, then computed the z-score of the
residual. An officer with a z-score of 1.0 on the vertical axis
at the top of Figure 3 received a bonus one standard devia-
tion larger than the average officer at his rank with his se-
niority.

**Figure 3. Social capital matters: Negative association between net-
work constraint and bank officers' bonuses.**
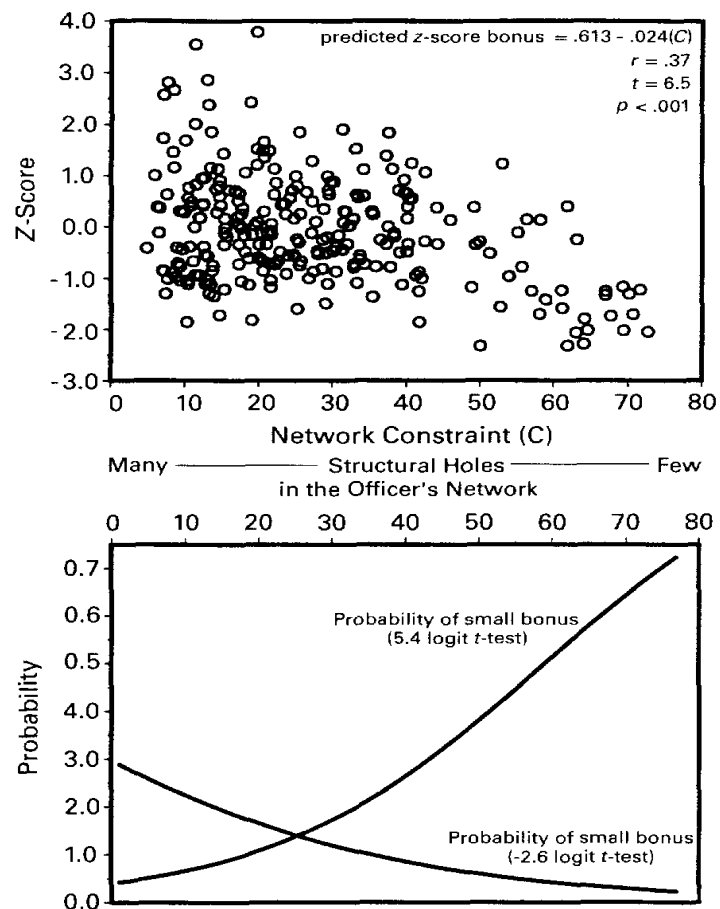
Social capital is again linked with higher returns. The regres-
sion results at the top of Figure 3 show a significant nega-
tive association with network constraint (−6.5 t-test for γ). I
get the same result if I hold human capital constant by using
the ratio of bonus to salary compensation as a criterion vari-

able (−4.2 t-test). The dollar metric for the effect at the top of Figure 3 is that the average bonus of the most-senior officers decreases by seven thousand dollars per point of network constraint (the standard deviation of residual bonuses for the most-senior officers is $291 thousand). The high-constraint officers at the right in Figure 3 have only a few contacts, who tend to cite one another as contacts. The low-constraint officers on the left in Figure 3 have many contacts disconnected from one another, contacts who rarely cite one another as substantial or frequent business contacts. In other words, the officers on the left in Figure 3 have entrepreneurial networks, like Robert in Figure 1, with strong relations to contacts in otherwise disconnected parts of the firm.

The logit results at the bottom of Figure 3 show that the social capital effect is even stronger than implied by the data in the top panel of the figure. The top panel shows a triangular pattern in the data. On the right side of the graph, officers with the most constrained networks receive low bonuses. On the left, officers receiving larger bonuses than their peers tend to have entrepreneurial networks, but many officers with equally entrepreneurial networks receive small bonuses. I attribute this to annual data. Entrepreneurial networks provide better access to rewarding opportunities, but that is no guarantee of exceptional gains every year. There is a .47 partial correlation between bonus in the current year and bonus in the previous year (after rank and seniority are held constant). Even the most productive officers sometimes see a lucrative year followed by a year of routine business. So, the logit results at the bottom of Figure 3 more accurately describe the social capital effect in these data. I divided the officers into three bonus categories: large (bonus more than a standard deviation larger than expected from rank and seniority), medium, and small (bonus more than a standard deviation less than expected from rank and seniority). Network constraint in the current year significantly decreases the probability of receiving a large bonus the next year (−2.6 t-test), but the stronger effect is the increased probability of receiving a low bonus next year (5.4 t-test).

Figures 2 and 3 offer baseline evidence of the average value of social capital. I now return to the probability sample of manufacturing managers described in Figure 2 to present evidence for the second part of my contingency argument, that the value of social capital decreases with the number of a manager's peers.

EVIDENCE OF CONTINGENT VALUE

The first issue is defining each manager's peers. The theoretical criterion is people who are substitutable in a structural equivalence sense of having similar relations with the same kinds of contacts (Burt, 1992: 208–215; Burt and Talmud, 1992; cf. Anheier, Gerhards, and Romo, 1995, on equivalence distinctions between forms of capital). Since I do not have network data sufficient to define peers by the theoretical criterion, however, I used the organization chart to define peers. I defined a manager's peers to be all of the people employed by the firm at his rank (senior, more senior, or most senior) in the same business function, broadly distin-

guishing field functions (sales and service), production functions (engineering and manufacturing), and corporate functions (human resources, finance, management information systems, and marketing).

Company records give the total number (N) of managers employed by the firm at each rank in each function. Adding this covariate to the regression model displayed in Figure 2 yields the following results (t-tests in parentheses):

$$predicted\ years\ early = 9.5476 - .3492C + .0008\ N + .0012\ C*N,$$
$$(-5.4) \qquad (0.7) \qquad (2.6)$$

which can be rewritten as:

$$predicted\ years\ early = (9.5476 + 0008\ N) - (.3492 - .0012\ N)\ C.$$

To preserve the zero-point in the regression in Figure 2, N is measured as the deviation from its average across the 170 managers ($N = N -$ mean N). The regression results show three things. First, the social capital effect here is almost identical to the effect in Figure 2 (.3492 here versus .35 in Figure 2). In other words, the average value of social capital is not changed for these managers by adding the number of peers as a covariate. Second, the number of peers has no direct effect on early promotion (0.7 t-test). This is not surprising, because rank and function (and thus some variation in number of peers defined by rank and function) were held constant to define early promotion. A promotion is early relative to peers at the same rank within the same function. Third, the predicted effect of peers is significant (2.6 t-test, $p < .01$). For every additional person hired to do the same work, the value of social capital decreases by .001 for the work. If another 291 people were to be hired for the average job in this study population, social capital could be expected to have no value to managers in the job ($-.3492 + .0012*291 = 0$).
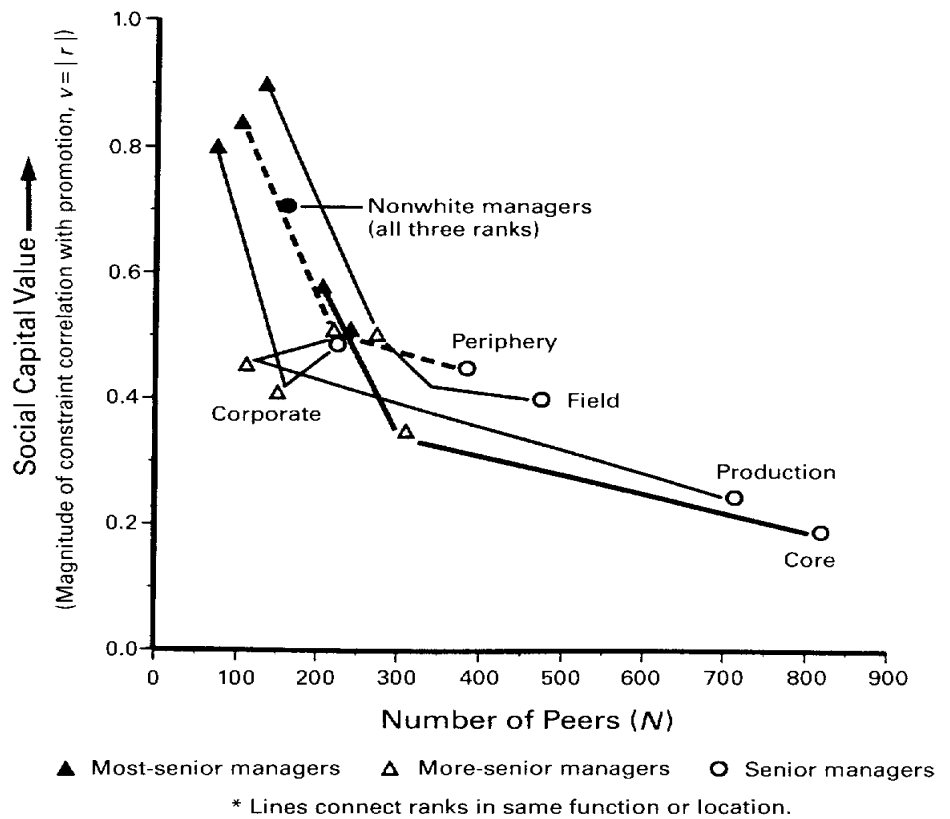
Confounding Effects

The value of social capital varies with several features of managerial work. I want to determine the unique effect of number of peers. Sixteen categories of managers are distinguished in Figure 4. The horizontal axis is the number of study population managers in each category (peers). The vertical axis is the correlation between network constraint and early promotion for sample managers from each category. The higher a category is in the graph, that is, the more negative the correlation between network constraint and early promotion, the more valuable social capital is for that category of managers. The value of social capital varies from a low among senior managers in jobs at the core of the firm ($r = -.20$) to a high among the most-senior managers in sales and service ($r = -.90$).

The first confounding factor is managerial rank. Social capital is more valuable to men in more-senior ranks. This is to be expected because there are fewer people at the top of the organization and they are more the authors of their jobs. The social capital effect on early promotion to senior rank is significant ($\gamma = -.25$, -3.1 t-test; 98 respondents; circles in Figure 4), but stronger for early promotion to the more-senior rank ($\gamma = -.44$, -3.0 t-test; 44 respondents; hollow triangles in Figure 4), and much stronger for early promotion to the

Figure 4. Value of social capital varies with number of peers.*

▲ Most-senior managers   △ More-senior managers   O Senior managers

* Lines connect ranks in same function or location.

most-senior rank ($\gamma = -.79$, -5.6 t-test; 28 respondents; solid triangles in Figure 4; see Burt, Jannotta, and Mahoney, 1997, for similar contingency in social capital's association with annual performance evaluations). In fact, between human and social capital, social capital is the primary factor distinguishing managers promoted early to the highest rank. This can be seen by computing expected promotion age, $E(age)$, from the human-capital baseline model introduced with Figure 2, and regressing age at promotion to current rank over $E(age)$ and network constraint C to estimate β and γ. The standardized estimates of β and γ are .22 and .18, respectively, for senior managers, .02 and .26 for more-senior managers, and .04 and .76 for the most-senior managers. Managers sorted by human capital (β) at lower ranks are sorted by social capital (γ) at higher ranks. This is not to say that networks are richer in structural holes at the top of the firm. Analysis of variance shows no difference between ranks in average network constraint ($F_{2,167} = 0.08$, $p = .92$). What changes with managerial rank is the strength of association between network constraint and early promotion, which is stronger toward the top of the firm.

The second confounding factor is the higher value of social capital to managers working across significant boundaries within or around the firm (see Burt, 1992: 131ff.; Raider and Burt, 1996, for discussion). The work of these boundary managers presents issues unique to the situation of each manager. The boundary managers in this firm work in sales or service with specific client firms. They work at remote plant locations. They are newly hired managers. They are the nonwhite managers working in a firm composed primarily of

whites. These managers are more visibly dealing with people different from themselves and so have to be more careful about how they craft relationships. The sales and service managers have to monitor interests in client firms. The managers at remote plants have to spend more time keeping in touch with shifting interests at corporate headquarters. Nonwhite and newly hired managers have to monitor colleagues more carefully because the errors of minorities and newcomers are more visible (Kanter, 1977: 206ff.). These tasks are made easier by the information and control benefits of structural holes, so it is not surprising to see a strong association between network constraint and early promotion for the boundary managers (−5.9 t-test for these managers versus −1.7 for other managers). There are several categories of boundary managers in Figure 4: nonwhites (solid circle), field managers (all three ranks of which are higher in Figure 4 than comparable ranks in other functions), and managers in remote plants or recently hired (the periphery managers in Figure 4, so called because they are on the periphery of the firm's social system).

These confounding effects notwithstanding, the most conspicuous feature of Figure 4 is the tendency for the value of social capital to decrease with the number of managers doing the same work. The value of social capital is higher for managers on the left side of the graph (where there are few peers) than it is for those on the right side of the graph (where there are many peers). The peer effect can be difficult to see because it is so closely associated with job rank. Fewer managers hold higher rank and social capital is more valuable for small N and high rank. The regression results for model II in Table 1 summarize the effects in Figure 4. Only

Table 1

Value of Social Capital Contingent on Number of Peers*

Variables	I	II
Intercept	8.44	5.05
Number of peers	−.53	−.46
	(−6.0)	(−4.6)
Job on a boundary of the firm	−	.29
		(2.2)
Job at the most-senior rank	−	.18
		(1.3)
Job at the more-senior rank	−	−.13
		(−1.2)
Job in sales or service	−	.06
		(0.5)
Job in production	−	−.04
		(−0.3)
Corporate job	−	.01
		(0.1)
R^2	.72	.95

*These are ordinary least-squares estimates from the 16 data points in Figure 4 predicting the magnitude of the correlation between early promotion and network constraint (value of social capital, v). Standard errors are given in parentheses. To estimate value v as a power function of number of peers N, the estimation equation is the following: $\ln(v) = \ln(a) + b\ln(N) + BX$, where B is a vector of regression coefficients and X contains the dummy variables in the rows. The dummy variable distinguishing boundary managers is one for nonwhites, managers hired during the last four years, managers in remote plants, and field managers.

two variables have a direct association with the value of social capital. The first is peers. Social capital is less valuable to managers with numerous peers (*t*-tests of −4.6 to −7.5). Second, social capital is more valuable to boundary managers (2.2 and 5.5 *t*-tests). Holding these two variables constant, variation by rank and function is negligible ($F_{5,8} = 2.73$, $p = .10$).

The Functional Form of Contingent Value

Figure 4 is repeated on the left in Figure 5 without lines connecting categories of adjacent ranks, displaying the aggregate regression line. The line, defined by regression model I in Table 1, is a social capital contingency function that describes how the value of social capital is contingent on the number of managers doing the same work.

Specifically, value decreases as a power function of peers. The value (*v*) of social capital to a category of managers doing the same work can be inferred from the magnitude of the negative correlation (*r*) between network constraint and relative success within the category, holding human capital differences constant: $v = |r|$, and predicted as a power function of the number (*N*) of managers in the category:

$$v = aN^b,$$

where *a* and *b* are parameters to be estimated, $|r|$ is the absolute value of the correlation between network constraint and relative success, and estimates are available from the log form of the combined equations, $\ln |r| = \ln(a) + b(\ln N)$, though in a study population in which social capital is extremely valuable, *r* can be close to maximum, so Fisher's *z* can be a useful criterion variable.[3]

The graph on the right in Figure 5 offers more data on the contingency function. For each manager, I drew a random subsample of similar managers within the total sample. I then computed the average number of peers, *N*, for managers in the subsample and the correlation, *r*, between network constraint and early promotion within the subsample.[4] Each of the 170 observations in the graph is a subsample correlation plotted against the corresponding subsample mean number of peers. The graph is like a sampling distribution across the social capital contingency function. The nonlinear contingency function is still evident in these more detailed data. The data fit the function about as well, despite the many more data now displayed (.66 R^2 versus .72), and if I add the boundary and job rank variables from Table 1 to the regression equation, there is a strong effect for number of peers (−15.3 *t*-test for a −.51 coefficient), a significant tendency for social capital to be more valuable to boundary managers (4.4 *t*-test), and a negligible association with job rank (1.5 *t*-test).

Further analysis reveals nothing to contradict the summary description in Figure 5. I fit alternative functional forms across the sixteen manager categories (left side of Figure 5) and the 170 subsample observations (right side of Figure 5). There is little difference between results obtained with the absolute value and square of the correlation *r* as the criterion variable measuring the value of social capital. Linear functions of *N* yield consistently weaker results than nonlinear

3

Useful in testing hypotheses about non-zero levels of correlation, Fisher's *z* is the arc hyperbolic tangent of a correlation. Its utility as a criterion variable measuring the value of social capital is that it keeps value scores within an upper bound of 1.0. Raw and transformed correlations are nearly identical for magnitudes from zero to about .5, then *z* is increasingly larger than *r*. The estimation equation with Fisher's *z* as the criterion variable is: $\ln(atanh |r|) = \ln(a) + b(\ln N)$, from which scores for the value of social capital can be recovered; $v = tanh[a(N)^b]$, where *atanh* is the arc hyperbolic tangent, and *tanh* is the hyperbolic tangent. Over the range of correlations in Figure 5, raw and transformed correlations yield similar predicted values of social capital: scores for *v* predicted with *z* versus *r* as the criterion variable are correlated .98 for the categories of managers on the left in Figure 5, and .99 for the subsample data on the right in Figure 5.

4

This is a resampling procedure to test the robustness of the contingency function (e.g., Finifter, 1972). I created a list of managers, first, in order of the population size of categories in Figure 4, then at random within each category. The subsample around each manager *i* contains managers *i* − *n* through *i* + *n* on the list. I obtained results for alternative sizes of *n*. Small subsamples of *n* less than a handful generate wildly different results from one subsample to another because so few managers are in each subsample. Large subsamples of *n* more than 30 obscure the steep part of the contingency function over few peers. The subsample results in Figure 5 are based on *n* equal to 5 percent of the population size of manager *i*'s category (e.g., *n* is 8 for the most-senior field managers, of whom there are 150 in the study population).

Figure 5. Contingency function.
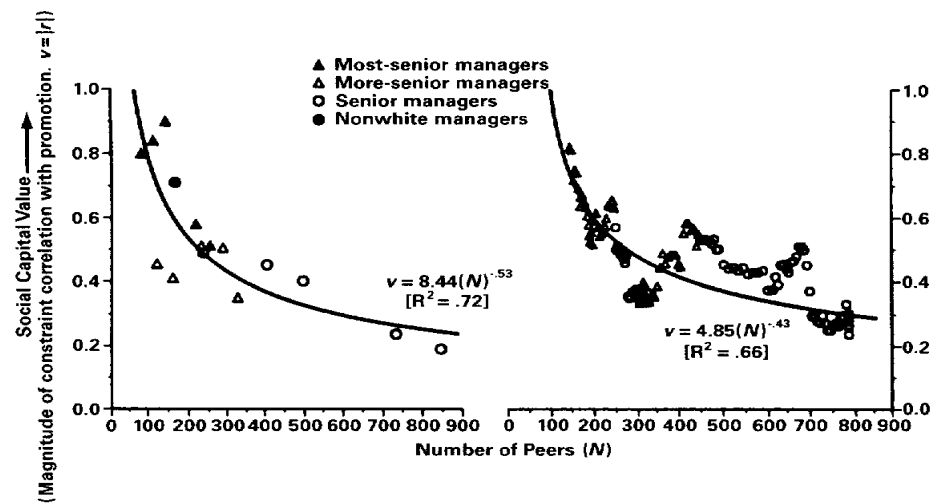
functions. Power, exponential, and log functions yield similar results, but the power function better captures high values of social capital (closer association with Fisher's z) and does about as well as the other nonlinear forms across lower values. Given the simplicity of the power function and no loss of fit in describing contingent value as a power function of N, I limit my discussion to power functions. I also checked for continuity in the contingency function with a surface plot of performance scores averaged across a grid of network constraint on one axis and number of peers on the other. There are no significant bumps, dips, or discontinuities in the contingent value of social capital. The slope of the association between early promotion and network constraint changes systematically from a steep negative association for managers with few peers to a weaker negative association for managers with many peers. Only the slope is changing. Early promotion and network constraint are the same on average, and vary similarly, for managers with many peers and managers with few peers. What differs across numbers of peers is the extent to which early promotion is correlated with network constraint—strong for managers with few peers, weak for managers with many peers. The smooth performance surface means that the contingency function in Figure 5 represents continuous change in the value of social capital.

DISCUSSION

I have presented argument and evidence for a structural ecology of social capital that describes how the value of social capital is contingent on the number of people doing the same work. Social capital, valuable on average, is especially valuable for managers with few peers because such managers do not have the guiding frame of reference provided by numerous competitors, nor the legitimacy provided by numerous people doing the same kind of work. The contingency function has two characteristics that say two things about the value of social capital: First, the value of social capital decreases with an increasing number of people doing the same work. Second, the rate at which peers erode the

value of social capital is steepest where social capital is most valuable. In other words, peers most erode the value of social capital to leaders and other boundary-spanning managers who have few or no peers. Understanding the contingent value of social capital is a useful addition in its own right to organization theory, but the contingency function in particular can be a useful tool for thinking about organizations more generally. I close with three implications for organization research: virtual monopoly, network organizations, and research design.

Virtual Monopoly

Kinds of managerial work are distinguished in Figure 6 by the contingent value of social capital for the work. The solid bold line, function A, is the contingency function for the sample managers in Figure 5: $v = 4.85(N)^{-.43}$. The dashed bold line, function A', shows the function for the same data but estimated with Fisher's z as the criterion variable. The two bold lines are parallel across the sample managers, diverging at low numbers of peers, numbers beyond the circumstances observed in the study population. Fisher's z preserves an upper bound of 1.0, which is reasonable, since value is a predicted magnitude of correlation.

Correlations predicted to be stronger than 1.0, however, are an interesting diagnostic of organization behavior. They indicate the number of peers below which managers have a virtual monopoly over their work. A manager for whom N equals 1 has no peers and so has a monopoly over the kind of work he or she does. His or her work is unique, perhaps as the chief executive officer, chairman of the board, or the key broker across an organization boundary. Beyond the human capital requirements of his or her work, the monopoly manager's success depends entirely on coordination with people doing other kinds of work—which means that the information and control benefits of social capital are especially valuable. How valuable is defined by the first parameter in the contingency function model. Given a contingency function estimated for a category of managers, $v = a(N)^b$, parameter a is the expected correlation between network constraint and success for managers with a monopoly on their job. When N equals 1, v equals a.

A near-zero estimate of parameter a means that social capital has no value. For example, function B in Figure 6 is estimated for the sample managers to describe the contingent value of social capital defined only by the authority relations. I recomputed network constraint from only the manager's authority relations (subordinates, boss, key sources of buy-in). Function B describes the association between early promotion and constraint in the network of a manager's authority relations. For reasons discussed elsewhere in an analysis of network content (Podolny and Baron, 1997; Burt, 1997a), there is little social capital value in the authority relations. Managers adapt to whatever structure of authority defines their jobs. Function B shows that the expected correlation between early promotion and authority-network constraint is consistently low, regardless of peers. The correlation is only

Figure 6. Work conditions distinguished by social capital contingency functions.
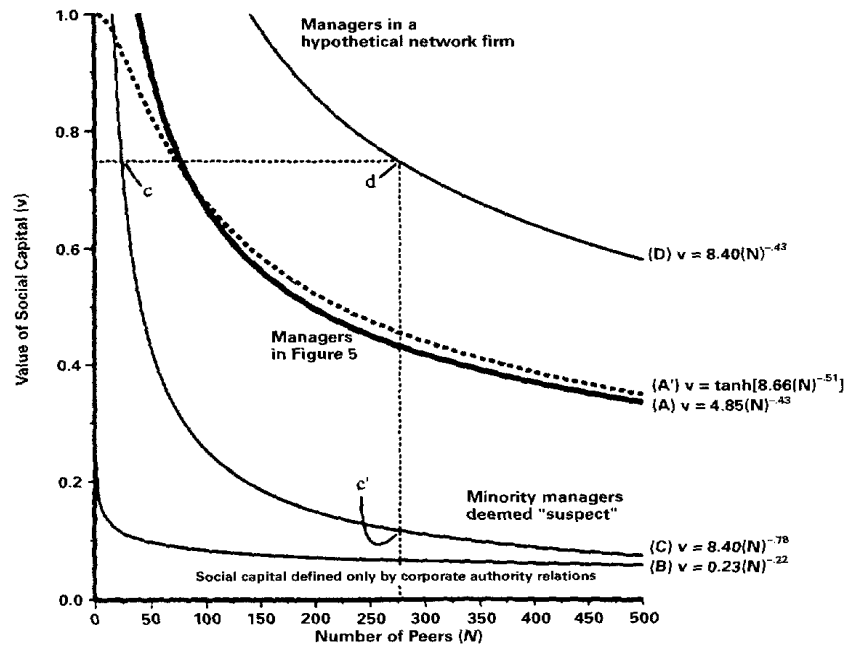
.23 even at the extreme of monopoly ($a = .23$), implying that there are no circumstances for these senior managers in which the structure of authority relations generates social capital.

An estimate of parameter a larger than 1 means that managers with one or more peers enjoy a virtual monopoly over their work. In a large organization, two managers can do the same work but be isolated from one another such that each has a virtual monopoly over his or her work. These are managers virtually free of peers, in terms of competition and legitimacy. Their relative success is completely determined by their relative access to the information and control benefits of social capital for reading the interests of significant other kinds of managers and knowing who can be brought together productively on new projects.

There is no one criterion number of peers that ensures a virtual monopoly. The number below which managers have a virtual monopoly depends on the extent to which managers doing their kind of work are scattered through the organization. The criterion is defined in a general way, however, by the contingency function. Solving the function for N when v equals 1 gives: virtual monopoly $N = (1/a)^{1/b}$. For example, the study population of senior managers in Figure 5—managers at the top of a large organization that grants substantial job autonomy to its senior managers—is differentiated such that a manager who is one of less than 40 people doing the same kind of work has a virtual monopoly: $(1/4.85)^{-1/.43}$ = 39.4. At N equal to 39.4, the solid bold line in Figure 6 crosses the upper boundary of v equal to 1.

Other contingency functions in Figure 6 illustrate higher and lower thresholds for virtual monopoly. Virtual monopoly is

readily available to managers described by function D, a hypothetical function included here as a heuristic device. I expect functions like D in a highly differentiated organization such as a large consulting firm or law practice containing many partners who are located in many cities and have diverse expertise. A manager has only to be one of less than 143 managers doing the same work in hypothetical function D to enjoy a virtual monopoly: $(1/8.4)^{-1/.43} = 142.6$.

In contrast, function C describes the contingent value of social capital for minority managers deemed "suspect" in the manufacturing firm from which I drew the sample of senior managers. Women and entry-rank men are the suspect senior managers in this firm in the sense that they are treated as outsiders (Burt, 1997b). Function C in Figure 6 is estimated for a probability sample of these suspect minority managers in the same way that function A was estimated for the probability sample of senior men. The steep slope of function C shows that women and entry-rank men in only the most unusual job assignments enjoy the benefits of social capital. Relative to senior men, women and entry-rank men are more visible in Kanter's (1977: 206ff.) sense of "tokens" being visible. There are fewer women in the senior ranks (12 percent), so they are visible across broader distances within the firm. Comparisons are more likely between a senior woman in marketing and a senior woman in finance, for example, than between similarly senior men in the two functions, because the two men would not stand out as so obviously different from the typical senior manager. While the senior men in Figure 5 have a virtual monopoly if they are one of less than 40 peers, women enjoy a comparable monopoly only if they are one of less than 17 peers: $(1/8.4)^{-1/.76} = 16.5$.

Network Organization

Observers from diverse perspectives see a shift in contemporary organizations away from bureaucracy, with layers of formal control replaced by fewer layers of negotiated informal control. The new form is a network organization. Sociological understandings of this change became articulate with Powell's (1990) discussion of network forms of organization. Powell and Smith-Doerr (1994) offered a stimulating synthesis of work on network organization (especially pp. 379ff. on the firm as a network of treaties, cf. Baker, 1992; Nohria, 1994; Sheppard and Tuchinsky, 1996), and Nohria (1996) has provided evidence of the shift to network forms of organization in even the largest of American corporations.

The shift away from bureaucracy means that managers cannot rely as much on directives from the firm. They are more than ever the authors of their own work. Firms gain by being able to identify, and adapt more readily to, needed production changes and market shifts (e.g., Piore and Sabel, 1984, on flexible specialization). There are new opportunities for managers, but there are also new costs. Coordination costs once borne by the corporate bureaucracy—each person responsible for coordination within a limited domain of responsibility—are now borne by individual managers who have re-

sponsibility for coordination across broader domains, with a corresponding increase in uncertainty, stress, and potentially disruptive conflict. In this environment, social capital is important. The shift away from bureaucracy is a shift to social capital as the medium for coordination within the organization.

The shift away from bureaucracy calls for a shift in research strategy for studying organizations. The tradition has been to identify forms of organization by their structure. The shift from a unitary to a multidivisional form of hierarchy is easy to see, for example, as a change in the formal structure of firms. The shift from hierarchy to network organization is more difficult to see in the same way because the change is not structural so much as procedural. The shift is from one coordination mechanism to another: formal coordination via bureaucracy to informal coordination via interpersonal negotiation. There is associated structural change in the form of fewer layers of bureaucracy and more complex interpersonal relations, but the structural change is only attendant to the fundamental change from formal to informal coordination.

Given that formal structure is such an imperfect indicator of network organization, and given the difficulty of observing interpersonal negotiations in any systematic way across the managers in a firm, a network organization needs to be defined and analyzed in terms of consequences. While informal relations are random noise in a traditional bureaucracy, they are the central coordination mechanism in a network organization. A firm can be said to be a network organization to the extent that success in the firm depends on informal relations. In other words, a firm is a network organization to the extent that a manager's success depends on social capital. When coordination is based on negotiated informal control, as in a network organization, more successful managers will be the managers with better access to the information and control benefits of structural holes.

A social capital definition of network organization has three virtues. First, it gives the concept operational meaning for empirical research. A firm is a network organization to the extent that there is a strong correlation within the firm between relative success and network constraint. Second, it makes explicit, through the contingent value of social capital, the fact that network organization is a matter of degree, not an absolute. All firms have network forms toward the top of the organization. Social capital is valuable to the work of managers with few peers, whether the managers are in a traditional hierarchy or a network organization. What makes a network organization different is that social capital is also valuable to the work of managers with more peers. In a traditional hierarchy, the benefits of social capital are only available to managers in unique positions. The slope of the contingency function for a set of managers indicates the rate at which individuals are subject to peer pressure and corporate convention. A steep slope means that the value of social capital plummets as the number of peers increases from virtual monopoly ($\partial v/N = bN^{b-1}$). Competition between peers leaves little room for individuals to develop entrepreneurial

opportunities. Emphasis on corporate convention indicates the firm's lack of interest in the efforts of individual managers to develop opportunities.

The point is illustrated by functions C and D in Figure 6. Hypothetical function D predicts a correlation of −.75, for example, between network constraint and relative success for managers who are one of 276 managers doing the same work (point d on the function). That magnitude of correlation is only observed among the sample managers at the highest rank (just below vice president, top of Figure 4). Function D describes managers in a network organization. Function C, in contrast, describes managers in a traditional hierarchy in that they are widely denied the benefits of social capital. The function shows that the .75 magnitude of correlation occurs among minority managers, but only if they are one of 24 or fewer managers doing the same work (point c on the function). Social capital has no effect on their relative success when there are 276 minority managers doing the same kind of work (v equals .12 when N equals 276; point c' on the function).

Third, the social capital definition of a network organization makes explicit, again through the contingent value of social capital, that network organization need not be equally present even for managers doing the same work in the same firm. Two managers can do the same work in the same firm, but one can experience the firm as a traditional hierarchy while the other experiences the firm as a network organization. Function C in Figure 6 shows that minority managers experience the study organization as a traditional bureaucracy. Social capital is only valuable when they have very few peers. More peers quickly trigger peer pressure to conform and regulation by corporate convention. The higher average value of social capital implied by function A shows that non-minority managers experience the same firm as more of a network organization.

Designing Research

Contingency functions are a frame of reference for designing research and cumulating results across studies. An average social capital effect estimated from a sample, as in Figure 2, depends on the shape of underlying contingency function(s) and where along the function(s) managers were selected for study. The expected magnitude of correlation between social capital and success, $E(v)$, is the sum of where sample managers i exist on function, v_i, and the probability, p_i, with which managers at that point are sampled for study: $E(v) = \sum_i p_i v_i$. For example, minority managers are largely denied the benefits of social capital (function C in Figure 6), but a sample of minority managers with unique jobs would show evidence of a strong social capital effect (point c on the function).

The most obvious implication for research design is that the richest evidence on social capital lies in data on managers with few peers. Some jobs are held by managers operating in consensus with peers and in accord with the corporate bureaucracy's chain of command. Other jobs are held by managers operating relatively independent of the corporate

bureaucracy. The second kind of manager will reveal more evidence of social capital effects. Illustrations in this analysis are managers in the highest ranks of the organization, boundary managers, and, more generally, managers with few peers.

The contingency function is particularly important to research at the other end of the socioeconomic scale: where people are trying to break out of lower classes into a better way of life. It might seem that social capital is irrelevant, since individuals at the bottom of the socioeconomic scale have relatively little control over their lives. Whatever its value on average, however, social capital will be more valuable to those few individuals who try to break away from peers and bureaucratic regulations to find their own route to success. Network entrepreneurs at the bottom of the socioeconomic scale are a promising and important subject for social capital research, as initial results are starting to show (e.g., Portes and Zhou, 1992; Bian, 1994: chap. 5; Borjas, 1995; Sanders and Nee, 1996).

The implication for cumulating research results across studies follows similarly. In the absence of a contingency function, research is aggregated across studies as if each were a replicate test of the same proposition. A naive observer can be expected to summarize a set of studies by stating the proportion of studies that reported a strong social capital effect on performance. But suppose one had data on the employees who respond to telephone complaints and inquiries from customers. These people work in large rooms of peers, and their calls are monitored by a manager who is listening to ensure adherence to the firm's guidelines for the job. These are employees at the boundary of the firm because of their contact with clients, but in their large numbers the firm is not looking for innovation so much as courteous reliability. These are employees on the far right of contingency functions like that in Figure 5. There is no reason to expect social capital to be valuable for success in this job, though it might prove useful in escaping to a new job.

Thus, understanding the contingent value of social capital allows for more accurate comparison across research projects, which means faster cumulation. Social capital studies of managers in jobs with large numbers of peers can be put aside as ill-designed. Studies of managers with few peers warrant close scrutiny. Studies reporting different strengths of association between managerial success and social capital can be integrated in terms of the relative extent to which managers in the separate studies work with different numbers of peers. This is precisely the kind of analytical power needed to establish social capital explanations on a par with the human capital explanations on which we were weaned.

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