

**Interorganizational Ties and Business Group Boundaries:
Evidence from an Emerging Economy**

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Abstract: We identify which types of ties best distinguish pairs of Chilean firms in the same business group from pairs of Chilean firms that are not group brethren. Overlap in owners, indirect equity holdings, and director interlocks are especially strong delineators of group boundaries. Family connections and direct equity holdings do not do as good a job of distinguishing group boundaries. These findings challenge the longstanding conventional wisdom among field-based scholars that family bonds are the defining feature of business groups in emerging markets. We speculate that family bonds are so durable that, over time, they come to pervade the entirety of an economy and lose their ability to distinguish business groups from the overall network of social and economic ties. Our techniques to identify business groups may apply to research on other types of groups – interpersonal and interorganizational – in which ties among actors are multiplex, ties are only partly observed, and group definitions are socially constructed.

1. INTRODUCTION

Business groups are deeply woven into the social and economic fabric of most emerging economies. Numerous, rich field studies illustrate that groups – *grupos* in Latin America, business houses in India, *chaebol* in South Korea, and others elsewhere – are ubiquitous in such economies. Groups have been studied in emerging economies such as China (Keister, 1998, 2000), India (Ghemawat and Khanna, 1998; Khanna and Palepu, 1997), Korea (Amsden, 1989; Chang and Choi, 1988), and Central America (Strachan, 1976).¹ A growing body of empirical work, set in a range of emerging markets, shows that group affiliation has a robustly large and often beneficial effect on the financial performance of member firms (Chang and Choi, 1988; Keister, 1998; Khanna and Palepu, 2000a,b; Khanna and Rivkin, 2001). Some of this work presents compelling causal evidence of the effect that group membership has on affiliate performance (see especially Fisman, 2001, and parts of Khanna and Yafeh, 2005).

Business groups have thus attracted the interest of a wide range of scholars, including economic sociologists, socialized economists, and students of institutions (Granovetter, 2003). Despite the interest in and importance of business groups, researchers know surprisingly little about what defines group boundaries. This gap reflects in part the fact that groups are socially constructed: arrived at by an unspoken consensus among societal actors, groups can assume a taken-for-granted nature. The relatively unexamined character of group boundaries is reflected in episodes that Strachan, one of the earliest students of business groups, reported from his field work in Nicaragua (1976: 6-7):

There have been 20 to 30 social or semi-social occasions at which I was introduced to a businessman by one of his close friends. At some point in the conversation which followed, I have smiled the smile of an insider and asked, “And what group do you belong to?” The replies, often with the same smile, have been direct, “Oh, I don’t belong to any group,” or “I suppose I am a member of the Banco Nicaraguense Group....” Never, however, has that question drawn a blank stare....

¹ There is a related, and much more extensive, literature on the Japanese *keiretsu*. See, for example, Aoki (1990), Caves and Uekusa (1976), Lincoln, *et al.* (1996), and Nakatani (1984). Although Japan is not an emerging economy, we do draw on the *keiretsu* literature selectively as we develop our hypotheses below.

As products of social construction, groups cannot likely be reduced to specific types of ties between firms such as equity holdings, family bonds, or director interlocks. Nonetheless, inter-firm ties play a role in the process of social construction, and as we illustrate below, field observers of groups have consistently identified groups with particular types of ties. It is valuable, then, to examine what kinds of intra-group bonds distinguish group insiders from outsiders. In this paper, we use unique data from one emerging economy, Chile, to pinpoint types of observable ties that demarcate the edges of business groups there. We choose Chile because a widespread and well-documented social consensus exists in Chile about the membership of each group; because prior research shows that group affiliation has extensive real consequences for Chilean firms in the time period of our data; and because Chileans have collected abundant, relevant data on a range of types of ties, a pre-requisite for our analysis.

As Strachan's report makes clear, group borders are often obvious to local observers. Why then should one spend energy to identify the ties that delineate groups? We see several reasons.

First, there are good grounds to fear that impressions of intra-group ties handed down from field researchers may be flawed. As we discuss below, field-based scholars tend to define the boundaries of groups in terms of the social and economic ties within groups. Yet social and economic ties are pervasive among members of the class that controls most firms in many emerging economies, not just among affiliates of business groups. As a result, scholars who focus on business groups exclusively may reach mistaken conclusions about the ties that distinguish such groups. Suppose, for instance, that family ties are endemic among the owning class in an economy. A scholar who looks only at business groups may conclude, erroneously, that family ties define group boundaries when, in fact, pairs of group firms are no more linked by family ties than are any other two firms in the economy. The scholar would be as misled as a taxonomist who, studying only dogs, concludes that canines are distinguished by having fur and four legs. In delineating groups, it is crucial to understand how the ties that distinguish group affiliates are distinct from the connections that exist in the economy at large. Are the bonds within groups tighter or thicker in some way? Do groups use different combinations of ties? Our empirical effort is the first to tackle these questions.

Second, the absence of compelling evidence that ties within business groups differ from ties in the economy as a whole leaves all research on business groups open to critique. As an extreme example, consider the case of Japan, where lines between Japanese business groups, the *keiretsu*, are less clear than the boundaries in Strachan's Nicaragua (Saxonhouse, 1993). Such ambiguity about the ties that bind group members together and about the identity of group insiders has contributed to claims by some scholars that *keiretsu* are a mere "fable" and "a figment of the academic imagination" (Miwa and Ramseyer, 2002). Clear evidence that group affiliates are bound together in distinctive ways would undermine this skepticism. More broadly, as research on business groups shifts toward large-scale empirical studies (Chang and Choi, 1988; Keister, 1998; Khanna and Palepu, 2000a,b; Khanna and Rivkin, 2001; Guillén, 2000, 2002), it becomes increasingly important to have verifiable means to pinpoint group boundaries. Research on, say, the performance effects of group affiliation is compromised if group borders cannot be identified with confidence.

Third, an analysis of the ties that distinguish business groups promises to address enduring concerns in the study of groups in general, not just emerging-market business groups. Students of interpersonal and interorganizational networks often struggle to understand who belongs to which groups. Relying on individual network actors themselves to identify group boundaries is hazardous: actors often form mediocre mental images of the groups in which they participate (Freeman and Webster, 1994). An alternative is to draw inferences about group boundaries from data on interactions such as conversations (Freeman *et al.* 1988; Bernard and Killworth, 1977) or co-attendance at social events (Davis *et al.* 1941; Freeman, 1987). Yet individuals are notoriously inaccurate when they report on their own past interactions (Bernard *et al.*, 1980). Finally, one may discern group boundaries by examining the patterns of ties among actors and using the techniques of social network analysis (Scott, 1991; Wasserman and Faust, 1994). This is a powerful approach, but it encounters a number of difficulties:

- Social network analysis may founder when ties among actors are multiplex (e.g., Padgett and Ansell, 1993). When many types of ties are present, which ones should a researcher focus on? We believe our research points toward an answer. Perhaps paradoxically, ties that are fragile – in the sense that

they are reassessed often – may carry the most information about where the true boundaries of groups lie. We develop this argument below.

- Social network techniques are also vulnerable when some types of ties are invisible to the researcher. Invisible ties are present in many kinds of groups – and surely in the business groups of every emerging economy we know. How can one make progress when some ties are hard to detect? Our approach confronts the fact that the researcher typically does not observe all types of ties.
- The clear-cut calculations of network analysis can obscure the fact that groups are ultimately cognitive simplifications constructed socially – in our case, a consensus reached implicitly by actors immersed in the Chilean economy. The socially constructed nature of groups has ramifications for how one interprets empirical studies of group boundaries.

In short, the paper contributes to broader research on how to analyze groups when ties among actors are multiplex, ties are only partly observed, and group definitions are socially constructed.

Section 2 contends that the social process of business group definition often focuses on the ties that bind constituent firms, and it discusses the origins and purposes of such ties. This discussion yields a pair of general hypotheses as well as a set of more specific hypotheses that concern the particular types of ties we can observe in Chile. Section 3 describes the Chilean context and discusses data and methods. Section 4 reports results. A final section interprets the findings, paying special attention to the informative nature of fragile ties as well as the limitations and future research opportunities implied by our focus on a single country.

2. TIES THAT DEFINE

Scholars in diverse disciplines – including anthropology, economics, history, political science, and sociology – have noted the ubiquity of business groups in emerging economies, have debated why they exist, and have explored their behavior and performance. The majority of studies of business groups have been field-based, in-depth explorations of groups in a single country. As the earlier quotation from Strachan (1976) suggests, field researchers typically report an unstated social consensus about which

firms belong to which groups. Formal definitions of groups are rare. Yet tellingly, in describing the essence of what groups are and discussing what defines their edges, field researchers tend to focus on the many social and economic ties that bind group firms together.

A sampling of perspectives is instructive. Leff (1978: 663) refers to a business group as “a group of companies that does business in different markets under a common administrative or financial control” and are “linked by relations of interpersonal trust, on the basis of a similar personal, ethnic or commercial background.” Encarnation (1989: 45), referring to Indian “business houses,” emphasizes multiple forms of ties among group members: “[I]n each of these houses, strong social ties of family, caste, religion, language, ethnicity and region reinforced financial and organizational linkages among affiliated enterprises.” In the context of Central America, Strachan (1976) resists the idea that a group’s constituents can be identified purely on the basis of a single type of tie, such as interlocking directorates. Thus “even a ban on [director] interlocks would not destroy nor even seriously impair the important group relations and patterns” (p. 18). Granovetter (2003), synthesizing from single-country studies, emphasizes multiple formal and informal connections that bind collections of firms into a group.

In sum, field researchers consistently report that groups are distinguished from the wider economy by the ties – social and economic, formal and informal – that exist between pairs of affiliated members. The focus on ties suggests to us that, in socially constructing the boundaries of groups, network actors also pay close attention to interfirm connections. Our model is that actors start with good knowledge of the ties present in their vicinity of the network, gain knowledge of ties in other parts of the network through social interaction, provisionally categorize firms into groups based on the relative frequency of in-group to out-group ties, and solidify their categorization into a consensus through further social interaction. Taking this as true, we examine the origins and function of ties in order to develop hypotheses about which ties might reflect the socially-constructed group boundaries. Though the following discussion examines cause and effect (what causes ties to form, and what effects do those ties have?), the hypotheses that emerge are intentionally statements of mere association (what types of ties are associated with intra-group relations?). This is appropriate since the available data permit tests of association but not of causality.

Formation and Purposes of Ties

How do ties among group firms form, and what purpose – if any – do they serve? We put forward three answers that emphasize transaction costs, the social nature of exchange, and historical events, respectively. Our theoretical perspective is purposely eclectic, for reasons that become clear below in the development of Hypothesis 1a.

Leff (1976, 1978) pioneered the idea that groups are responses to market imperfections, a perspective later adopted by Caves and Uekusa (1976), Chang and Choi (1988), and Khanna and Palepu (1997, 1999, 2000b). Indeed, markets in emerging economies are often thin, riddled with information gaps, and weakly supported by contract-enforcement institutions such as courts. These features expose trading partners to opportunistic behavior and raise the costs of transacting via the market (Williamson, 1975). In such a risky environment, ties are put in place among group affiliates to encourage the consummation of mutually beneficial exchanges that would be too costly to complete otherwise. Ties can reduce transaction costs by facilitating information flows between firms (Useem 1984; Granovetter 1985; Davis 1991; Burt 1992; Podolny 1994; Mizuchi 1996) or by aligning firms' interests, as when an equity cross-holding creates a situation of "mutual exchange of hostages" (Williamson 1983). Information flow and interest alignment may work together: greater information flow may make the parties in a relationship aware of more opportunities for exchange, and greater alignment may make it more likely that exchange will be mutually beneficial. Moreover, a single type of tie may both facilitate information flow and align interests. A friendship between senior managers, for instance, may promote communication about opportunities *and* reduce the fear of opportunism (Ingram and Roberts, 2000).

A second interpretation of the origin and function of the ties among group members emphasizes the social nature of exchange rather than transaction costs. In uncertain environments – and emerging economies are notoriously marked by uncertainty – boundedly rational managers engage in repeated trade with the same partners rather than search for new partners (Geertz, 1978; Podolny, 1994). Out of these on-going contacts emerge social relationships ranging from casual friendships to marriages. The social

ties, in turn, reinforce the recurring patterns of exchange. Under extreme uncertainty, this process might imply highly redundant ties and “an exclusive, enclosed network” (Podolny, 1994: 482).

A final interpretation of intra-group ties is historical. Ties among group members may emerge as wealthy owner-managers expand their operations into new industries, diversify their holdings to reduce personal risk, or divide their assets among offspring. Family connections among group affiliates, for instance, may simply reflect inheritance patterns. Under this perspective, ties embody history but may have little, if any, economic impact on the future.

Though prior researchers have offered these three interpretations for ties within groups, note well that nothing in the interpretations is inherently specific to the notion of groups. Uncertainty, for instance, is endemic throughout most emerging economies. Hence, we might expect repeated exchange and coincident ties to arise universally in such settings. Likewise, market imperfections are rife so we might expect ties that reduce transaction costs to emerge everywhere in an emerging economy. The interpretations say little about why particular ties should be more prominent within sets of firms that are collectively perceived as groups than throughout the economy. Our empirical effort is, at its heart, an attempt to figure out whether ties are indeed different within groups and, if so, how and why.

We hasten to point out two issues that we do *not* attempt to resolve empirically. By no means are the three interpretations mutually exclusive. Social relationships may deter opportunistic behavior, for example; one is less likely to cheat a trading partner if doing so leads to ostracism by one’s family. We do not try to resolve whether, say, market-imperfection rationales for ties are more valid than historical explanations. In addition, the interpretations leave open the question of whether group membership leads to the formation of ties or ties among firms cause groups to coalesce. The bonds put in place to forestall opportunistic behavior may lead to confederations of firms that then become seen as groups. Alternatively, repeated exchange and interaction within a group may cause formal and informal ties to emerge. In this paper, we do not claim to resolve whether ties lead to groups or groups engender ties.

Limits on Ties as Delineators

The numerous paths by which ties may form and the multiple purposes they may serve help to account for one of the most striking features of the ties that field observers report: their sheer multiplexity. The kinds of ties that can arise between firms are numerous, and many can arise at once (Encarnation, 1989; Strachan, 1976). They encompass formal economic arrangements such as equity crossholdings, inter-firm loans, director interlocks, common owners, and buyer-supplier agreements. They may also include social connections based on family, friendship, religion, language, ethnicity, educational background, and so forth. Moreover, many of the ties available to network actors as they construct their consensus about group boundaries may be invisible to a researcher. For instance, a researcher may be able to obtain a comprehensive list of director interlocks, but it is unlikely that he or she will be able to track all friendships among senior managers.

These considerations make it clear that discerning group boundaries perfectly from any single type of tie will be difficult. We formalize that notion in a pair of hypotheses that propose significant limits on the ability of a researcher to discern group boundaries from a cross-sectional knowledge of ties. First, a pair of firms within a group has access to a wide variety of types of ties. Each type of tie can serve both information flow and alignment purposes. There may thus be more kinds of ties than there are underlying purposes. To make matters more challenging, some types of ties, perhaps many, may be visible to actors who help to socially construct group boundaries but invisible to the observer. Hence:

Hypothesis 1a (non-necessity): There is no type of visible tie that two members of the same business group must necessarily have. Put differently, two firms that are members of the same group may lack any particular type of visible tie.

An immediate implication of this hypothesis is that two firms in the same group may display no visible tie whatsoever. Moreover, if different kinds of ties are functional substitutes for each other, or if ties reflect historical events rather than serve functional purposes, no particular type of tie must be in place before others form. This implication stands in contrast to prior scholarship concerning ties in business groups. Several scholars of business groups emphasize causal orderings among particular forms of ties (Gerlach, 1992a; Lincoln *et al.*, 1992, 1996; Uzzi, 1996; Keister, 1998): certain types of ties

precede others. Many of the papers single out financial linkages as precursors to others. Given the wide variety of ties that are available, however, the multiple purposes that each might serve, the ways that different types may work together, and the ways that ties may form by historical accident, we see little rationale for a strict causal ordering. A particular sequencing may be the accepted norm in a specific community, but this is based only on convention, not necessity.

Because the hazards of exchange in an emerging market apply to all pairs of firms, not just those in the same group, it is reasonable to speculate that ties may form and persist between transacting firms anywhere in the economy, not just within what network actors come to label a group. For this reason, we posit:

Hypothesis 1b (non-sufficiency): Any type of tie or set of types of visible ties may arise between firms that are *not* members of the same business group. That is, no set of types of visible ties is sufficient to assure that two firms are members of the same business group.

Candidate Ties

No type of tie is necessary or sufficient for a researcher to infer for certain that two firms are members of the same group. Still, the presence of a tie or the intensity of a tie may signify that the *odds* of affiliation are greater. The potential invisibility of many types of ties suggests that in any particular setting, only a subset of types will be accessible to a researcher, and the subset is likely to vary from one setting to another, depending on the availability of data. In the Chilean setting, for instance, we are able to observe five types of ties within and beyond business groups: family connections, director interlocks, common owners, direct equity holdings, and indirect equity holdings. Here we discuss the conceptual underpinnings of each type, and we describe prior findings about each type in the context of business groups not only in Chile, but around the world. This adds to our set of hypotheses. We also discuss briefly some types of ties that we are *not* able to observe in Chile; we make no claim that we have observed all possible ties, and indeed our empirical scheme does not require that we do so. A detailed description of the data and the measurement of each type of tie is deferred until the next section.

Family connections. Among field-based studies of business groups, no type of tie has received greater attention than family connections. The prominence of families prompted Strachan (1976) to title

his pioneering study in Nicaragua *Family and Other Business Groups in Economic Development*. Yoo and Lee (1987) report that nearly a third of the executive officers in South Korea's 20 largest *chaebol* are family members. In cataloging "axes of solidarity" among business groups worldwide, Granovetter (2003) discusses kinship first. Indeed, each of the major groups in most emerging economies is dominated by one or more families that typically have been associated with the group for decades (Dutta, 1997). Zeitlin and Ratcliff (1988) assign a prominent place to family and kinship units in their analysis of the locus of economic power in Chile.

Family ties within business groups may simply reflect chance patterns of inheritance and nepotism, but they might also serve a functional purpose: promoting alignment. Opportunistic behavior may be mitigated within a group because the individuals who govern member firms share common goals. Ouchi (1980) suggests that goal congruence, shepherded by tradition rather than by economists' price-based mechanisms, characterizes most non-market, non-hierarchical organizational forms. In this vein, identity appears to be important to the cohesion of Japanese *keiretsu* (Dore, 1987; Gerlach, 1992b) and Israeli *kibbutzim* (Simons and Ingram, 1997). The traditions and identity that support goal congruence may very well arise from bonds of kinship. Descriptive work from South and East Asia (Landa, 1994; Hamilton, 1996) and Central America (Strachan, 1976) suggests a hierarchy of ties that might reasonably be associated with goal congruence. Family relationships are uppermost in this hierarchy, followed by ethnic ties of decreasing specificity. Moreover, family involvement introduces a stable institution which guarantees repeated social contact among the individuals in a group (Allen and Panian, 1982; Davis and Stout, 1992). The threat of ostracism may be especially salient, and thus credible, in such high-frequency interactions, and may therefore help reinforce stability. The reliability and stability associated with family relationships may be especially valuable in the situations of high uncertainty that characterize emerging markets (Geertz, 1978). Such relationships may facilitate the development of alignment, trust, and coordination among companies belonging to a business group. Repeated contact with family members may also promote the flow of information about favorable exchange opportunities. Finally, family affiliations may be highly visible and available to network actors as they construct a consensus about group boundaries. For all these reasons, we postulate:

Hypothesis 2a (family presence): A pair of firms whose governing individuals are linked by family ties is more likely to belong to the same group than is a pair where family ties are not present.

Hypothesis 2b (family intensity): The greater are the family ties between two firms, the greater is the likelihood that the two belong to the same group.

It is also possible, however, that the emphasis field-based scholars of groups have put on family connections is misplaced. Field-based researchers immerse themselves in the groups they study, but pay less attention to wider networks beyond groups. Suppose that family ties pervade an economy, not only within business groups but among the entire owning class. This may be either because family ties are of incontrovertible value in circumventing transactional hazards in emerging markets, or because they are the residue of the past. For example, a study of the Glasgow shipbuilding industry (Ingram and Lifschitz, forthcoming) shows that kinship and family ties were once the basis of inter-firm relationships. A generation later, kinship ties were not nearly as important in governing real activity, but inter-firm ties nonetheless displayed this signature of the past.

In the face of such ubiquity of family ties, a field-based scholar who focuses on business groups exclusively may conclude, wrongly, that family ties distinguish groups from the rest of the economy. Actors immersed in the economy, more familiar with the full panoply of connections than are researchers, might conclude that family ties do not, in their cognitive simplifications, delineate group borders.

Common owners. Where else might the traditions that result in goal congruence come from? The inaccessibility of such traditions to outsiders suggests that the most direct way to foster common identity within a group is through the involvement of the same people in multiple companies. Thus we might expect to see the same individuals, not just members of the same family, holding major stakes in a group's constituent firms. Common ownership may arise for rational, functional reasons, or simply because a single individual makes an array of investments. Leff (1978) has emphasized the scarcity of managerial and entrepreneurial talent in several emerging economies. This could be a reason why a limited number of individuals are involved in starting and operating multiple ventures. Over time, this

process could yield ownership overlap between firms in the same group. Regardless of the reasons for its origin, ownership overlap promotes both alignment of interests and flow of information between firms, and it may be highly visible to network actors. Hence:

Hypothesis 3a (common owner presence): A pair of firms with overlapping owners is more likely to belong to the same group than is a pair without overlapping owners.

Hypothesis 3b (common owner intensity): The greater is the owner overlap between two firms, the greater is the likelihood that the two belong to the same group.

Director interlocks. An individual may be involved in multiple companies not only through ownership stakes, but also through board positions. Interlocking directorates have received a great deal of scholarly attention (Mizruchi, 1996). Most of this research has been conducted in developed economies, but the underlying ideas apply to emerging markets as well. The informational role of interlocking directorates was emphasized in several early studies including Useem's (1984) work on the "inner circle" of well-connected directors in the U.S. and Britain and on the "business scan" that well-interlocked companies have. In his classic study of poison pill adoption, Davis (1991) conceptualizes interlocking directorates as information conduits. He shows how director interlocks clarified the value of the poison pill as an anti-takeover device and, thus, sped the adoption of that organizational innovation. Consistent with the view that directors are conduits for valuable information, Keister (2000) finds that interlocking directorates are associated with superior performance in Chinese business groups. Whether conveying information or promoting alignment, director interlocks may be especially prominent signifiers of group borders:

Hypothesis 4a (director interlock presence): A pair of firms with interlocked directors is more likely to belong to the same group than is a pair without interlocked directors.

Hypothesis 4b (director interlock intensity): The greater is the degree of director interlock between two firms, the greater is the likelihood that the two belong to the same group.

Direct equity holdings. Economists have typically seen congruence of goals and alignment of interests as arising not via individual directors, owners, or families, but through equity stakes. Indeed, economic models of groups have sometimes emphasized the role of equity to the near-exclusion of all

other types of ties (Wolfenzon, 1999; Khanna, 2000). Flath (1996) argues that *keiretsu* affiliates may hold partial equity stakes in each other in order to bond them to take hidden actions that are Pareto optimal, and thus to forestall opportunistic behavior. Lincoln, Gerlach, and Takahashi (1992) think of equity interlocks in the Japanese *keiretsu* as playing a mutual support role. Together, these models suggest that groups of firms that trade with one another regularly may take equity stakes in each other to reduce the hazards of trade.

Direct equity interlocks may arise not only to support exchange among groups of existing firms, but also to nurture new ventures. Often, existing firms will act as *de facto* venture capitalists and underwriters (Gompers and Lerner, 2001). In return for an equity stake, an established company will fund a startup and endorse the venture's external commitments with its own reputation and status (Stuart, Hoang, and Hybels, 1999). Startups face particularly stiff challenges in emerging economies (Batjargal and Liu, 2004). Surrounded by weak institutions for contract enforcement, they find it difficult to make credible commitments to capital providers, suppliers, employees, and customers. As a result, startups in emerging economies may turn to existing business groups, which make commitments on their behalf in exchange for ownership stakes. Over time, this process results in a cluster of firms linked together by direct equity ties. Whether equity links arise to foster new ventures or to align interests among existing ventures, we posit:

Hypothesis 5a (direct equity presence): A pair of firms linked by a direct equity holding is more likely to belong to the same group than is a pair without such a holding.

Hypothesis 5b (direct equity intensity): The greater is the direct equity holding of one firm in a pair by the other, the greater is the likelihood that the two belong to the same group.

Indirect equity holdings. Several economists who study business groups have focused on pyramidal ownership structures or hierarchical chains of ownership relations (La Porta *et al.*, 1999; Wolfenzon, 1999). The belief underlying these studies, sometimes left implicit, is that such pyramids form the most important inter-firm groups in economies around the world. *Indirect* equity ties are the building blocks of these pyramids: firm A has a stake in firm C not directly, but through an equity position in firm B, which, in turn, owns part of C. Indirect ties may promote alignment between connected firms (Flath, 1992), but

they are usually represented as serving a very different purpose: they allow powerful individuals to control chains of companies with miniscule equity stakes and to expropriate the profit shares of minority shareholders. Indirect equity holdings may be a hallmark of business groups even if such ties provide only weak alignment of interests.

Hypothesis 6a (indirect equity presence): A pair of firms linked by an indirect equity holding is more likely to belong to the same group than is a pair without such a holding.

Hypothesis 6b (indirect equity intensity): The greater is the indirect equity holding of one firm in a pair by the other, the greater is the likelihood that the two belong to the same group.

Unobserved ties. There is no reason to believe that these five kinds of ties, the particular ones that we can measure in Chile, are a comprehensive list of all the ties that may exist between firms in a business group. On the contrary, we have emphasized that many other kinds of ties can exist and be visible to the actors who contribute to the social construction of group boundaries, but escape observation by researchers. Prior work has emphasized, for instance, banking- or debt-based relations (Berglof & Perotti, 1995; Weinstein & Yafeh, 1998), membership in ethnic networks or broad kinship systems (Pan, 1991; Kotkin, 1992) as well as the role of common managerial experience based on, say, school ties (Ungson *et al.*, 1997; Keister, 2000) or past employment (Uzzi, 1996; Keister, 2000). Our claim is not that we have captured an exhaustive set of group-defining ties. (Indeed, it is probably impossible for any study to do so, and Hypothesis 1a presumes that we have not.) Rather, our claim is that we have considered a wide enough range of candidate ties to shed meaningful light on the question of what kinds of ties distinguish group co-members from pairs of unaffiliated firms.

3. CONTEXT, DATA, AND METHODS

The Chilean Context

We test our hypotheses with data from Chile. We focus on Chile for several reasons. First, business groups are dominant actors in the Chilean private sector (Zeitlin, 1974; Zeitlin and Ratcliff, 1988; Majluf *et al.*, 1998; Lefort and Walker, 1999). The size and dominance of the Chilean groups appear not to be

decreasing, at least by some measures, even though the country has developed rapidly in the past decade (Khanna and Palepu, 1999, 2000b; Lefort and Walker, 1999). Second, a handful of prior studies suggest that members of Chilean groups are connected by a rich variety of economic and social ties. Zeitlin's (1974: 109) early analysis of Chilean corporations in the 1960s alludes to a "complex kinship unit in which economic interests and kinship bonds are inextricably intertwined." In a survey of chief executives, chief financial officers, and human resource managers, Khanna and Palepu (1999) report that senior executives of Chilean groups stress the importance of non-economic ties. Majluf *et al.* (1998) similarly emphasize non-economic ties. Observing a variety of ties is important, making it far more likely that the interpretation of our results will shed light on what kinds of ties are group-distinguishing and why. Third, a clear consensus exists in Chile concerning which firms belong to each group, and this consensus helps us test our hypotheses. The consensus reflects, in part, an accident of history. After business groups were implicated in a financial crisis in the early 1980s, regulators began to track groups closely, and groups were forced to clarify their membership rolls.

Last, but by no means least, we focus on Chile because a rare combination of data about intra- and extra-group ties is available there. For instance, we know what equity stake each widely held company in Chile holds in every other widely held company. Such detailed equity interlock information is unavailable in at least a dozen other countries we have studied. We also know the identities of the largest private owners and the directors of widely held Chilean companies, as well as the family names of these owners and directors. This permits a richer investigation than would be possible in any other emerging market we have examined.

Of course, since business groups are responses to the institutional context, or at least co-evolve with the context, it may well be that the ties that delineate groups are different in settings other than Chile. As such, some salient features of the Chilean context are worth noting. First, free-market economic reforms had taken root in Chile before the time for which we have data (Bosworth, *et al.*, 1994, especially Chapter 1; Khanna and Palepu, 1999, 2000b). Relative to most emerging markets, Chile possessed well-functioning capital markets: domestic liberalization had occurred, and access to overseas capital markets was relatively unfettered. The country was politically stable with sound legal institutions. Labor markets

operated with less freedom.² Corruption, while not absent in Chile, was notably less than that in most emerging markets during the post-Pinochet era. This was perhaps related to the general absence of red-tape and regulatory meddling in the economy by bureaucrats. The distinctive characteristics of Chile have implications for interpreting our findings, as we discuss below.

Data, Measures, and Validation

Our data set encompasses all 457 firms that were monitored by regulatory authorities in Chile's *Superintendencias de Valores y Seguros (SVS)* in 1997. The SVS, Chile's counterpart to the United States' Securities and Exchange Commission, supervises all publicly traded companies as well as private companies that have many shareholders, that fulfill major government contracts, or that play prominent roles in the financial system (Chile's Security Markets Law Number 18045). The data set includes both group affiliates and unaffiliated firms. Especially because it includes private companies, our data set is unusually comprehensive. Zeitlin and Ratcliff's (1988) well-known analysis of the ties among Chilean firms, in contrast, focuses on the 37 largest non-financial and six largest financial corporations. To test our hypotheses, we require two types of data about these firms: (a) the name of the group (if any) in which each is a member, and (b) the family, ownership, director, and equity ties between each pair.

Data on group affiliation. It is absolutely crucial to our study that we obtain reliable data concerning the consensus group affiliation of each firm. Without this, it would be impossible to achieve our central goal – to identify the observable ties that best delineate group boundaries. Fortunately for our purposes, regulatory authorities at the SVS monitor and record group affiliation. The SVS does not publicize the existence of the affiliation list, but we were able to obtain a copy after multiple visits to the regulator revealed that such data exist. We use the SVS affiliation data to produce, for each pair of firms, a dummy variable $Group_{ij}$, which is 1 if firms i and j are members of the same group and 0 otherwise.

² Thus, Khanna and Wu (1998) argue that those Chilean groups that were purely responses to financial market imperfections disbanded following capital market development, while others that attempted to compensate for a broader range of market failures did not.

The SVS tracking of group affiliation is a response to Chile's economic crisis of 1982-83, during which real national output fell 20% and unemployment rates soared above 30% (Barandiaran and Hernandez, 1999). Even before the crisis, leading bank regulator Mauricio Larraín grew concerned about indiscriminate lending by banks to companies with which they were closely affiliated: groups, with convoluted holdings in one another, might accumulate huge debts without regulators noticing, and subsequent defaults could trigger a banking crisis. Accordingly, Minister of Economics and Finance Rolf Lüders asked Larraín to begin building maps of groups. Larraín's concern proved prescient. In the ensuing crisis, banks were discovered to have as much as 45% of their loan portfolios concentrated in related groups (Larraín, 1989), and many observers blamed the crisis, in part, on unbridled lending to affiliates.

In the aftermath of the crisis, the activities of group-specific financial institutions were strictly proscribed, and efforts to track group membership were initiated so that regulators could spot any future lending to affiliates immediately and unambiguously. Thus, in Chile, unlike in many other emerging economies, the term "business group" has a legal, if somewhat vague, definition:

“[A business] group is a set of companies which present such a sort of relationships and linkages in their property, management, administration, or credit responsibilities, that there is ground to believe that the economic and financial decisions of those companies are guided by or subordinated to the shared interest of the group, or that there are common financial risks in the credits obtained or in the financial instruments they issue” (Article 96, Title XV, Law 18045, Mercado de Valores, translation from Majluf, *et al.*, 1998).

Note that this definition does not instruct the regulators to focus on specific kinds of ties as they track group boundaries. It focuses on outcomes such as subordinated interests and common financial risks rather than particular ties such as family connections or director interlocks.

It is crucial to verify that the SVS group affiliation list reflects the consensus view of group boundaries among Chileans, not just the idiosyncratic perspective of the regulators. Toward this end, we took three steps. First, we checked the regulators' list against the opinions of other knowledgeable sources. Chilean academics, managers, and regulators outside the SVS viewed and confirmed random

samples of the list. Independent published sources, typically in Spanish, ratified the composition of certain groups. In addition, several business groups provide information concerning affiliated companies in their annual reports, and we always found this information to be consistent with SVS data.

Second, we asked whether the stock market's perception of group membership is aligned with the regulators'. Analyzing the monthly stock market returns of group members and unaffiliated firms on the Santiago stock exchange, we found that the returns of firms within each regulator-identified group move together more closely than chance would dictate, even after one introduces a variety of control variables. Thus the groups that the regulators pinpoint do appear to be collections of firms whose economic fates are tied together in the eyes of the investor community as a whole.³ (The econometric issues involved in this analysis are complicated. An appendix that describes the analysis in detail is available from the authors.)

Third, we contacted Rolf Lüders, former Minister of Economics and Finance and one of the famed Friedman-trained "Chicago boys" who overhauled Chile's economy during the 1970s and 1980s, and asked him how the original maps of group affiliation were constructed. Though regulators did research specific ties (e.g., examining ownership linkages that newly founded companies were required to reveal in an official newspaper), Lüders confirmed that they relied on a consensus view of group boundaries. "There was a general knowledge of group membership," he remarked. "This is a small country, you know."⁴

Measures of ties. In addition to Group_{ij} , we produced \mathbf{Tie}_{ij} , a vector measuring the family, owner, director, and equity ties between firms i and j . Two sources provided the raw data for \mathbf{Tie}_{ij} . Ownership and equity data came from a SVS data set that identifies as many as 20 of the largest individual owners of each widely held firm as well as the equity stake that each such firm holds in every other such firm. These ownership and equity interlock data are especially difficult to find in most countries. Director rolls

³ We checked the robustness of this analysis using a bootstrapping approach: we reassigned firms to groups randomly and found that such randomly constructed groupings very rarely display intra-group correlations in stock returns as high as we observe in regulator-defined groups. This validates the view that regulators' definitions of groups are aligned with the definitions of the stock market.

⁴ Telephone interview with Rolf Lüders, now Professor of Economics, Pontificia Universidad Católica de Chile, August 16, 2005.

came from a Chilean colleague, who extracted them from a separate SVS database and provided them to us. We merged the two sources with each other and with the group affiliation data, relying on conversations with data collectors and on knowledgeable observers in Chile when slightly different company or personal names were used across the sources.

The raw data were manipulated to generate a dozen indicators of the ties between each pair of firms. The first four elements of \mathbf{Tie}_{ij} capture family connections between firms i and j . To measure these connections, we began by identifying – with the assistance of a graduate student in Chile – the family affiliations of each owner and director of each firm. (Naming conventions in Chile are such that each individual carries both a paternal and a maternal surname. Our analyses focus on paternal links only, reflecting the patriarchal nature of Chilean society.) We then constructed the following measures of the presence and intensity of family ties:

$\text{DirFamilyDum}_{ij} = 1$ if there are distinct (i.e., not the same individual) directors of firms i and j with the same surname; 0 otherwise.

DirFamily_{ij} = the number of individuals serving on the board of firm i with a distinct director of the same surname serving on firm j 's board, plus the number on j 's board with a distinct director of the same surname on i 's board, divided by the total number of board members for i and j .

$\text{OwnFamilyDum}_{ij} = 1$ if there are distinct major owners of firms i and j with the same surname; 0 otherwise.

OwnFamily_{ij} = the number of major owners of firm i with a distinct major owner of the same surname associated with firm j , plus the number of major owners of firm j with a distinct major owner of the same surname associated with firm i , divided by the total number of major owners for i and j .

The dummy variables are useful for testing tie-presence hypotheses, while the continuous variables are associated with the tie-intensity hypotheses. Note that the continuous variables range from 0 (no family overlap of boards or ownership rolls) to 1 (full overlap).

We initially worried that commonplace names – the Chilean equivalent of “Smith” and “Jones” might generate spurious family links among firms. Having examined the underlying data, however, we now believe that this is a minor source of error. Our data set includes 5,702 distinct owners with 1,702 distinct family names. We examined the names that occur most frequently (e.g., Larrain, Errazuriz, Ibanez) and

confirmed with Chilean sources that they are indeed associated with actual, prominent Chilean families. The one name that does appear frequently, but may not represent a single family, is Garcia; this name accounts for 53, or less than 1%, of owners. Spurious links appear to be extremely rare in the data. We were also concerned that the focus on paternal surnames alone would lead us to miss important maternal connections. Accordingly, we created additional measures of maternal family ties. All of the results reported below are robust to the inclusion of maternal-tie measures.

Four additional elements of \mathbf{Tie}_{ij} measure owner and director overlap:

$\text{DirectorDum}_{ij} = 1$ if at least one individual serves on the boards of both i and j ; 0 otherwise.

$\text{Director}_{ij} =$ the number of individuals serving on the boards of both firm i and firm j divided by the average number of board members for i and j .

$\text{OwnerDum}_{ij} = 1$ if firms i and j have a major owner in common; 0 otherwise.

$\text{Owner}_{ij} =$ the number of individuals appearing on the ownership rolls for both firm i and firm j divided by the average number of individual owners listed for i and j .

The final four elements of \mathbf{Tie}_{ij} measure direct and indirect equity interlocks. Indirect interlocks arise when, for instance, firm i owns part of firm k , which in turn owns part of firm j . To account for such indirect holdings, we calculate firm i 's total stake in j by all direct and indirect routes and then subtract out any direct holding. These calculations produce four measures:

$\text{DirectEqDum}_{ij} = 1$ if firm i directly holds a stake in firm j or vice versa; 0 otherwise.

$\text{DirectEq}_{ij} =$ the maximum of two figures: the fraction of firm j 's shares directly held by firm i and the fraction of firm i 's shares directly held by firm j .

$\text{IndirectEqDum}_{ij} = 1$ if firms i holds a stake in firm j through a third company or vice versa; 0 otherwise.

$\text{IndirectEq}_{ij} =$ the maximum of two figures: the fraction of firm j 's shares held by firm i through third companies and the fraction of firm i 's shares held by firm j through third companies.

Note that we rely on equity interlocks among only the 457 companies in the SVS database.

Consequently, an equity interlock between two companies will not be detected if it arises through a third company that the SVS does not track. As a result, our data set understates indirect equity holdings. It

does so, however, for both within-group dyads and non-group dyads. Since the data are understated for both sub-samples, it is unclear what bias, if any, this will create in the analyses described below.

Moreover, our data set includes both publicly traded companies and some private companies, as described above. Thus we presumably miss fewer indirect holdings than would other researchers such as La Porta *et al.* (1999), who rely on data for publicly traded companies only. Note also that there is no lower threshold on ownership stakes in our dataset. Equity stakes as small as 1% are reported with precise figures, and even smaller stakes are denoted by special symbols.⁵

Control variables. Since factors other than ties may influence the odds that two firms are group brethren (and are perceived as brethren), we also generated a set of control variables. Our first control, a dummy variable, indicates whether two firms in a dyad participate in the same industry (as defined by 2-digit SIC codes). If group brethren tend to participate in the same industry, this variable will have a positive sign. Our second control variable measures the absolute difference between the years of incorporation of the two firms in a dyad. If group brethren tend to be founded at the same time, this variable will have a negative sign. Finally, we generated a pair of dummy variables that indicate whether the two firms in a dyad are (a) both larger than the mean sizes in their industries, (b) both smaller than the means, or (c) larger in one firm's case and smaller in the other's. These variables will detect whether, say, group dyads consist of pairs of especially large firms.

Analysis and Estimation

Hypotheses 1a and 1b argue that no type of tie is necessary or sufficient to assure that two firms are members of the same group. To examine these hypotheses, we rely on simple tabulations of elements of \mathbf{Tie}_{ij} for $\text{Group}_{ij} = 0$ and $\text{Group}_{ij} = 1$. We analyze, for instance, whether intra-group dyads sometimes exhibit no ties whatsoever and whether each type of tie arises on occasion for non-group dyads.

The other hypotheses, which relate the presence and intensity of a tie to group affiliation, require a more sophisticated approach. Specifically, we estimate the probit model

⁵ In the analysis, we assume that these smaller stakes are, on average, a holding of 0.5%.

$$\text{Group}_{ij} = \alpha + \beta' \overline{\text{Tie}}_{ij} + \chi' \text{Control}_{ij} + \varepsilon_{ij} \quad (1)$$

where $\overline{\text{Tie}}_{ij}$ is a subset of the full vector of observable ties Tie_{ij} (or in some of our analyses, the full vector itself), Group_{ij} is the vector of control variables, and ε_{ij} is an error term. If there are N firms and GROUP is an N x N matrix with Group_{ij} as its i,j^{th} entry, then each of the $N(N-1)/2$ dyads below the main diagonal of GROUP provides an observation for the estimation. The indicator variables in Tie_{ij} allow us to test tie-presence hypotheses while the continuous variables are relevant for the tie-intensity hypotheses.

Quadratic assignment procedure. Estimation of Equation 1 poses a challenge. The usual significance tests associated with probit estimations are valid only under the assumption that the various ε_{ij} 's are independent of one another. Because the unit of analysis here is the dyad, not the individual firm, it is implausible to argue that the error terms are independent. Standard techniques for dealing with correlated errors, such as generalized least squares, fail to capture the particular pattern of interdependence embodied in the dyads.

To assess significance, we adapt the nonparametric quadratic assignment procedure (QAP) commonly used by researchers who examine dyads in social network data (Baker and Hubert, 1981; Krackhardt, 1988; Gulati and Gargiulo, 1999). First we estimate the probit model in Equation 1 to obtain a point estimate of β , \mathbf{b}^* . Then we permute the rows and columns of GROUP at random – that is, the rows of GROUP are rearranged in a new, randomly assigned order, and the columns are rearranged in the same order – and estimate Equation 1 again. Under the null hypothesis that $\overline{\text{Tie}}_{ij}$ has no influence on Group_{ij} , this produces a second estimate of β that preserves the pattern of interdependence in the error terms. We repeat this procedure of random permutation and probit estimation 500 times, thereby generating a distribution for β that is valid under the null. Finally, we compare each element of the vector \mathbf{b}^* to the distribution generated for that element. If the element is in, say, the upper 5% of the distribution, then we can reject the null hypothesis (that the tie variable has no real association with group affiliation).⁶

⁶ A second issue associated with Equation 1 is that it will not allow us to explore the possibility that within-group dyads differ from non-group dyads in the *combinations* of ties they exhibit. To explore this, we conduct factor analyses (Harmon, 1976) on Tie_{ij} – one for within-group dyads and one for non-group dyads. If these two subsets reveal similar factors, we can be confident that groups' boundaries are *not* strongly delineated by the particular

4. RESULTS

Descriptive Statistics

Our analysis begins with data on the 457 firms that were monitored by the SVS in 1997. These firms generate 104,196 firm dyads. Of the 457 firms, director data are available for only 386, producing 74,305 dyads. Of the full set of 457 firms, 203 (44%) are members of business groups. Groups range in size from two monitored firms to 19, providing a total of 760 within-group dyads. Table 1 shows the distribution of the number of firms per group. Table 2 provides summary statistics on the components of Tie_{ij} for the total sample, for the within-group dyads, and for the non-group dyads. In addition to the conventional descriptive statistics, Table 2 shows the number of non-zero observations for each variable and the mean value among the non-zero observations. Table 3 shows the correlations among the components of Tie_{ij} .

Non-sufficiency and Non-necessity (H1a and H1b)

Three related analyses provide support for Hypotheses 1a and 1b. First, no type of tie arises in all within-group dyads, just as Hypothesis 1a would predict. Common owners, for instance, link only 355 of the 760 pairs of firms that are group brethren, or 47% of the total. The percentage is lower for all other types of ties. Accordingly, no type of tie is necessary for two firms to be members of the same group. Likewise, in line with Hypothesis 1b, Table 2 shows that every type of tie arises for some set of non-group dyads. Among the dyads that span group boundaries, 5,067 are linked by a family connection among directors, for example. No type of tie occurs exclusively within groups and hence none is sufficient to “prove” that two firms must be members of the same group.

For a second perspective on Hypotheses 1a and 1b, we find it helpful to display the underlying data graphically as in Figures 1 through 7. To create the figures, we first assign each firm a number between 1

manner in which ties are mixed and matched. This would validate the simple linear specification of Equation 1. See footnote 7 below for results.

and 457. The 203 group-affiliated firms are last in the list, and firms within the same group are numbered consecutively. In Figure 1, a black mark indicates that the row-firm is in the same group as the column-firm. Black blocks in the southeast corner correspond to groups. In Figure 2, firms are arrayed along rows and columns in the same order as in Figure 1, but now a black mark indicates that the row-firm has at least one director with a family member among the directors of the column-firm. Figures 3-7 show similar diagrams for owner-based family connections, director overlaps, owner overlaps, direct equity holdings, and indirect equity holdings. For each type of tie in Figures 2-7, some white spots appear in areas that were black in Figure 1. These white spots demonstrate that two firms which are members of the same group may lack any particular type of tie (Hypothesis 1a). In addition, many black spots appear where white areas were in Figure 1. These spots, representing ties that cross group boundaries, illustrate that any type of tie may arise between firms that are not members of the same group (Hypothesis 1b). The figures also shed light on other hypotheses, discussed below.

For a final perspective on Hypotheses 1a and 1b, we examine the full array of ties that arise for each dyad. \mathbf{Tie}_{ij} contains dummy variables for six different kinds of observed ties so there are 2^6 , or 64, possible ways that each pair of firms can be linked. Fifty of these 64 arise at least once among within-group dyads, and 51 of the 64 appear for at least one non-group dyad. That is, pairs of firms are occasionally linked in almost every conceivable way, and this is equally true for pairs that are and are not members of the same group. Among within-group dyads, the most common of the 64 possibilities involves no observed tie at all; 32% of within-group dyads are not joined by any visible tie whatsoever, strongly in line with Hypothesis 1a. Moreover, there is no evidence at all of a strict causal ordering among the types of ties.

Presence and Intensity of Ties (H2a – H6b)

The evidence we have already examined lends some credence to the remaining hypotheses. Table 2 shows that all six types of ties arise much more frequently (H2a – 6a), and are larger when they arise (H2b – 6b), within groups than across group boundaries. The darkest areas of the figures for owner, director, and direct equity ties are similar to the group structure shown in Figure 1, as Hypothesis 4a, 5a,

and 6a would predict. On the other hand, the two diagrams reporting family relationships illustrate that large Chilean firms – those within a group, those in different groups, and those outside of groups – are widely connected to one another by family bonds.

For statistical tests of the tie-presence and tie-intensity hypotheses, we turn to Table 4, which shows the results of the probit estimation of Equation 1 with the quadratic assignment procedure used to determine significance levels.⁷ Models 1 through 6 examine the correlations between group membership and, sequentially, each of the types of ties we have measured. In each case, we include both an indicator variable to detect incidence of the tie in question and a continuous variable to indicate the intensity of the tie. The first six models demonstrate a statistically significant relationship between group membership and each type of tie. The relationship is weakest for the two measures of family connections and for direct equity interlocks. Because each model focuses on a single type of tie and the types are positively correlated with each other (Table 3), the relationships in Models 1-6 are likely overstated.

Models 7 and 8 carry out multivariate probit estimations. In both cases, owner overlap and indirect equity interlocks are strongly associated with group affiliation. The presence of either type of tie is a strong indication of affiliation, and the stronger the tie, the stronger the indication. Other types of ties (direct equity interlock, director overlap, and two kinds of family connections) do not have quite as strong an association with group identity, as Model 7 shows. Once we represent each of these other types by a single variable, in Model 8, all have significant explanatory power. All of the observed types of ties delineate group boundaries to some extent. There is particularly strong evidence that overlap among major individual investors and indirect ownership through a third firm increase the probability that two firms are affiliated with the same group. The quadratic assignment procedure proves critical in reaching our conclusions. Several variables in the models shown in Table 4 are significant at the 1% level in conventional probit estimations, but insignificant with QAP.

⁷ A factor analysis on the full set of 74,305 dyads with director information reveals three underlying and easily interpretable factors: one associated with direct personal or financial connections, one with family bonds, and one with equity holdings. Within-group and non-group dyads produce similar factors, giving us added confidence in the linear specification of Equation 1.

Evidence on the magnitude of effects is presented in Table 5. In line with convention, we calculate the impact of each variable under the assumption that all other variables set to zero.⁸ We base our calculations on Model 7 in Table 4. The presence of any overlap at all between individual owners heightens the probability of group affiliation by 0.6%. Once there is such overlap, a one-standard-deviation increase in the overlap raises the odds of being in the same group by 3.6%. Similarly, the presence of any indirect equity relationship between a pair of firms increases the probability that the two are in the same business group by 0.4%. Given some relationship, a one-standard-deviation increase in the indirect equity interlock raises the odds of common group membership by 0.3%. In interpreting these figures, it is helpful to note that the odds of any two randomly selected firms being in the same group is less than 0.9%. Compared to this figure, the effects of ties on the probability of group affiliation are quite large. The impact of owner overlap is clearly the largest in the model, followed by director interlocks, indirect equity holdings and direct equity holdings. Owner-based family connections have the smallest effect, and director-based family ties also have a modest impact. These results are robust to the removal of outliers on the independent variables.

The quadratic assignment procedure also allows us to test for the statistical significance of *differences* between pairs of coefficients. In Model 7, the following coefficient differences are significant at the 10% level:

OwnerDum	>	OwnerFamilyDum
Owner	>	OwnerFamily
IndirectEqDum	>	OwnerFamilyDum
IndirectEq	>	OwnerFamily
Owner	>	DirFamily
IndirectEq	>	DirFamily

These findings confirm that family ties are relatively weak delineators of group boundaries.⁹

⁸ The alternative is to set the other variables to their mean levels. This naturally raises the magnitudes in Table 5. e.g. The magnitude of the owner overlap effect rises from 0.6% to 1.1% (effect of any overlap at all), and from 3.6% to 4.9% (effect of a one standard deviation increase in owner overlap, conditional on their being overlap at all).

⁹ The control variables and goodness-of-fit deserve brief mention. Three of the control variables are consistently significant: pairs of firms in the same industry and pairs of firms founded few years apart are especially likely to be group siblings, and pairs of small firms are unlikely to be siblings. Exclusion of the control variables has virtually no impact on the magnitude or significance of the tie-related coefficients. Conventional goodness-of-fit measures are of limited utility when the vast majority (99.14%) of firm-pair observations consist of firms that do not belong to the same group ($\text{Group}_{ij} = 0$). Here a model that indiscriminately predicts all firm pairs to belong to different

5. IMPLICATIONS

The direct contribution of this paper is to identify which of several candidate ties best distinguish group siblings from unaffiliated pairs of firms in Chile. Patterns of owner overlap, indirect equity holdings, and director interlocks are especially strong delineators of group boundaries. Family connections and direct equity holdings play a less robust role. Overall, we view business groups in Chile as tightly coupled icebergs floating in a wider sea of relationships. Family connections provide cohesion for the sea as a whole. Individual owners, chains of equity, and directors define the icebergs most clearly. Our interpretation is that owner overlap, indirect equity holdings, and director interlocks are particular salient to economic actors in Chile as they collectively construct the boundaries of business groups.

These findings challenge two schools of conventional wisdom about emerging-market business groups. First, in contrast to the emphasis in several descriptive, field-based theses (Strachan, 1976; Zeitlin and Ratcliff, 1988; Dutta, 1997), our results question whether family connections truly define groups in the eyes of economic actors or merely pervade the entirety of the owning class in emerging economies. Their general importance in the economy is not questioned by our analysis, but their disproportionate importance in ubiquitous groups is cast in doubt. Second, economists who have studied business groups tend to assume that equity holdings provide the glue that holds groups together (Wolfenzon, 1999; Khanna, 2000). While our findings do show a boundary-defining role for equity holdings, particularly indirect holdings, they surely do not support an *exclusive* focus on equity.

The Power of Fragile Ties

Our results beg the question, *why* do certain types of ties play a greater role than others in the social construction of group boundaries in Chile? Stepping back from the detailed findings, we are struck by a

groups, for instance, is correct in 99.14% of cases, even though it is wrong in *all* cases in which Group_{ij} actually equals 1. Model 8 in Table 4 improves on this considerably, correctly predicting $\text{Group}_{ij} = 1$ instances as frequently as 38.5% of the time without reducing the overall explanatory power of the model below 99.14%.

pattern: the types of ties that delineate group borders most clearly are arguably the more fragile ties among our candidates. That is, they tend to be reassessed occasionally, and they can be severed readily if some underlying exchange relationship disappears. Placing our candidate ties along a spectrum of fragility, we see owner and director overlaps and indirect equity ties at the fragile end, family connections at the opposite end, and direct equity holdings in the middle. Family connections tend to endure for generations. Even if inoperative and without real effect, they remain in place from the point of view of a researcher (Padgett and Ansell, 1993: 1274; Scott, 1991: 32). At the other end of the spectrum, owner and director ties in a dyad are based on particular, single individuals. If a sole owner sells shares in either company or a single director leaves either board, such a tie may be broken. Direct equity holdings lie in the middle of the spectrum since the severance of such a tie requires a consensus among a set of decision makers, not a single owner or director. Indirect equity holdings are more fragile than direct holdings: a break anywhere along a chain connecting two firms can cut an indirect tie whereas a much more specific break has to occur to sever a direct holding.¹⁰ Arguably then, the more fragile a type of tie is, the better it delineates the boundaries of Chilean business groups.

This pattern may seem counterintuitive at first, but is in fact logical. Suppose that the pairs of firms in each business group are persistently undertaking exchanges with one another. Firms that are not in the same group occasionally exchange goods or services as well, but these relationships are not as enduring. Assume also that exchanges sometimes give rise to ties – friendships, marriages, director interlocks, ownership stakes, etc. Finally, suppose that types of ties differ in their fragility – i.e., the frequency with which they are reassessed and the ease with which they are severed. Under these simple assumptions, ties that endure even after underlying exchange relationships disappear will, over time, come to pervade an entire economy. As they do so, they lose their power to delineate the patches of persistent exchange in the economy – the business groups. In contrast, fragile ties, established along with an exchange relation but dismantled if the relationship is severed, do a relatively good job of marking out persistent patches of

¹⁰ This logic breaks down if there are multiple paths that link two firms, for example, if firm A holds stakes in firms X, Y, and Z, all of which hold stakes in firm B. We examined our data with software for social network analysis, however, and found this circumstance was very rare in Chile.

relations. Hence fragile ties have unusual power to convey information about group boundaries. (A simulation model that confirms this intuition is available from the authors.)

Our interpretation is highly speculative at this point, of course. A priority for future research is to measure the fragility of different types of ties and to test the proposition that fragile ties best distinguish group affiliates from members of different groups. This might be done in Chile or other economies with business groups. Alternatively, it may be done in organizational contexts far removed from the business groups of emerging markets.

Our speculation about the discriminatory power of fragile ties, if borne out, has implications for groups in general, not just emerging-market business groups. The strategy of using fragile ties to discern group borders in ambiguous settings is potentially quite valuable to scholars and managers alike. Many scholarly studies of groups argue that group membership has an impact that can be tested empirically. One might argue, for instance, that members whose connections transcend group boundaries will serve as important information bridges or will gain from their brokering ability (Granovetter, 1973; Burt, 1992). To test whether such propositions are valid, one must first be able to distinguish group insiders from outsiders. A focus on fragile ties might enhance such an ability.

For managers also, the ability to discern group boundaries from fragile ties is potentially valuable. A challenging part of a manager's job is to grasp the informal structure of groups within an organization. Individuals tend to be more strongly influenced by members of their own groups than by outsiders (Festinger *et al.*, 1950; Frank, 1995; Roethlisberger and Dickson, 1939; Roy, 1954) so a manager who is skilled at spotting intra-organizational groups is probably better able to identify key points of leverage in an organization and direct the informal structure toward productive ends. The benefits of discerning interpersonal groups are echoed at the level of inter-firm groups. An understanding of which firms trade with one another intensely, for instance, may enable a manager to pinpoint under-served customers or avoid a move that will incite retaliation. Hence a stratagem for discerning group boundaries when groups do not publicly declare their boundaries – and often they do not – is potentially very useful for actors in social and organizational networks.

Our findings have implications beyond the use of fragile ties to discern group borders. If ties indeed serve as the internal glue of groups, then the findings are important for individuals who are trying to dismantle or assemble business groups – policy makers as well as managers and owners of group firms. The findings concerning non-necessity (Hypothesis 1a) clarify why policymakers’ attempts to dismantle Korean *chaebol* – by forbidding various intra-group transactions, but leaving other ties intact – have met with failure. The results concerning non-sufficiency (Hypothesis 1b) predict that creating groups, as recently attempted in China (Keister, 2000), is likely to prove more difficult than merely enforcing equity exchange. For a different set of actors – multinationals – the findings suggest that investing equity in a joint venture with a part of a group is likely not sufficient to build a lasting bond unless the financial tie is accompanied by complementary personal and social investments.

Specificity to Chile

Even while drawing out the widely applicable implications of the paper, such as the potential importance of fragile ties, we would emphasize that our narrow results concerning which particular ties are most salient apply to Chile alone. This is true for two reasons. First, business groups and the ties that define them are in all likelihood organizational responses to local institutional context. We emphasized earlier how several factors – market imperfections, the nature of social exchange, and history – influence the formation of ties. The ties that reveal group boundaries may be as varied as those factors are in disparate emerging markets. For instance, we noted above that Chile differs from many emerging markets in the advanced state of its capital markets and its relative lack of corruption. This might have influenced which ties rose to prominence there and came to shape collective perceptions of group boundaries. Further, it is more likely that family ties come to pervade the economy at large – and cease to discriminate group boundaries – in a small country like Chile than in a larger one.

Second, we have emphasized that groups, as cognitive categorizations, are socially constructed, and we have sought the ties that reflect the construction process in Chile. Processes of social construction are notoriously path dependent (Berger and Luckmann, 1966). Group-defining ties that seemed salient to

earlier mappers of Chilean groups such as Mauricio Larraín and Rolf Lüders, even for idiosyncratic reasons, might show up as especially important in our results. The social construction process in another country might follow a very different path to a distinctive destination. A priority for future work is to determine whether our findings generalize to business groups in other emerging markets.

Other Limitations and Future Work

The present work has many limitations, which highlight avenues for future research. *Longitudinal* data on group membership and on ties, which we were unable to find for several of the kinds of Chilean ties profiled in this paper, hold great promise for future work. Such data would allow us to measure directly the fragility of different types of ties rather than rely on logical arguments. In addition, time-series data could be used to probe the origins and evolution of business groups, akin to Gulati and Gargiulo's (1999) study of alliance networks, and to test hypotheses of causality, not just association.

Other extensions of our data set would also be of interest, in light of the invisible ties that underpin Hypotheses 1a and 1b. The history of Chile suggests that data on the ethnic origins of business group leaders and their political party affiliations might reveal relevant ties. Also, we currently link members of families purely by means of surnames. The development of family trees among Chilean business leaders might permit us to discern the effects of family ties with greater precision.

We also see an opportunity to couple our focus on inter-firm ties with the burgeoning econometric literature on the performance effects of business group affiliation in emerging economies (Chang and Choi, 1988; Guillén, 2000; Khanna and Palepu, 2000a, b) and in Japan (Caves and Uekusa, 1976; Nakatani, 1984; Lincoln *et al.*, 1996). As in the case of interlocking directorates in the United States (Mizruchi, 1996), different ties may serve various combinations of information dissemination or incentive alignment purposes, and thus have different effects on firm performance. Emerging-market business groups are a rare venue in which researchers can shed light on the under-studied issue of the performance effects of network affiliation (Keister, 2000; Rowley *et al.*, 2000).

We have confined ourselves to dyadic analyses here, in keeping with much of the literature on networks. This reflects two facts: that good examinations of networks often begin with analyses of dyads

(Wasserman and Faust, 1994) and that statistical techniques for social network analysis are better developed for dyads than for higher-level structures. The network data we have collected, however, lend themselves to higher-level analyses, which might enable one to examine the positions, roles, power, status, and brokerage relations of group affiliates relative to unaffiliated firms (Burt, 1976; White *et al.*, 1976; Winship and Mandel, 1983; Burt, Hogarth, and Michaud, 2000).¹¹

Finally, our speculation that fragile ties best delineate group boundaries should apply in settings – interorganizational and interpersonal – far removed from business groups in emerging economies. A fascinating avenue for future research, we feel, is to pursue this hypothesis in a wide range of contexts.

¹¹ For instance, following Gerlach (1992a), one might fruitfully undertake a blockmodel analysis of the Chilean firm network. Blockmodels tend to place into the same block those pairs of firms that have similar ties to other, third-party firms, and one might therefore expect a blockmodel analysis to place members of the same group into the same block. We undertook an exploratory blockmodel analysis and found that it did a poor job of replicating the group classifications provided by the SVS. The analysis placed group siblings into the same block more often than would occur by chance, but not much more often. In a sense, we are not surprised by this weak result. Pairs of firms with similar underlying relationships to others need not display similar patterns of visible ties to those others. This is true because many types of visible ties are available, more types are available than there are purposes to serve, some types of ties can serve multiple purposes, some types of ties might not be visible to the researcher, and ties may persist after the relationship that motivated their formation is severed. For all these reasons, group siblings that have a similar functional relation to some third firm might not have the same visible ties to that firm. In this light, it is not surprising that a blockmodel cannot neatly parse firms into groups. Gerlach's more successful application of blockmodeling to Japanese *keiretsu* may suggest interesting contrasts between the structures of Japanese and Chilean groups.

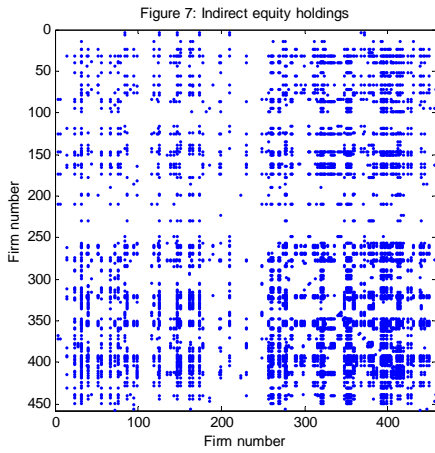
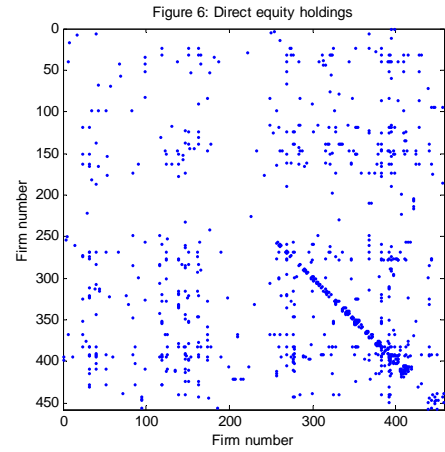
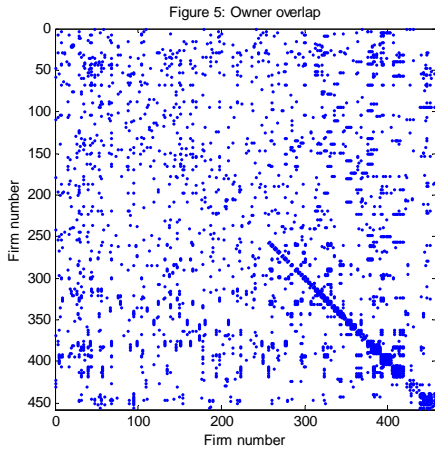
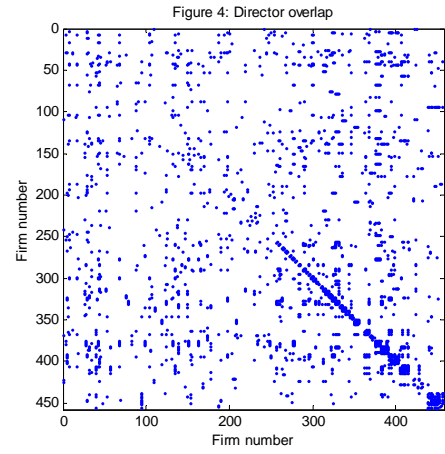
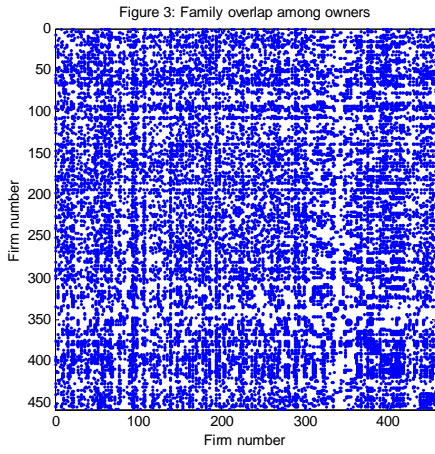
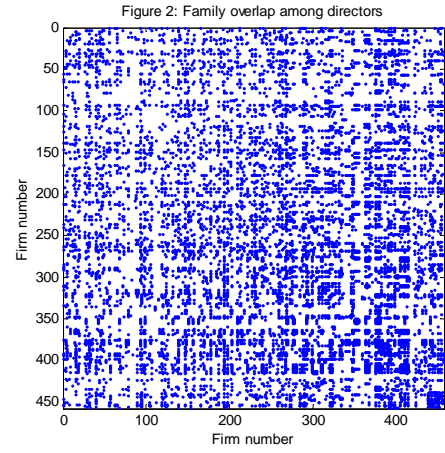
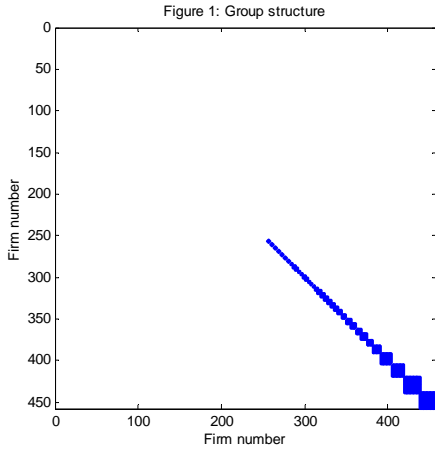


TABLE 1 – DISTRIBUTION OF FIRMS PER GROUP

Number of firms per group	Number of groups this size	Number of dyads per group	Total dyads from groups this size	Number of companies
2	14	1	14	28
3	11	3	33	33
4	6	6	36	24
5	2	10	20	10
6	3	15	45	18
7	2	21	42	14
10	1	45	45	10
13	1	78	78	13
15	1	105	105	15
19	2	171	342	38
Total	33		760	203
			Non-group firms	254
			Total firms	457

TABLE 2 – SUMMARY STATISTICS FOR TIE VARIABLES

	Number of observations	Mean value	Standard deviation	Minimum	Maximum	Number of non-zero observations	Mean value among non-zero observations
DirFamily: degree of family overlap among directors							
All dyads	74,305	0.0113	0.0442	0.00	0.67	5,311	0.1584
Within-group dyads	637	0.0798	0.1175	0.00	0.67	244	0.2083
Non-group dyads	73,668	0.0107	0.0425	0.00	0.67	5,067	0.1560
OwnerFamily: degree of family overlap among owners							
All dyads	104,196	0.0124	0.0432	0.00	0.64	9,871	0.1306
Within-group dyads	760	0.0737	0.1134	0.00	0.64	286	0.1960
Non-group dyads	103,436	0.0119	0.0419	0.00	0.60	9,585	0.1286
Director: degree of overlap among board directors							
All dyads	74,305	0.0033	0.0341	0.00	1.00	1,162	0.2111
Within-group dyads	637	0.1512	0.2285	0.00	1.00	283	0.3402
Non-group dyads	73,668	0.0020	0.0230	0.00	1.00	879	0.1696
Owner: degree of overlap in major individual owners							
All dyads	104,196	0.0028	0.0292	0.00	1.00	1,627	0.1798
Within-group dyads	760	0.1443	0.2084	0.00	1.00	355	0.3088
Non-group dyads	103,436	0.0018	0.0198	0.00	1.00	1,272	0.1438
DirectEq: size of direct equity relationship							
All dyads	104,196	0.0009	0.0269	0.00	1.00	457	0.2086
Within-group dyads	760	0.0725	0.2291	0.00	1.00	124	0.4442
Non-group dyads	103,436	0.0004	0.0175	0.00	0.99	333	0.1209
IndirectEq: size of indirect equity relationship							
All dyads	104,196	0.0001	0.0075	0.00	0.99	3,045	0.0049
Within-group dyads	760	0.0109	0.0704	0.00	0.99	142	0.0586
Non-group dyads	103,436	0.0001	0.0044	0.00	0.77	2,903	0.0023

TABLE 3 – CORRELATIONS AMONG MEASURES OF TIE PRESENCE

Indicator variables						Levels					
	1	2	3	4	5	1	2	3	4	5	
1. DirFamilyDum						1. DirFamily					
2. OwnerFamilyDum	0.51					2. OwnerFamily	0.60				
3. DirectorDum	0.14	0.10				3. Director	0.07	0.17			
4. OwnerDum	0.12	0.10	0.74			4. Owner	0.19	0.18	0.81		
5. DirectEqDum	0.06	0.05	0.21	0.21		5. DirectEq	0.09	0.08	0.41	0.42	
6. IndirectEqDum	0.03	0.02	0.06	0.07	0.14	6. IndirectEq	0.03	0.03	0.12	0.10	0.01

Based on 74,305 observations of dyads with director-related data. Correlations in bold are significant at the 1% level

TABLE 4 – RELATIONSHIP OF TIES TO GROUP AFFILIATION

$$\text{Group}_{ij} = \alpha + \beta' \text{Tie}_{ij} + \chi' \text{Control}_{ij} + \varepsilon_{ij}$$

	Model	1	2	3	4	5	6	7	8
H2a DirFamilyDum: indicator of family overlap among directors		0.11						0.38 **	0.37 ***
H2b DirFamily: degree of family overlap among directors		4.07 ***						-0.20	
H2a OwnerFamilyDum: indicator of family overlap among owners			0.07					0.16	0.19 ***
H2b OwnerFamily: degree of family overlap among owners			3.94 ***					0.28	
H3a DirectorDum: indicator of overlap among board directors				1.16 ***				0.36	
H3b Director: degree of overlap among board directors				2.97 ***				0.80	1.47 ***
H4a OwnerDum: indicator of overlap in major individual owners					1.10 ***			0.70 ***	0.93 ***
H4b Owner: degree of overlap in major individual owners					3.62 ***			2.46 **	1.99 ***
H5a DirectEqDum: indicator of direct equity relationship						1.43		0.62	0.57 ***
H5b DirectEq: size of direct equity relationship						1.35 **		-0.20	
H6a IndirectEqDum: indicator of indirect equity relationship							0.68 ***	0.43 ***	0.43 ***
H6b IndirectEq: size of indirect equity relationship							5.76 ***	2.25 ***	2.37 ***
Indicator that both firms are in same industry		0.41 ***	0.40 ***	0.25 ***	0.21 ***	0.33 ***	0.42 ***	0.21 ***	0.20 ***
Difference in year of incorporation/100		-0.35 ***	-0.35 **	-0.38 ***	-0.40 ***	-0.32 **	-0.31 **	-0.45 ***	-0.45 ***
Indicator that both firms are larger than industry average		0.21 ***	0.24 ***	0.11 *	0.13 *	0.19 ***	0.24 ***	0.03	0.04
Indicator that both firms are smaller than industry average		-0.25 ***	-0.25 ***	-0.26 ***	-0.23 ***	-0.24 ***	-0.24 ***	-0.19 ***	-0.19 ***
Intercept		-2.41 ***	-2.45 ***	-2.42 ***	-2.49 ***	-2.37 ***	-2.39 ***	-2.56 ***	-2.56 ***

Observations: 104,196 for models with no director-related variables; 74,305 for models with director-related variables

***, **, and *: Statistically significant at the 1%, 5%, and 10% level, respectively, in a one-sided test using the Quadratic Assignment Procedure

TABLE 5 – INTERPRETATION OF MAGNITUDES OF PROBIT RESULTS

Change in RHS variable	Change in Prob(Group _{it} = 1)	Change in RHS variable	Change in Prob(Group _{it} = 1)
DirFamilyDum: from 0 to 1	+0.3%	OwnerDum: from 0 to 1	+0.6%
DirFamily: 1 σ increase*	-0.0%	Owner: 1 σ increase*	+3.6%
OwnerFamilyDum: from 0 to 1	+0.1%	DirectEqDum: from 0 to 1	+0.5%
OwnerFamily: 1 σ increase*	+0.0%	DirectEq: 1 σ increase*	-0.3%
DirectorDum: from 0 to 1	+0.3%	IndirectEqDum: from 0 to 1	+0.4%
Director: 1 σ increase*	+0.5%	IndirectEq: 1 σ increase*	+0.3%

Based on Model 7 reported in Table 4

* One standard deviation increase from the mean level, given corresponding indicator = 1

References

- Allen, M.P. and S.K. Panian. 1982. "Power, Performance, and Succession in the Large Corporation." *Administrative Science Quarterly* (27), 538-547.
- Amsden, A. 1989. *Asia's Next Giant: South Korea and Late Industrialization*. New York: Oxford University Press.
- Aoki, M. 1990. "Toward an Economic Model of the Japanese Firm." *Journal of Economic Literature* (28), 1-27.
- Baker, F.B. and L.J. Hubert. 1981. "The Analysis of Social Interaction Data." *Sociological Methods and Research* (9), 339-361.
- Barandiaran, E. and L. Hernandez. 1999. "Origins and Resolution of a Banking Crisis: Chile 1982-86." Central Bank of Chile Working Paper 57.
- Batjargal, B. and M. Liu. 2004. "Entrepreneurs' Access to Private Capital in China: The Role of Social Capital." *Organization Science* (15), 159-172.
- Berger, P.L. and T. Luckmann. 1966. *The Social Construction of Reality: A Treatise in the Sociology of Knowledge*. Garden City, NY: Doubleday.
- Berglof, E. and Perotti, E. 1994. The governance structure of the Japanese financial *keiretsu*. *Journal of Financial Economics*, 36: 259-284.
- Bosworth, Barry, Dornbusch, Rudiger, and Laban, Raul (1994): *The Chilean Economy: Policy Lessons and Challenges*, Brookings
- Bernard, H.R. and P.D. Killworth. 1977. "Informant Accuracy in Social Network Research II." *Human Communication Research* (4), 3-18.
- Bernard, H.R., P.D. Killworth, and L. Sailer. 1980. "Informant Accuracy in Social Network Research IV: A Comparison of Clique-level Structure in Behavioral and Cognitive Data." *Social Networks* (2), 191-218.
- Burt, R.S. 1976. "Positions in Networks." *Social Forces* (51), 93-122.
- Burt, R.S. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge: Harvard University Press.
- Burt, R.S., R.M. Hogarth, and C. Michaud. 2000. "The Social Capital of French and American Managers." *Organization Science* (11), 123-147.
- Caves, R. and M. Uekusa. 1976. *Industrial Organization in Japan*. Washington, DC: The Brookings Institution.
- Chang, S. J., and U. Choi. 1988. "Strategy, Structure, and Performance of Korean Business Groups: A Transactions Cost Approach." *Journal of Industrial Economics* (37), 141-158.
- Davis, A., B.B. Gardner, and M.R. Gardner. 1941. *Deep South*. Chicago: University of Chicago Press.
- Davis, G.F. 1991. "Agents Without Principles? The Spread of the Poison Pill Through the Intercorporate Network." *Administrative Science Quarterly* (36), 583-613.
- Davis, G.F. and S.K. Stout. 1992. "Organization Theory and the Market for Corporate Control." *Administrative Science Quarterly* (37), 605-633.
- Dore, R.P. 1987. *Taking Japan Seriously*. Stanford, CA: Stanford University Press.
- Dutta, S. 1997. *Family Business in India*. New Delhi: Response Books, Sage Publications.
- Encarnation, D. 1989. *Dislodging Multinationals: India's Comparative Perspective*. Ithaca, NY:

- Festinger, L., S. Schachter, and K. Back. 1950. *Social Pressures in Informal Groups*. Stanford: Stanford University Press.
- Fisman, R. (2001), "Estimating the Value of Political Connections," *American Economic Review*, Vol. 91, pp. 1095-1102.
- Flath, D. 1992. "Indirect Shareholding Within Japan's Business Groups." *Economics Letters* (38), 223-227.
- Flath, D. 1996. "The Keiretsu Puzzle." *Journal of Japanese and International Economies* (10), 101-121.
- Frank, K.A. 1995. "Identifying Cohesive Subgroups." *Social Networks* (17), 27-56.
- Freeman, L.C., S. Freeman, and A.G. Michaelson. 1988. "On Human Social Intelligence." *Journal of Social and Biological Structures* (11), 415-425.
- Freeman, L.C. and C.M. Webster. 1994. "Interpersonal Proximity in Social and Cognitive Space." *Social Cognition* (12), 223-247.
- Freeman, S. 1987. "Verbal Response Data as Predictors of Social Structure." Ph.D. dissertation. School of Social Sciences, University of California, Irvine.
- Geertz, C. 1978. "The Bazaar Economy: Information and Search in Peasant Marketing." *American Economic Review* (68), 28-32.
- Gerlach, M.L. 1992a. "The Japanese Corporate Network: A Blockmodel Analysis." *Administrative Science Quarterly* (37), 105-39.
- Gerlach, M.L. 1992b. *Alliance Capitalism: The Social Organization of Japanese Business*. Berkeley: University of California Press.
- Ghemawat, P. and T. Khanna. 1998. "The Nature of Diversified Business Groups: A Research Design and Two Case Studies." *Journal of Industrial Economics* (46), 35-62.
- Gompers, P. and J. Lerner. 2001. "The Determinants of Corporate Venture Capital Success: Organizational Structure, Incentives, and Complementarities." In R.K. Morck (ed.), *Concentrated Corporate Ownership*, National Bureau of Economic Research, University of Chicago Press.
- Granovetter, M.S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* (78), 1360-1380.
- Granovetter, M.S. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* (91), 481-510.
- Granovetter, M.S. 2003. "Business Groups and Social Organization." In N. Smelser and R. Swedberg (eds.), *Handbook of Economic Sociology*, 2nd edition.
- Guillén, M. 2000. "Business Groups in Emerging Economies: A Resource-based View." *Academy of Management Journal* (43), 362-380.
- Guillén, M. 2002. "Structural Inertia, Imitation, and Foreign Expansion: South Korean Firms and Business Groups in China, 1987-95." *Academy of Management Journal* (45), 509-525.
- Gulati, R. and M. Gargiulo. 1999. "Where Do Interorganizational Networks Come From?" *American Journal of Sociology* (104), 1439-1493.
- Hamilton, G., ed. 1996. *Asian Business Networks*. New York: Walter de Gruyter.
- Harman, H.H. 1976. *Modern Factor Analysis*. Chicago: University of Chicago Press.

- Ingram, P. and P.W. Roberts. 2000. "Friendships Among Competitors in the Sydney Hotel Industry." *American Journal of Sociology* (106, 2, 387-423.
- Ingram, Paul and Arik Lifschitz. (forthcoming). "Kinship in the shadow of the corporation: The interbuilder network in Clyde River shipbuilding, 1711-1990." *American Sociological Review*.
- Keister, L. 1998. "Engineering Growth: Business Group Structure and Firm Performance in China's Transition Economy." *American Journal of Sociology* (10), 404-40.
- Keister, L. 2000. *Chinese Business Groups: The Structure and Impact of Interfirm Relations during Economic Development*. Oxford University Press: Oxford, New York.
- Khanna, T. 2000. "Business Groups and Social Welfare in Emerging Markets: Existing Evidence and Unanswered Questions." *European Economic Review* (44), 748-761.
- Khanna, T. and K. Palepu. 1997. "Why Focused Strategies May Be Wrong for Emerging Markets." *Harvard Business Review* (75: 4), 41-51.
- Khanna, T. and K. Palepu. 1999. "Policy Shocks, Market Intermediaries, and Corporate Strategy: The Evolution of Business Groups in Chile and India." *Journal of Economics and Management Strategy* (8), 271-310.
- Khanna, T. and K. Palepu. 2000a. "Is Group Membership Profitable in Emerging Markets? An Analysis of Diversified Indian Business Groups." *Journal of Finance*, April
- Khanna, T. and K. Palepu. 2000b. "The Future of Business Groups in Emerging Markets: Long Run Evidence from Chile." *Academy of Management Journal*. Vol. 43, No. 3: 268-85. June.
- Khanna, T. and Wu, D. M. 1998. "Empresas CAP 1994." Case no. 798-053, Harvard Business School Publishing, Boston, MA.
- Khanna, T. and J. Rivkin. 2001. "Estimating the Performance Effects of Business Groups in Emerging Markets." *Strategic Management Journal* (22), 45-74.
- Khanna, T. and Y. Yafeh 2005. "Business Groups and Risk Sharing around the World," *Journal of Business*, Vol. 78, pp. 301-340.
- Kotkin, J. 1992. *Tribes: How Race, Religion and Identity Determine Success in the New Global Economy*. New York: Random House.
- Krackhardt, D. 1988. "Predicting With Networks: Nonparametric Multiple Regression Analysis of Dyadic Data." *Social Networks* (10), 359-381.
- La Porta, R., F. Lopez-de-Silanes, and A. Shleifer. 1999. "Corporate Ownership Around the World." *Journal of Finance* (54), 471-517.
- Landa, J.T. 1994. *Trust, Ethnicity and Identity: Beyond the New Institutional Economics of Ethnic Trading Networks, Contract Law, and Gift-exchange*. Ann Arbor: University of Michigan Press.
- Larraín, M. 1989. "How the 1981-83 Chilean Banking Crisis Was Handled." World Bank Working Paper 300.
- Leff, N. 1976. "Capital Markets in the Less Developed Countries: The Group Principle." In R. McKinnon, ed. *Money and Finance in Economic Growth and Development*. New York: Marcel Dekker.
- Leff, N. 1978. "Industrial Organization and Entrepreneurship in the Developing Countries: The Economic Groups." *Economic Development and Cultural Change* (26), 661-75.
- Lefort, F. and E. Walker. 1999. "Corporate Governance in Chile: Results and Hypothesis." Escuela de Administracion, Pontificia Universidad Catolica de Chile mimeo.

- Lincoln, J. R., M.L. Gerlach, and C.L. Ahmadjian. 1996. "Keiretsu Networks and Corporate Performance in Japan." *American Sociological Review* (61), 67-88.
- Lincoln, J.R., M.L. Gerlach, and P. Takahashi. 1992. "Keiretsu Networks in the Japanese Economy: A Dyad Analysis of Intercorporate Ties." *American Sociological Review* (57), 561-585.
- Majluf, N., N. Abarca, D. Rodríguez, and L.A. Fuentes. 1998. "Governance and Ownership Structure in Chilean Economic Groups." *Revista ABANTE* (1), pp. 111-139.
- Miwa, Y. and J.M. Ramseyer. 2002. "The Fable of the Keiretsu." *Journal of Economics and Management Strategy* (11), 169-224.
- Mizruchi, M.S. 1996. "What Do Interlocks Do? An Analysis, Critique, and Assessment of Research on Interlocking Directorates." *Annual Review of Sociology* (22), 271-298.
- Nakatani, I. 1984. "The Economic Role of Financial Corporate Grouping." In M. Aoki, ed. *The Economic Analysis of the Japanese Firm*. Amsterdam: North Holland.
- Ouchi, W.G. 1980. "Markets, Bureaucracies, and Clans." *Administrative Science Quarterly* (25), 129-145.
- Padgett, J.F. and C.K. Ansell. 1993. "Robust Action and the Rise of the Medici, 1400-1434." *American Journal of Sociology* (98), 1259-1319.
- Pan, L. 1991. *Sons of the Yellow Emperor: The Story of the Overseas Chinese*. London: Mandarin Paperbacks, Reed International Books.
- Podolny, J.M. 1994. "Market Uncertainty and the Social Character of Economic Exchange." *Administrative Science Quarterly* (39), 458-483.
- Roethlisberger, F.J. and W.J. Dickson. 1939. *Management and the Worker*. Cambridge: Harvard University Press.
- Rowley, T., D. Behrens, and D. Krackhardt. 2000. "Redundant Governance Structures: An Analysis of Structural and Relational Embeddedness in the Steel and Semiconductor Industries" *Strategic Management Journal* (21), 3, 369-386.
- Roy, D. 1954. "Efficiency and 'The Fix': Informal Intergroup Relations in a Piecework Machine Shop." *American Journal of Sociology* (60), 255-266.
- Saxonhouse, G.R. 1993. "What Does Japanese Trade Structure Tell Us About Japanese Trade Policy?" *Journal of Economic Perspectives* (7), 21-43.
- Scott, J. 1991. *Social Network Analysis: A Handbook*. London: Sage.
- Simons, T. and P. Ingram. 1997. "Organization and Ideology: Kibbutzim and Hired Labor, 1951-1965." *Administrative Science Quarterly* (42), 784-813.
- Strachan, H. 1976. *Family and Other Business Groups in Economic Development: The Case of Nicaragua*. NY: Praeger.
- Stuart, T.E., H. Hoang, and R.C. Hybels. 1999. "Interorganizational Endorsements and the Performance of Entrepreneurial Ventures." *Administrative Science Quarterly* (44), 315-349.
- Ungson, G., R. Steers, and S. Park. 1997. *Korean Enterprise: The Quest for Globalization*. Boston: Harvard Business School Press.
- Useem, M. 1984. *The Inner Circle*. Oxford: Oxford University Press.
- Uzzi, B. 1996. "The Sources and Consequences of Embeddedness for the Economic Performance of Organizations: The Network Effect." *American Sociological Review* (61), 674-698.

- Wasserman, S. and K. Faust. 1994. *Social Network Analysis: Methods and Applications*. Cambridge: Cambridge University Press.
- Weinstein, D. and Y. Yafeh. 1998. "On the Costs of a Bank-Centered Financial System: Evidence from the Changing Main Bank Relations in Japan," *Journal of Finance*, Vol. 53, pp. 635-672.
- White, H.C., S.A. Boorman, and R.L. Breiger. 1976. "Social Structure from Multiple Networks. I. Blockmodels of Roles and Positions." *American Journal of Sociology* (81), 730-780.
- Williamson, O.E. 1975. *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: Free Press.
- Williamson, O.E. 1983. "Credible Commitments: Using Hostages to Support Exchange." *American Economic Review* (73), 519-540.
- Winship, C. and M. Mandel. 1983. "Roles and Positions: A Critique and Extension of the Blockmodeling Approach." In S. Leinhardt, ed. *Sociological Methodology, 1983-1984*. San Francisco: Jossey-Bass.
- Wolfenzon, D. 1999. "A Theory of Pyramidal Ownership." Harvard University, Department of Economics mimeo.
- Yoo, S. and S.M. Lee. 1987. "Management Style and Practice of Korean *Chaebols*." *California Management Review* (29:4), 97-110.
- Zeitlin, M. 1974. "Corporate Ownership and Control: The Large Corporation and the Capitalist Class." *American Journal of Sociology* (79), 1073-1119.
- Zeitlin, M. and R.E. Ratcliff. 1988. *Landlords and Capitalists: The Dominant Class of Chile*. Princeton: Princeton University Press.