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Engineering Growth: Business Group Structure and Firm Performance in China's Transition Economy[1]

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Business groups have received increasing attention from academics interested in interorganizational relations and their impact on firms. As part of industrial reform, the Chinese government began in the mid-1980s to encourage firms to form business groups with structural characteristics that promised to enhance financial performance and productivity. Using 1988–90 panel data on China's 40 largest business groups and their 535 member firms, the study finds that the presence and predominance of interlocking directorates and finance companies in business groups improved the financial performance and productivity of the groups' member firms. In addition, firms in groups with nonhierarchical organizational structures performed better than firms in hierarchical groups, suggesting that complete integration into a hierarchical organization is not an optimal strategy.

INTRODUCTION

Since 1978, China's government has experimented with market-oriented industrial reform aimed at enhancing the financial performance and efficiency of the nation's enterprises. One of the most dramatic, yet least-studied, components of this effort to engineer industrial growth is the

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transfer of control of many state-owned firms from government bureaus to newly emerging business groups (*qiye jituan*). Business groups are coalitions of firms, bound together by varying degrees of legal and social connection, that transact in several markets under the control of a dominant, or core, firm (Granovetter 1995). Policy makers studied Japan's keiretsu and Korea's chaebol in preparation for the formation of similar groups in China. In the mid-1980s, the Chinese state began to permit firms to acquire ownership rights in each other and to reduce its own role to that of a shareholder with limited liability and authority (Dong and Hu 1995; Li 1995).[2] Many of the groups were organized around prior administrative bureaus and most were in manufacturing, though some reorganization and diversification began to occur immediately. By the early 1990s, there were more than 7,000 known business groups in China (Reform 1993). Total 1993 assets of state-owned *qiye jituan* were 1.12 trillion yuan (135.70 billion U.S. dollars), or one-quarter of total state-owned assets (Kan 1996).[3] Like the keiretsu and chaebol, China's *qiye jituan* are infused with elaborate interfirm relations, including interlocking directorates, debt relations, and trade ties (Li 1995).[4]

Following the Japanese state's role in the post–World War II formation of the keiretsu, China's state began in the mid-1980s to encourage business groups with certain structural features to emerge.[5] Chinese officials argued

[2] In the late 1980s, Chinese securities markets were just emerging, thus the shareholder role was in flux. By the mid-1990s, interactions with foreign firms and the increasing tendency of Chinese firms to list on foreign securities exchanges began to render the meaning of stock ownership in China consistent with its meaning in the West, particularly in the United States (Dong and Hu 1995; Xie 1996). State-owned enterprises related to national security, defense, advanced proprietary technologies, and scarce mineral mining could not be sold to private or foreign investors. A state-owned enterprise in a central industry (energy, transportation, or communications) could be sold, but the state maintained a majority share (Bureau of State Assets Management 1995; Dong and Hu 1995).

[3] There are two types of business groups in China: groups of small, often private firms that resemble Taiwan's *guanxi qiye* (Fields 1995); and *qiye jituan,* groups of large, primarily state-owned firms that resemble Japan's keiretsu. I focus on the second type because they are more predominant. Estimates of the proportion of state-owned firms that are members of *qiye jituan* vary with definitions of ownership; 1990 estimates range from 20% to more than 50% (Li 1995).

[4] The state's intention was to foster economies of scale and to create structures that would ease firms through transition. The chaebol have suffered recently as a result of their size, but Chinese policy makers argue they facilitated development (Li 1995; personal interviews). A difference between Chinese groups and their Asian counterparts is that social relations, while important, played a minor role in group formation in China (though social ties became more important in group reorganization in the 1990s).

[5] The postwar emergence of the keiretsu was actually a reemergence of the prewar *zaibatsu,* family-centered holding companies. U.S. occupation forces outlawed the zaibatsu in 1945, but MITI (the Japanese Ministry of International Trade and Industry)

that when Japan and South Korea were developing, business groups with specific structural traits protected firms from competition, created economies of scale, and enhanced firm performance (Li 1995; PRC 1986). Officials pointed to such features as director interlocks in the keiretsu and chaebol and group-specific banks in the keiretsu as structural components worth emulating (PRC 1980, 1984). Officials have employed "administrative guidance" (including propaganda and asset injections) to increase the likelihood that China's large business groups will develop these same structural features and will, therefore, be less susceptible to the adverse effects that economic shocks and poorly developed markets can have on firms (Nee 1992; PRC 1987).

Existing research proposes that business groups with certain structural characteristics may indeed improve firm performance. This literature provides rich descriptions of business groups in various contexts (Amsden 1989; Fields 1995; Gerlach 1992*b*), but it has largely been limited by data availability to speculation about their performance implications (Aoki 1982; Hamilton and Biggart 1988; Steers, Shin, and Ungson 1989). Recent evidence from Japan demonstrates that keiretsu membership reduces variation in firm performance (Lincoln, Gerlach, and Ahmadjian 1996), but even this evidence is insufficient to support claims that there are advantages of specific structural components of the groups. Interorganizational theory suggests that interlocking directorates, a common component of business group structure, will improve performance because they enhance interfirm communication and otherwise reduce transaction costs. However, empirical studies of the interlocks-profits relationship have been inconclusive (Mizruchi 1996; see also Mizruchi and Galaskiewicz [1993] for an excellent review). Research in the United States has generally failed to find a positive effect of interlocks on firm profits, in part because interlocks often form when a firm is in financial decline (Dooley 1969; Richardson 1987). In contrast, research from countries where financial institutions behave differently than they do in the United States finds a positive interlocks-profits relation (Carrington 1981; Meeusen and Cuyvers 1985). As interlocks in Chinese business groups do not result from financial crisis, this case provides a unique opportunity to understand the performance implications of business group structure while clarifying when interlocks matter.

While the bulk of interorganizational relations literature has focused on director interlocks, other interfirm ties may be more consistent pre-

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began to resurrect these groups as keiretsu as early as 1953 (Gerlach 1992*a*; Johnson 1982). MITI ultimately assembled the groups, supported and guided their core companies, and protected both the groups and their member firms from competition (Miyashita and Russell 1994).

dictors of firm performance (Mizruchi and Galaskiewicz 1993, p. 57). Although it remains to be demonstrated empirically, business groups literature speculates that interfirm credit systems improve performance, particularly where financial markets are weak (Lamoreaux 1994; Granovetter 1995). Finance companies (nonbank, group-specific financial firms) in Chinese business groups are typical of the interfirm finance arrangements discussed in this literature and are thus likely to play an analogous role in improving performance. Transaction cost economics, however, cautions that business group membership benefits firms because the groups economize on control; thus the groups are effective to the extent to which they avoid overorganization by keeping contracts implicit and modes of monitoring informal (Williamson 1985; see also Lincoln et al. [1996, p. 69] for an application of transaction cost ideas to a study of the consequences of business groups). Thus while cooperation via interlocks and financial arrangements may be advantageous, complete integration into a single, hierarchical organization is unlikely to be an optimal strategy (Powell 1990; Powell and Smith-Doerr 1994). The Chinese business groups also provide an opportunity to evaluate these arguments.

My objective is to analyze the effect of business group structure on the financial performance and productivity of the groups' member firms using 1988–90 panel data on China's 40 largest business groups and their 535 member firms. I use 1988–90 data for two reasons. First, the groups did not begin to emerge until the mid-1980s, so these data allow examination of the impact of the business groups in the initial stages of their development. Second, because the groups had become structurally similar by the mid-1990s as a result of the state's promotion of features such as finance companies, these data maximize structural variation. I use multiple indicators of group structure, including indicators of the presence and predominance of interlocking directorates, the presence and predominance of finance companies, and measures of the hierarchical organization of the group. The outcomes I investigate are firm profitability and productivity (measured as output per worker). I evaluate claims about the relationship between the structure of interfirm relations and firm performance and find that coordination through director interlocks and financial arrangements enhances performance but that too much coordination can be detrimental.

BUSINESS GROUP STRUCTURE AND FIRM PERFORMANCE

From the beginning of industrial reform, Chinese firms felt increasing pressure to improve financial performance and productivity, yet the environment in which the firms operated in the late 1980s was not conducive to such improvements. Equity markets were rudimentary: most of the

nation's large domestic banks operated under the aegis of the Central Bank and engaged primarily in government-directed credit extension (Karmel 1994). State funds were limited and were distributed according to social and political, rather than performance, criteria (Li 1995; Spiegel 1994). Private and foreign banks were only permitted to operate under highly constrained conditions, and while Chinese stock markets had begun to develop, trading on these markets remained restricted and provided little capital to firms (Gong 1995). Because product markets were in the initial stages of development, firm access to both inputs and markets for finished goods was limited. Infrastructure limitations and a scarcity of reliable firms specializing in transportation precluded the national distribution of products. In addition, advanced technology was scarce, and increasing competition from foreign firms raised short-term survival concerns and detracted attention and resources from activities that might have led to long-term improvements in financial performance.

Researchers have speculated that business groups with certain structural characteristics may aid firms in overcoming the challenges that accompany development, such as those that faced firms in China in the 1980s (Hamilton 1991; Leff 1978, 1979). Groups that perform banking functions may substitute for more well-developed financial markets and allow firms to obtain otherwise scarce financing. The group may act as a vehicle for mobilizing capital beyond the single family or small group, enlarge the pool from which human resources can be recruited, and allow firms to hire labor where labor markets do not function effectively (Lamoreaux 1986; Leff 1978). Economies of scale may also allow firms to overcome problems associated inefficient product markets, to engage in research and development, and to contend more effectively with foreign competition (Aoki 1982; Granovetter 1995). In addition, the elaborate interfirm relations engendered by the groups may improve the flow of communication among firms, reducing the cost of gathering information and facilitating the diffusion of technological and managerial expertise (Leff 1978, 1979).

Of course, the structure of business groups varies widely among contexts. Japan's keiretsu are organized either vertically or horizontally and develop across industries. The keiretsu generally include a bank, a holding or trading company, and a diverse group of manufacturing firms (Gerlach 1992*a;* Lincoln et al. 1992). In contrast, Korea's chaebol are typically controlled by a single family or a small number of families and are uniformly vertically organized (Kim 1991). Business groups in Taiwan (*guanxi qiye*) tend to be small, loosely integrated entities characterized by a didactic managerial style as opposed to the authoritarian style common in Korean and Japanese groups (Fields 1995; Hamilton and Kao 1990). Not surprisingly, Chinese business groups have developed their own unique struc-

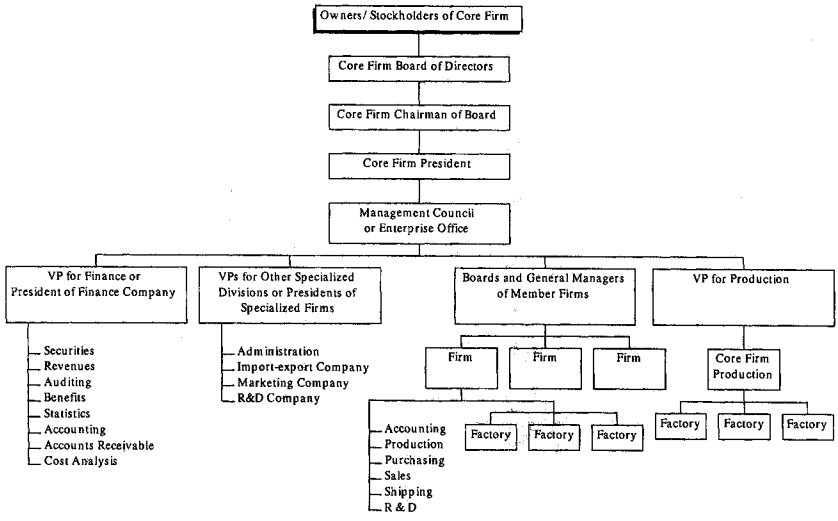

FIG. 1.—The organization of the typical Chinese business group

tures. The groups are large, multi-industry entities with strong ties to the state but not to particular families. Structural variation among the groups has decreased in recent years, in part as a result of the state's efforts to influence group structure. In the late 1980s, however, there was sufficient variation among the Chinese groups in the presence and predominance of interlocking directorates and finance companies, as well as in management structure, to examine their effects on firm outcomes.

Interlocking Directorates

In the 1980s, the board of directors of a Chinese firm was composed of representatives of the firm's owners, including other firms, the business group, and the state. The board oversaw firm management and strategy, chose and oversaw general managers, and made all major financial decisions for the firm (Li 1995; Xie 1996). When a firm entered a business group, partial ownership was transferred to the group's core firm, whose board of directors oversees the activities of member firms. Figure 1 depicts the organizational structure of a typical Chinese business group.[6] As the

[6] The figure depicts the typical organizational structure of a Chinese business group, not the typical management structure. Thus, the typical business group portrayed in the figure could be managed either hierarchically (i.e., the core firm could be actively involved in the affairs of member firms) or nonhierarchically.

figure illustrates, the core firm's board of directors is accountable to the shareholders and oversees the activities of the president of the core company.[7] The president oversees the group's management council or enterprise office, which is composed of the vice presidents and general managers of the group's member firms. The enterprise office is the management office for the core company; it controls production for the core firm and oversees the activities of other member firms (Li 1995; Xie 1996). The finance company, other specialized firms such as an import-export company, the core firm's production division, and the group's other member firms occupy equivalent positions in this hierarchy. The member firm's board of directors contained a representative of the core firm and, in the figure, is located with the member firms below the core firm's management council.

Interlocking directorates are not new to China; they existed in government ministries before reform when a single state representative was assigned to the boards of more than one firm (Schurmann 1965; Xie 1996).[8] In the business groups, interlocks occur when member firms acquire shares in each other and place representatives on each others' boards. The interlocks have the same functional form as interlocks in other contexts (i.e., an individual occupies a seat on more than one board of directors); however, unlike in the United States, where interlocks are both a source of information (Davis 1992; Haunschild 1993; Mizruchi 1992) and a form of co-optation or monitoring (Aldrich 1979; Dooley 1969; Mizruchi and Stearns 1988), interlocks in China primarily function as an information source for the interlocked firms (Li 1995; SASBG 1995; Xie 1996).[9] The interlocks allow information about technological advances, market opportunities, innovative strategies, and so on, to pass among firms in the group. Interlocks are not the only source on information available to firms, but they are a central and predominant source. Because interlocks in China are not a form of co-optation, they were viewed differently by Chinese

[7] Unlike in many Western countries, the Chinese board oversaw the chairman of the board. While there is some separation of ownership and control in business groups, formal ownership was a more direct indicator of control in the early stages of economic transition in China than it is in the West.

[8] Bendix (1956) argued that the existence of interlocks between ministries and state-owned firms is a practice common to all centrally planned economies.

[9] My interviews with group managers confirmed this narrower, information-gathering role for interlocks in China and confirmed that managers are aware of most interlocks (see below for data details). Co-optation was unlikely in the early stages of reform because ownership was not well defined and there were few interlocks between groups. In 1988, 40% of China's largest business groups had interlocks; by the mid-1990s, nearly all large groups had interlocks (and finance companies). See table 5 below.

managers during the 1980s than they are generally viewed by Western managers. Chinese managers generally saw them as positive, as they tended to see most forms of social connection among firms in the group (I give more description on interlocking directorates in Chinese business groups elsewhere; see Keister 1998*b*).[10]

Research has shown that interfirm relations affect firm power (Bonacich and Roy 1986), philanthropy (Galaskiewicz and Burt 1991), political behavior (Mizruchi 1992), strategy (Palmer et al. 1987), survival (Miner, Amburgey, and Stearns 1990), and the likelihood of acquisition (Palmer et al. 1995). In addition, researchers argue that interlocks should improve firm performance because they facilitate the flow of information among firms, are a means of co-optation, serve as a monitoring mechanism, and are a reflection of social cohesion (Mizruchi 1996, p. 280). According to resource dependence arguments, informational asymmetries and other uncertainties make corporate environments highly unpredictable (Cook 1977). Interlocks may reduce informational asymmetries by facilitating the flow of information among firms, including collusive information among competitors (Haunschild 1993, 1994; Powell and Brantley 1992), or by facilitating the diffusion of information about innovative practices (Powell 1990; Rogers 1995) and business practices more generally (Davis and Powell 1992; Useem 1984). Another source of uncertainty is resource acquisition: firms depend on resources controlled by other organizations. To minimize dependence and to increase control, firms may use interlocks to leverage resources from other firms, to make others dependent on them, and to monitor the activities of those they control (Pfeffer and Salancik 1978). Interlocks may also serve as an indicator of voluntary relations within which all firms are embedded and may facilitate the unity necessary to carry out joint projects, affect political change, and otherwise manage corporate activity (Granovetter 1985).

Empirical research on the relationship between interlocks and firm performance in the United States, however, has been inconclusive largely because the highly interlocked firms are those in financial decline (Dooley 1969; Mizruchi and Stearns 1988; Meeusen and Cuyvers 1985). In contrast, in countries where the division of labor among financial institutions differs from the United States there may be a positive interlocks-profits relationship (Carrington 1981; Meeusen and Cuyvers 1985). Chinese business groups provide an ideal context in which to examine the interlocks-profits relationship outside the United States. Interlocks in China do not

[10] My interviews confirmed this impression that appears in Chinese literature on interlocks, but my interviews also suggested that, as Chinese firms become more competitive, the meaning of interlocks may converge with their meaning in the West (January 1996, February 1996, March 1997).

develop more readily among firms that are in financial decline; rather they reflect ownership patterns and lines of authority within business groups (Li 1995). These conditions are not unlike those in countries where a positive interlocks-profits relationship has been documented. Moreover, given the high levels of uncertainty in China's transition economy, gaining control over the environment is a central concern for firms (Li 1995). The term *guimo* (scope) refers to the power that group membership gives the firm: it is the collective power (economic, political, and social) of unified action.[11] *Guimo* implies economies of scale and access to inputs, financing, markets, and political influence that come with greater size. Interlocks in the business groups increase *guimo* by improving interfirm communication. The interlocks also decrease transaction costs and facilitate the management of resource flows. The role of the interlock is evident in this argument made by the CEO of a Chinese pharmaceutical company: "Interlocks are one of our strongest links to other firms in the business group. Through interlocks, we get ideas about ways to better manage our firm and about technological changes we might otherwise not hear of. . . . [They] also give us an advantage in trade. Other firms know us through the interlocks and are more likely to send the products we need when we need them" (October 1996).[12] In a transition economy, interlocks that are based on political and social connections may facilitate the sharing of rare business information and trading favors among firms. While it is possible that such practices might eventually lead to corruption and irrational decision making, it is likely that during transition, favoritism will aid firms in negotiating ill-developed markets.

Firms involved in the interlocking directorates are not the only companies that will benefit from the improved information flow. Rather, all firms in a business group in which any firms are interlocked will benefit from the presence of the interlocks because member firms are tightly connected through social relations as well as other, more formal relations (e.g., debt relations, personnel exchanges, social ties, political ties). Information passed through the interlocks will continue to spread through the firms' other connections with each other. As a manager in a firm that mines precious metals noticed: "Interlocking directorates are probably the most important ties among firms . . . but managers also have other connections, and news that spreads through the interlocking directorates eventually spreads to all corners of the group because we lend each other money, attend trade shows together, and meet outside of work" (July 1995). Thus, because conditions in China's transition economy resemble conditions in

[11] *Guimo* was the primary reason for group membership given by the majority of managers I interviewed.

[12] As the quote indicates, many managers are aware of the benefits of interlocks.

which interlocks have been shown to improve profits, we would expect the following:

HYPOTHESIS 1A.—*Firms in business groups with interlocking directorates will perform better financially and be more productive than firms in business groups without interlocking directorates.*

The logic underlying the argument that interlocks facilitate firm performance through improved information flow also suggests that the advantages of the interlocks will increase as the number of ties increases. The proliferation of the interlocking directorates within a group decreases the time necessary for information to spread to a large number of member firms. The more predominant the interlocks, the greater the number of firms benefiting directly from the information flowing through these ties. Accordingly, in China's transition economy, we should see that firm performance will improve as the proportion of firms in a group with board overlaps increases:

HYPOTHESIS 1B.—*As the proportion of business group member firms tied through interlocking directorates increases, the financial performance and productivity of the firms will improve.*

If interlocks in the business groups improve performance by improving communication among firms, the effect of interlocks should be enhanced by other ties that also improve communication. Joint ventures with foreign firms are an important source of information for firms in a developing economy. Information regarding technological innovations is often spread through joint ventures, and, not surprisingly, firms with joint ventures tend to have performance advantages (Beamish 1993; Chiu and Chung 1993; Schroath, Hu, and Chen 1993). A business group extends the benefits of a single joint venture to all members of the group. If a firm that is not in a business group acquires information from an overseas partner regarding a technological innovation, the information may improve the productivity and performance of the focal firm. If the focal firm is a member of a business group, it is likely that the information acquired through the joint venture will be passed through one or more of the formal or informal connections that exist among member firms. This produces advantages not only for the focal firm but also for the other firms in the focal firm's group. Because information in a business group diffuses through the various interorganizational ties that exist in the group, if a single firm in the group has a joint venture, all firms in the group are likely, over time, to benefit from the information obtained through the joint venture.

Moreover, because director interlocks are a key mode through which information from the joint venture is diffused, the impact of the joint ventures on financial performance will be stronger in groups with director interlocks. An executive in a computer manufacturer observed: "It is dif-

ficult for Chinese-made computers to compete with the faster, smaller computers made by American companies. . . . We need to learn to make smaller chips and to fit more memory in less space. One of the ways we learn to do these things is through joint ventures, our own or those of a fellow business group member. We often get information from [a company in the same group] because our boards are interlocked" (May 1996). Therefore, in China's transition economy:

HYPOTHESIS 1C.—*The financial performance of firms in business groups in which any firm has a joint venture will be greater than in groups in which no firms have joint ventures.*

HYPOTHESIS 1D.—*The effect of joint ventures on firm financial performance will be stronger in groups that have interlocking directorates than in groups without interlocking directorates.*

The Finance Company

While the bulk of literature on interfirm relations focuses on interlocks, alternative types interfirm ties may have a more consistent effect on performance (Mizruchi and Galaskiewicz 1993). Researchers speculate that joint ventures, commercial contracts, or financial arrangements may provide greater insight into the functioning of interfirm ties because they vary less across contexts (Amsden 1989; Steers et al. 1989). Economic historians have documented the occurrence of "insider lending" in which a single firm or bank collects and reallocates funds within a group of firms, usually in the early stages of economic development (Gerschenkron 1962; Goto 1982; Lamoreaux 1991, 1994; Munn 1981; Tilly 1966). Similarly, as Japan was developing, business groups that included group-specific banks prospered. These banks began as more informal arrangements, and as the economies developed, aided the group's member firms in financing both short-term projects and activities with more long-term objectives such as research and development (Miyashita and Russell 1994). While this research speculates that a causal relationship exists between the interfirm ties and firm performance, this relationship has not been demonstrated empirically (Mizruchi and Galaskiewicz 1993, p. 57).

Insider lending appears to substitute for a formal financial system and to give firms access to otherwise scarce capital where markets are inadequate at allocating funds (Goto 1982; Lamoreaux 1986). Informal financing arrangements allow funds to be allocated to their highest return uses within a particular group, provides opportunities for diversification, and allows firms to engage in otherwise unaffordable activities. Insider lending can mitigate certain informational asymmetries and reduce transaction costs, allowing firms to gain control over their environments. During de-

velopment, for example, if banks exist, they are likely to be skeptical about unfamiliar potential borrowers. Informal finance arrangements, that are often based on trust among well-acquainted parties, reduce such risks by reducing the amount of information unknown to each party and the costs associated with investigating potential borrowers (Williamson 1981). These arrangements might also provide a vehicle for co-opting resources and thus further reducing environmental uncertainties (Pfeffer and Salancik 1978).

In China in the late 1980s, financial markets were unable to distribute funds efficiently, which left many firms without necessary capital. Firms that were members of some business groups had access to additional financing through the group's finance company (*caiwu gongsi*), a specialized firm that collected and redistributed funds within the group and also obtained funds through state banks on behalf of member firms (Shi 1995). Reformers originally experimented with finance companies in the central industries and later in most other industries (Li 1995). Initially the activities of the finance companies were not monitored, but as their activity expanded regulations were implemented to control lending practices. The finance company enabled the member firms to engage in research and development, to better manage investments both within the group (i.e., investments in other firms that are members of the same group) and outside the group, and, if necessary, to meet short-term operating expenses (for a description of the emergence and functioning of finance companies in Chinese business groups see [Keister 1998*a*]).

The informational and market-substitute advantages of the group-specific bank suggest that firms in Chinese business groups with finance companies should be advantaged over firms in groups that do not have finance companies, and the more extensive the operations of the finance company, the greater the advantages of this specialized firm.

HYPOTHESIS 2A.—*Firms in business groups with a finance company will perform better financially and be more productive than firms in business groups without a finance company.*

HYPOTHESIS 2B.—*The more extensive the internal financing activities of the finance company, the better the financial performance and productivity of member firms.*

The importance of the finance company to business group member firms is evident in the interaction between finance company activities and joint ventures. Although firms get funding from both joint venture partners and informal financial arrangements, the strong ties among firms in a group make finance company capital more attractive. Thus the effect of joint ventures on performance should be weaker in groups that have access to funds via the finance company:

HYPOTHESIS 2C.—*The effect of joint ventures on firm financial performance will be weaker in groups with finance companies than in groups without finance companies.*

Hierarchical Organization

While interfirm cooperation may be advantageous, it does not follow that complete integration into a single, hierarchical organization is an optimal strategy. Recent research on non-market, non-hierarchical forms of governance acknowledges that such forms are more than hybrids of markets and hierarchies. Stable network forms of organizing, such as business groups, demonstrate that markets are by no means a starting point from which other forms of organizing evolve and that movement toward markets is neither necessary nor desirable (Powell 1990; Powell and Smith-Doerr 1994). Network forms of organizing are effective in facilitating firm performance when monitoring and contractual arrangements are informal (Lincoln et al. 1996; Williamson 1985). Greater integration reduces firm control and restricts the ability of managers to use their knowledge about the needs and abilities of the firm. Therefore, hierarchical organizational forms may increase the firm's transaction costs and negatively affect productivity and performance.

One way to evaluate this claim is to compare performance in hierarchical and nonhierarchical business groups. Some Chinese groups are highly authoritarian: the core firm is actively involved in the day-to-day operations of its subsidiaries. It makes production and personnel decisions in addition to directing more typical matters, such as those regarding corporate strategy. Other groups are more democratic: the core firm allows subsidiaries to manage operations independently. Because the role of the state is reduced to that of a shareholder once the group is established, it can only encourage (rather than require) certain types of management structures to develop in the groups. Thus the management structure in a group develops as a result of state preferences, the preferences of the core firm's managers and board members, and competitive and evolutionary forces. The manager of a steel manufacturer invoked transaction cost ideas in his summary of the potential impact of an authoritarian group management system on the firm: "The business group is very important. You know, *guimo.* We get money and protection from the group, but that doesn't mean a manager in the core firm knows better than I do how to best run my company. The government wants the core firm to be involved in managing member firms, but that is no different from having the state involved. By now bureaucrats ought to realize that was a bad strategy" (March 1996).

Thus, in China's transition economy, we would expect the following:

HYPOTHESIS 3.—*The financial performance and productivity of member firms will be weaker in hierarchical business groups than in nonhierarchical groups.*

RESEARCH DESIGN

Data

To evaluate the claims made in hypotheses 1–3, I collected 1988–90 panel data on the structure of China's 40 largest business groups and the financial performance of their 535 member firms.[13] I collected the majority of the data during 1995 and 1996 in interviews with core firm managers.[14] While the 1988–90 period saw some retrenchment in economic reform, in part because of events at Tiananmen Square, the formation of business groups continued through this period (curtailment of economic reform at the time of the student democratic movement is discussed by my interviewees; for addition support, see Li [1995]). The core firms are located in 15 provinces and in Beijing, Tianjin, and Shanghai (municipalities that are directly under the jurisdiction of the central government). The member firms are located in all provinces, autonomous regions, and independent municipalities. The business groups in the data set accounted for 68% of the total assets of state-owned business groups in 1990. The member firms are in a variety of industries including manufacturing and ser-

[13] Because there are missing values on the dependent variables, I use 462 firms in the analyses. The sample includes only large groups (officially, groups with total assets greater than 100 million yuan), thus the results are generalizable only to large groups. I believe that a sample containing only group members is ideal for evaluating my hypotheses, which address relations between group structure and member firm performance. If the hypotheses addressed member vs. nonmember performance differences, it would be necessary to include nonmembers.

[14] I conducted all interviews in Chinese without a translator. I began with 1990 data that Robert Feenstra and Gary Hamilton obtained from the Chinese Economic and Trade Commission; I collected an additional year of data (1988), corrected errors in the original data, and considerably expanded the original number of variables. To maximize accuracy, I personally copied data from the firms' financial statements, spoke with managers formally and informally (out of the plant), and validated the data against other published sources. While errors may still exist, the data appear consistent with other estimates of firm performance (Jefferson and Xu 1991; Naughton 1995). I conducted qualitative interviews in the 40 largest groups, in a random sample of small, medium, and large groups in Shanghai, and in additional groups in underrepresented cities and industries. It would be ideal to compare firm performance in the late 1980s to prereform performance or performance prior to business group membership, but such data are not available.

vices; most firms are former state-owned enterprises, although joint ventures and collective enterprises are also included.[15]

Equation Specification and Estimation

To estimate the effects of group structure on firm profits and productivity, I use random effects feasible generalized least squares (GLS) regression equations. The random effects equations decompose the error term to adjust for autocorrelation arising from common firm membership in the same group and for intertemporal correlation of error terms. Because many of the group-level indicators are present in the same groups (e.g., groups with a finance company often have interlocks as well), the test variables are highly correlated. Therefore, I include separate equations (tables 1–3) for each set of test variables (these are not nested models); I also include two equations (table 4) that combine all test variables to demonstrate their joint effect.[16] The equations are of the form

$$Y_{1990i} = \alpha + \beta' x_i + \gamma' Y_{1988i} + \lambda' G_i + \epsilon_{it}, \quad (1)$$

where Y_{1990i} is 1990 profits or output per worker, α is the intercept, x_i is a vector of group- and firm-level control variables, Y_{1988i} is a lagged dependent variable, G_i is a vector of group structure variables that test the hypotheses, and ϵ_{it} is the stochastic error term. For the actual estimation of the output per worker equations, all variables (both independent and dependent) are multiplied by the number of workers in 1990 (i.e., the dependent variable is 1990 output, not a ratio).[17]

To test hypotheses that propose different processes for firms in groups with different structures (e.g., hypothesis 1c), I model firm performance separately (but in the same equation) for different groups (Greene 1993, p. 582). In these equations, there are two intercepts: one for firms with

[15] A collective is jointly owned by a "guardian" organization (another firm, a social organization, or a government agency) and a rural township or urban municipality. Collectives existed prior to 1978 but were often ignored by the state planning system. Since reform, they have thrived because of their flexible management systems, low labor costs, and ability to retain profits (Oi 1990; Walder 1995).

[16] The random effects model decomposes the error term as follows: $\epsilon_{it} = \alpha_i + \rho_j + \gamma_t + \lambda_{it}$ where ϵ_{it} is the total stochastic component for firm i in time t, α_i is the error component associated with firm i, ρ_j is the component associated with group j, γ_t is the component associated with time period t, and λ_{it} is the stochastic component (Greene 1993). While intertemporal correlation is minimal in panel data, preliminary tests indicated that errors were correlated between 1988 and 1990. Multilevel or hierarchical models use a similar algorithm and return equivalent estimates (Bryk and Raudenbush 1992).

[17] Using the output/worker ratio as the dependent variable did not alter the productivity results substantively.

TABLE 1

1990 PROFITS AND 1990 OUTPUT PER WORKER REGRESSED ON INTERLOCKING DIRECTORATES

	1990 PROFITS			1990 OUTPUT PER WORKER	
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	−1.273**	−1.386**	...	.630***	.706***
	(2.30)	(2.52)		(16.43)	(16.02)
No interlocks	...	...	−.278	...	...
			(.48)		
With interlocks	...	...	−.203	...	...
			(.41)		
Lagged (1988) profits or output per worker	.014	.014	.013	.013***	.012***
	(1.59)	(1.60)	(1.55)	(6.15)	(6.10)
Measures of group structure:					
Had interlocking directorates (1988)	1.057**	...	...	.101***	...
	(2.61)			(4.16)	
% of firms with interlocks (1988)	...	1.960***	...	...	.033***
		(3.22)			(3.88)
Had joint ventures (1988)	1.147**	.945*	...	...	...
	(2.55)	(2.10)			
With interlocks	...	...	2.449***	...	...
			(3.45)		
No interlocks	...	...	.303	...	...
			(.59)		
Group control variables:					
No. of second-tier subsidiaries (1990)	3.375***	3.193***	3.680***	.018**	.005
	(4.04)	(3.81)	(4.46)	(3.26)	(.82)
No. of third-tier subsidiaries (1990)	.780	.917	.384	...	...
	(1.26)	(1.49)	(.61)		
Firm control variables:					
(log) total assets (1990)	.286	.291	.107	−.007***	−.012***
	(.87)	(.89)	(.32)	(3.31)	(5.10)
Thousands of workers (1990)	.006	.005	.007	...	...
	(.65)	(.59)	(.87)		

TABLE 1 (*Continued*)

	1990 Profits			1990 Output per Worker	
	Model 1	Model 2	Model 3	Model 4	Model 5
Core firm	3.770***	3.681***	...	−.003	.018**
	(3.79)	(3.73)		(.50)	(2.65)
With interlocks	...	...	8.086***	...	...
			(5.84)		
No interlocks	...	...	1.643	...	...
			(1.57)		
Total sales in group (1990)	.311***	.304***	.285***	...	...
	(3.50)	(3.44)	(3.28)		
Foreign located	−1.226	−1.305*	−1.485*	...	...
	(1.86)	(1.98)	(2.30)		
Light industry	−.801	−.877	−1.000	.087*	.062
	(.70)	(.78)	(.90)	(2.27)	(1.62)
Adusted R^2	.228	.234	.273	.238	.261

NOTE.—Monetary values are in 100 million 1990 yuan ($12.5 million). Entries are GLS estimates of metric regression coefficients; absolute *t*-statistics are in parentheses. Included in the regression (but not displayed) are dummy variables for having a technology center (a state-supported research division), being in a protected industry, % of profits remitted to the state, location in same province as core firm, and being established since 1978. Data are from 40 Chinese business groups, 462 firms.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

the trait (e.g., interlocks) and one for firms without it. These equations take the form

$$Y_{1990i} = (\alpha_1 + \gamma_1' G_{i1}) + (\alpha_2 + \gamma_2' G_{i2}) + \beta' x_i + \gamma' Y_{1988i} + \epsilon_{it}, \qquad (2)$$

where each term is equivalent to the standard equation (1), but where the subscript "1" denotes that the term is for firms in groups with the structural feature of interest (e.g., director interlocks) and the subscript "2" denotes that the term is for firms in groups without the feature.[18]

I use two firm-level dependent variables: 1990 firm profits and productivity (output per worker) and standard performance indicators (Meyer 1994; Stickney 1990). Profits are actual profits (revenues less expenses), and productivity is output per worker (output is the actual dependent

[18] The intercept is multiplied by the dummy variable indicating the presence of the structural feature. The use of structural equation explains the absence of the single form of variables that appear to be interactions.

TABLE 2

1990 PROFITS AND 1990 OUTPUT PER WORKER REGRESSED ON FINANCE COMPANY

	1990 PROFITS			1990 OUTPUT PER WORKER	
	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	−1.807**	−.717	...	.556***	.564***
	(2.73)	(1.41)		(13.36)	(13.64)
No finance company	...	...	−.028	...	...
			(.80)		
With a finance company	...	...	.376	...	...
			(.67)		
Lagged (1988) profits or output per worker	.015*	.015*	.011	.007***	.007***
	(1.71)	(1.80)	(1.32)	(3.84)	(3.91)
Measures of group structure:					
Had a finance company (1988)	1.423**	...	...	.013*	...
	(2.56)			(2.32)	
Proportion of firms with debt to finance company	...	.301***	...	...	.004**
		(4.12)			(2.44)
Had joint ventures (1988)	.411	1.001*	...	...	...
	(.79)	(2.26)			
With finance company	...	...	.092*	...	...
			(1.62)		
No finance company	...	...	.758*	...	...
			(1.64)		
Group control variables:					
No. of second-tier subsidiaries (1990)	3.694***	3.91***	4.745***	.007	.012*
	(4.46)	(4.76)	(5.89)	(1.40)	(2.41)
No. of third-tier subsidiaries (1990)	1.963**	.937	1.641*	.036***	.033***
	(2.58)	(1.53)	(2.24)	(5.20)	(4.62)
Firm control variables: (log) total assets (1990)	.305	.081	−.585*	−.007**	−.004*
	(.93)	(.25)	(1.70)	(2.76)	(2.25)

TABLE 2 (*Continued*)

	1990 Profits			1990 Output per Worker	
	Model 1	Model 2	Model 3	Model 4	Model 5
Thousands of workers (1990)	.005	.004	.011	...	...
	(.53)	(.58)	(1.33)		
Core firm	3.896***	3.511***	...	.006	−.002
	(3.90)	(3.58)		(.67)	(.24)
With finance company	...	...	11.30***	...	...
			(7.64)		
No finance company	...	...	1.750*	...	...
			(1.74)		
Total sales in the group (1990)	.322***	.341***	.305***	−.002*	−.001
	(3.63)	(3.91)	(3.60)	(1.89)	(1.28)
Foreign located	−1.325**	−1.068	−1.291*	.068**	.076***
	(1.99)	(1.65)	(2.02)	(2.76)	(3.12)
Light industry	−.986	−1.162	−1.325	.062*	.077*
	(.87)	(1.04)	(1.22)	(1.80)	(2.38)
Adusted R^2	.227	.252	.298	.372	.373

NOTE.—Monetary values are in 100 million 1990 yuan ($12.5 million). Entries are GLS estimates of metric regression coefficients; absolute *t*-statistics are in parentheses. Included in the regression (but not displayed) are dummy variables for having a technology center (a state-supported research division), being in a protected industry, % of profits remitted to the state, and location in same province as core firm. Data are from 40 Chinese business groups, 462 firms.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

variable, but it is multiplied by the number of workers).[19] Modeling assets turnover (sales/net assets) as the dependent variable produced virtually identical results. I include two interlocking directorates indicators: a dummy variable indicating the presence of interlocks in the business group and a continuous variable indicating the percentage of firms in the business groups involved in the interlocks (both derived from lists of

[19] These are actual, not remitted, profits. I do not use logged profits because there are negative observations. Because I control for firm size and sales, profits can be interpreted as profits per size or per sales. The Shapiro-Wilk statistic (the ratio of the best estimator of the variance—based on the square of a linear combination of the order statistics-to the corrected sum of squares of the variance) indicated that profits and output are normally distributed. The data set does not cover enough time periods to conduct survival analyses.

TABLE 3

1990 PROFITS AND 1990 OUTPUT PER WORKER REGRESSED ON GROUP MANAGEMENT STRUCTURE

	1990 PROFITS		1990 OUTPUT PER WORKER	
	Model 1	Model 2	Model 3	Model 4
Intercept	−.101	−.165	1.185***	1.142***
	(.18)	(.30)	(16.90)	(17.03)
Lagged (1988) profits or output/ worker	.014	.011	.011***	.011***
	(1.57)	(1.33)	(5.96)	(5.89)
Measures of group structure:				
Core influenced (in 1988):				
Production decisions of firms	−1.045**	...	−.718***	...
	(2.54)		(8.39)	
Day-to-day operations of firms	...	−1.066**	...	−.692***
		(2.67)		(8.21)
Group control variables:				
Had joint ventures (1988)	1.112**	1.192**	...	...
	(2.47)	(2.64)		
No. of second-tier subsidiaries (1990)	3.348***	3.332***	.007	.007
	(4.00)	(3.98)	(1.24)	(1.23)
No. of third-tier subsidiaries (1990)	.670	.848	...	...
	(1.08)	(1.37)		
Firm control variables:				
(log) total assets (1990)	.307	.297	−.009***	−.009***
	(.94)	(.91)	(4.12)	(4.09)
Thousands of workers (1990)	.005	.005	...	...
	(.54)	(.63)		
Core firm	3.746***	3.830***	.008*	.009*
	(3.77)	(3.85)	(1.75)	(1.81)
Total sales in the group (1990)	.313***	.314***	...	...
	(3.51)	(3.54)		
Foreign located	−1.250*	−1.245*	...	...
	(1.89)	(1.89)		
Light industry	−.876	−.875	.072*	.074*
	(.77)	(.77)	(2.03)	(2.06)
Adjusted R^2	.227	.228	.341	.337

NOTE.—Monetary values are in 100 million 1990 yuan ($12.5 million). Entries are GLS estimates of metric regression coefficients; absolute t-statistics are in parentheses. Included in the regression (but not displayed) are dummy variables for having a technology center (a state-supported research division), being in a protected industry, % of profits remitted to the state, location in same province as core firm, and being established since 1978. Data are from 40 Chinese business groups, 462 firms.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

TABLE 4

1990 PROFITS AND 1990 OUTPUT PER WORKER REGRESSED ON THREE TEST VARIABLES

	1990 PROFITS		1990 OUTPUT PER WORKER	
	Model 1	Model 2	Model 3	Model 4
Intercept	−.743	−.101	.997***	.999***
	(.851)	(.151)	(11.11)	(10.62)
Lagged (1988) profits or output/worker	.014*	.016*	.008***	.010***
	(1.92)	(2.26)	(4.61)	(3.67)
Measures of group structure:				
Had interlocking directorates (1988)	.718***	...	.976***	...
	3.12		(4.13)	
% of firms with interlocks (1988)	...	.052***	...	.108***
		(3.48)		(4.21)
Had a finance company (1988)	.984***	...	.014***	...
	4.40		(3.32)	
% of firms with debt to finance company (1988)	...	.261***	...	.240**
		(2.72)		(2.43)
Core influenced (in 1988):				
Production decision of firms	−1.02***	−1.10**	−.276***	−.285**
	(4.22)	(2.16)	(3.21)	(2.32)
Day-to-day operations of firms	−.992***	−1.14***	−.309**	−.295**
	(3.31)	(3.11)	(2.60)	(2.49)
Had joint ventures	2.31***	1.09**	1.19*	1.00*
	(3.36)	(2.64)	(1.06)	(1.20)
Group control variables:				
No of second-tier subsidiaries (1990)	1.65***	3.65	3.42**	1.05
	(3.73)	(.004)	(2.54)	(.001)
No of third-tier subsidiaries (1990)	.005	2.21	.844	.505
	(.312)	(.000)	(.225)	(.170)
Firm control variables:				
(log) total assets (1990)	2.60**	.628**	.010***	.008***
	(2.88)	(2.31)	(3.14)	(3.16)
Thousands of workers (1990)	1.23	.857	.001	.002
	(.005)	(.000)	(.002)	(.000)
Core firm	2.59**	2.34**	.009*	.002
	(2.88)	(2.62)	(1.06)	(.260)
Total sales in the group (1990)	.332***	.342***	.000	.000
	(3.90)	(2.54)	(.019)	(.290)
Foreign located	−2.31***	−2.17**	.035*	.041*
	(3.36)	(2.52)	(1.45)	(1.69)
Light industry	−.765	−.954	.065**	.073**
	(.720)	(.920)	(2.00)	(2.24)
Adjusted R^2	.226	.244	.383	.382

NOTE.—Monetary values are in 100 million 1990 yuan ($12.5 million). Entries are GLS estimates of metric regression coefficients; absolute t-statistics are in parentheses. Included in the regression (but not displayed) are dummy variables for having a technology center (a state-supported research division), being in a protected industry, % of profits remitted to the state, location in same province as core firm, and being established since 1978.

* $P < .05$.

** $P < .01$.

*** $P < .001$.

board members for each firm in 1988). I also include two finance company indicators: a dummy variable indicating the presence of a finance company and a continuous indicator of the percentage of firms with debt to the finance company (both are 1998 measures and refer to finance companies that have registered with the government). Two dummy variables indicate whether the group's management structure is hierarchical: one indicates whether the core firm is involved in the production decisions of the member firms (e.g., locating productive inputs, determining output and inventory levels); the other indicates whether the core firm is involved in the day-to-day operations (e.g., personnel matters) of member firms.[20] A dummy variable indicates that at least one group member had (foreign) joint ventures in 1988.[21]

A lagged dependent variable in all equations allows interpretation of the coefficients in terms of change in the outcome variable. Because the member firms are spread across a variety of industries, I control for (logged) total firm assets and (logged) number of workers. I indicate whether the firm is in light industry (vs. heavy) to account for capital intensity and remaining industry-specific differences and whether the firm is the core firm.[22] I indicate firm integration in the group with a measure of the fraction of the firm's total sales (in 1990) that are in the group. Well-connected firms might perform better not because the group has interlocks, for example, but because the firm has better access than other firms to productive inputs. Because new firms are likely to be more effi-

[20] I developed the hierarchy indicators from questions that I asked at least two of the group's managers from different divisions about core firm relations with member firms. These indicators of core firm management strategy across all member firms eliminate particular strategies that might develop in response to the performance of a particular firm. I explored creating a continuous indicator, but the groups fall into two discrete categories (hierarchical and nonhierarchical) on both indicators. I use both measures in the analyses because some firms were hierarchical on one and not on the other. Preliminary tests with the continuous indicator suggest that the relationship between authoritarianism and performance is direct, not curvilinear. However, a more precise measure of authoritarianism is necessary to draw more decisive conclusions about this relationship.

[21] The presence of joint ventures is a group-level construct because the hypotheses suggest that all members of a group will benefit from the joint ventures of a single-member firm. This variable is not included in the productivity equations for lack of conceptual justification; this was borne out in preliminary tests indicating that this variable did not improve the fit of the productivity equations.

[22] I arrived at this industry distinction after extensive examination of the effect of industry on the dependent variables. Other indicators of industry (including both Western and Chinese definitions) and former administrative bureau explained less variance in the outcome variables, and I found no correlation between industry or former bureau and the test variables. Eliminating the core firm from the analyses did not change the results substantively.

cient, I control for whether the firm was established in or after 1978. Geographic controls include an indicator of firm location in a foreign country (which signals access to foreign financing, technology, and management methods) and an indicator of location in the same province as the group's core firm (because proximity reduces the cost of requesting and receiving assistance).[23]

I operationalize state involvement in firm affairs with indicators of (1) the presence of a technology center, (2) firm activity in a central industry, and (3) the proportion of profits remitted to the state.[24] A technology center is a subsidized research organization; firms with technology centers (generally those dubbed "high tech") have a portion of their expenses for technological research subsidized and receive tax breaks of 30%–50%. The power, steel, iron, automotive, communications, household appliance, and petrochemical industries are central industries; firms in these industries receive state assistance more readily. I use group-level indicators of the number of second- and third-tier subsidiaries to control for size and vertical integration. Second-tier subsidiaries are firms in which a member firm (but not the core firm) has ownership rights; third-tier subsidiaries are firms in which a second tier subsidiaries (but not the core firm) has an ownership interest.[25]

Table 5 presents descriptive statistics for variables included in the analyses. In 1988, 40% of the groups had interlocking directorates, 40% had a finance company, and 20% of the groups had at least one firm with joint ventures (there is some overlap in having these traits). The indicators of group hierarchy indicate that more than half of the groups are involved in both the production decisions and day-to-day operations of their member firms. Particularly noteworthy are the correlations among the measures of group structure. Consistent with the state's efforts to encourage

[23] Approximately 7% of the firms are located in the same province as the core firm (this low number is not surprising because there is considerable overlap between group membership and membership in administrative bureaus that existed prior to reform and that were not limited by geography). Preliminary tests included additional measures of geographic distance such as an indicator of the average geographic distance between every pair of firms in the group. I also examined urban/rural differences and differences in urban location (e.g., coastal vs. interior). The additional constructs did not improve equation fit.

[24] Most firms in the sample did not remit profits in 1988 or 1990

[25] The second- and third-tier subsidiaries draw attention to the issue of group boundary. I include only the 535 firms in which the core firm has an ownership interest for two reasons. First, second- and third-tier subsidiaries are not considered members of the business group by the definition given above. Second, hypothesis 3 concerns the influence of the core firm's management style on member firms, and the core firm has no measurable influence over firms owned by its subsidiaries.

TABLE 5

MEANS, SDs, AND ZERO-ORDER CORRELATIONS

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1990 profit	.20	8.77	.249*	.234*	.015	.101*	.091*	−.129*	−.127*	.114*	.100*	−.005*	.160*	.003	.215*	.092*
1990 output	4.37	13.64	.079	.027*	−.064	.137*	.077	−.214*	−.186*	.128*	.298*	−.114*	.171*	−.009	.455*	.361
1. 1988 profit	.16	6.67	...	.687*	.159*	.047	.083	−.015	−.070	.097*	.010	.128*	.134*	−.035	.082	.064
2. 1988 output	3.74	10.92			.158	.081	.098	−.073	−.112	.126	.108*	.114	.101	.012	.161	.107
Measures of group structure:																
3. Joint ventures (1 = yes)[a]	.200	.405				−.134*	.498*	.011	.056	.042	−.065	.349*	−.001	.555*	−.099*	−.165*
4. Interlocks[a]	.400	.496					.577*	−.782*	−.625*	.876*	.088*	−.038*	.252*	.041	.109*	.096*
5. Finance company[a]	.400	.496						−.505*	−.421*	.391*	.050	.421*	.314*	.119*	.092*	−.042
6. Core affects production[a]	.652	.483							.798*	−.796*	−.096*	.251*	−.295*	−.129	−.136*	−.060
7. Core affects day-to-day[a]	.643	.494								−.692*	−.104*	.171*	−.295*	−.130	−.129*	−.048
8. % of firms in interlocks[a]	.195	.295									.094*	−.037*	.278*	−.037	.092*	.039
9. % of firms with debt to finance company	.24	2.48										−.004	.016	−.042	.510*	.345*
Group control variables:																
10. No. of direct subsidiaries	32.57	24.83											−.041*	−.089*	.128	.114*
11. No. of second-tier subsidiaries	54.15	47.30												−.038*	.134	.101*
12. No. of third-tier subsidiaries	40.25	48.98													−.035	.012*
Firm control variables:																
13. Total assets	3.07	14.73														.161*
14. Thousands of workers	9.48	31.96														...

NOTE.—Monetary values are in 100 million 1990 yuan ($12.5 million). Profits, output, total assets, and number of workers are measured at the firm level, $N = 535$. All othr variables are measured at the business group level, $N = 40$.

[a] 1988 values; otherwise 1990 values.

* $P < .05$.

the formation of business groups with certain structures, many of the test variables are present in the same groups. In keeping with the idea that the presence of interlocking directorates and a finance company are positively correlated to financial performance, the correlations between these variables and firm profits are positive. Likewise, consistent with the argument that an authoritarian management negatively impacts performance and productivity, the management structure indicators (variables 6 and 7) are negatively correlated with profits and output.

RESULTS

Interlocks Improve Performance and Productivity

A remaining controversy in the sociology of organizations is the effect of director interlocks on firm performance. Interorganizational theory suggests a positive interlocks-profits effect, but empirical studies have been inconclusive (Mizruchi 1996). Table 1 presents GLS estimates of the equations including the interlocking directorates test variables. Consistent with hypothesis 1a, my analyses revealed unambiguously that, in Chinese business groups, interlocking directorates have a positive effect on firm performance and productivity. The presence of interlocks in a business group has a positive effect on the profits (model 1) and productivity (model 4) of the group's member firms (model 1). Moreover, it is clear that the more predominant the interlocks within a business group, the greater the profits and productivity of the member firms (models 2 and 5), as hypothesis 1b proposed.[26] Taken together, these results demonstrate not only that interlocking directorates matter but also that they matter for all firms in a group in which any firms are linked through director interlocks.[27]

[26] The data provide strong support for the proposed direction of causation. Because the independent variables are measured in 1988 and the dependent variable in 1990, the coefficient estimates provide some support for the proposed causal direction. Moreover, in 1988, there was no statistically significant difference between the profits and productivity of firms in groups with the test variables and those in groups without the test variables. For example, there was no significant difference in profits or productivity for firms in groups with interlocks and those in groups without interlocks. The same was true for groups with and without a finance company and a hierarchical organizational structure. Yet, both the 1990 profits and productivity of firms in groups that had interlocks in 1988 and those in groups that had a finance company in 1988 were significantly greater than the profits and productivity of those in groups that did not have these traits in 1988. In contrast, the 1990 profits and productivity of firms in groups that were hierarchical in 1988 were significantly lower than those that were not hierarchical in 1988.

[27] Including an indicator of focal firm membership in interlocks did not improve equation fit. Extensive investigation of the relationship between interlock predominance and performance revealed that the relationship is strictly increasing; i.e., a threshold effect (Bunting 1976) was not apparent. There was also no evidence of an effect of density of interlock ties.

Why is the relationship between interlocking directorates and firm profitability and productivity unambiguous in these data while prior research has produced mixed results? The answer, in part, rests on differences in the context in which this research and prior research have been conducted. Existing research into the impact of interlocks on firm performance has produced mixed results because it has been conducted primarily in the United States, where firms often add bank members to their boards of directors during financial crises (Dooley 1969; Richardson 1987). My regression results are strong because interlocks in Chinese business groups do not form primarily when firms are in financial crisis. When the Chinese state is influential in organizing a group, officials deliberately combine profit- and loss-making firms are into the same groups (Li 1995). The rationale is that the profitable firms will absorb the losses of the other firms; one implication of this practice is that there is not a performance-membership relation in these groups. My interviews confirm this: when groups participate in selecting their members, 82% of firms are chosen for strictly functional reasons (i.e., the firm has some capacity the group needs). The next 11% are chosen because their managers have social or political ties to someone in the group.

The mechanism by which interlocking directorates affect performance is best illustrated with an example relayed to me by the member of the board of directors of one of China's major airlines (also one of the country's largest business groups) in February 1996. Shortly after the group formed in the mid-1980s, a change in airline legislation in the United States would have made it possible for one member of the group to expand considerably into the U.S. market. A manager in another firm learned of the change during a trip to the United States and mentioned it as part of his report to his firm's board of directors. A board member, who heard the report and who also held a seat on the board of the firm that might benefit from the information, recognized the importance of the information. He relayed it to the relevant manager in the other firm, whom he knew from meetings of that firm's board. The second firm was able to act on the information and expand its sales. Perhaps the role interlocks play in relaying information is their single greatest advantage in China.

The mechanism by which interlocks affect performance is also clarified by the interaction between interlocks and joint ventures, another source of information in the groups. Prior research predictably finds that firms benefit from joint ventures because contact with foreign firms often transfers technology and management expertise to the Chinese firm (Beamish 1993; Chiu and Chung 1993; Schroath et al. 1993). When a single firm in a business group has a joint venture, all the firms in the group benefit because the firms in the group are tied to each other in various ways.

Information entering the group through the joint venture is passed among member firms through interlocking directorates and other formal and informal linkages. Model 3 of table 1 includes the results of the structural equation model in which the profits of firms in groups with and without interlocking directorates are modeled with separate regression lines. As hypotheses 1c and 1d proposed, the effect of joint ventures is positive and highly significant for firms in groups with interlocks but not significant (and relatively small) for firms in groups with no interlocks.[28]

An alternative explanation of the positive effect of interlocks on profits and productivity involves the role political and social ties play in the groups. Most interlocks develop on the basis of ownership connections, but in those based on political and social connections, the interlocks may be more than a conduit for technological information. They may instead facilitate nepotism, the sharing of rare business information, and the trading of favors among firms. Additional research on the mechanism by which interlocks in the business groups facilitate performance could clarify this.

Note that in models 1–3 in table 1, the effect of lagged profitability is not significantly different from zero. Preliminary tests demonstrated that while lagged (1988) profits predicted current (1990) profits before the interlocking directorate variables were added, their effect was reduced by the addition of the interlock constructs. This is, in part, a testament to the importance of interlocking directorates in business groups because it indicates that interlocks are more influential even than prior performance. In addition, the weakness of the lagged dependent variable may be the result of dramatic changes underway in Chinese industry: as a result of economic reform, firm behavior (and therefore financial performance) has been changing considerably every year. Under such circumstances, prior performance is a weak predictor of current performance. In contrast, lagged output is a strong predictor of 1990 output (table 1, models 4 and 5). In both of these models, however, the intercept is also highly significant, suggesting that omitted variables still explain a large amount of variation in the dependent variable. Omitted variables in these equations and those discussed below might include measures of firm flexibility, group unity, and manager competence.

Finance Companies Improve Performance and Productivity

Literature on economic development has argued that business groups improve access to financing (and thus firm performance) when they contain

[28] Because information passes among firms through various interfirm linkages, similar relationships between joint ventures and the presence of other linkages (e.g., trade

a group-specific banking company. Indeed, the results presented in table 2 demonstrate that both profits and productivity are greater for firms in Chinese business groups with finance companies, as proposed by hypothesis 1a. Likewise, consistent with hypothesis 1b, the more extensive the operations of the finance company, the greater the performance and productivity advantages enjoyed by the firm. Model 1 demonstrates that the presence of a finance company has a positive effect on these firm outcomes. In fact, the increase in profits between 1988 and 1990 for firms in business groups with a finance company was 1.4 million yuan greater than the change in profits for firms in groups without finance companies. Model 2 demonstrates that the proportion of firms with debt to the finance company is also a positive influence on firm performance.

In the late 1980s and early 1990s, Chinese firms sought financing from numerous sources, and foreign joint ventures often provided funds that were not available domestically. Accordingly, the presence of joint ventures has a positive relationship with firm profits (though the coefficient is not significant in model 1). Model 3 explores the relationship between joint ventures, the presence of a finance company, and profitability in more depth. In this structural equation model, the variable indicating that the presence of joint ventures for firms in groups that had finance companies in 1988 is positive and significant, while the same indicator for firms in groups without finance companies is positive and significant, but it is also significantly less. This supports hypothesis 2c, which suggests that firms will seek financing from the group's finance company first and then utilize nondomestic sources that are more difficult to obtain and less predictable in the long run.

As the CEO of the core firm of a medium-sized business group in Shanghai argued when I interviewed him in July 1995, firms in China simply do not have adequate access to financing on their own. The first time I spoke with this manager, he was the president of one of the group's most prosperous member firms, and he was dubious that finance companies would have an impact on firm outcomes (in fact, he suggested that my research was not going to yield much useful information). The second time I spoke with this manager, over a year later, he had become the CEO of the group's core firm. In his new position, he had much more contact with his group's finance company, as well as with the finance companies of other groups. His attitude was completely changed, and he argued that because many firms simply cannot acquire adequate credit independently, the finance companies are indispensable, particularly for firms that may

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ties, personnel exchanges) should exist. Modeling this possibility, I indeed found similar results. Space considerations prevent the display of these (redundant) results.

still be struggling to rid themselves of the legacy of inefficiency left behind by central planning.

The ability to improve the efficiency of operations is crucial in the transition from state socialism, a system that bred large, inefficient business enterprises. Survival in postsocialism requires the firm to remake drastic changes to production, management, marketing, and nearly all other aspects of corporate operation. Yet, as has been the case in China since the beginning of reform, it is likely that environmental challenges and economic shocks associated with development will impede the realization of these changes. The argument that the business group finance company eases this transition by centralizing the capitalization process for a group of firms is supported by the empirical results and was also evident in my interviews with managers. The 1988–1990 increase in productivity of firms in business groups with a finance company was significantly greater than that of firms in groups without a finance company, shown in the results of models 4 and 5 in table 4. Likewise, the majority of managers in business groups argued that the finance company substitutes for a more formally developed financial market.

Hierarchy Hinders Performance and Productivity

Innumerable managers remonstrated during my interviews that authoritarian group managers were no different than the bureaucrats who oversaw the operations of these firms prior to industrial reform. My results, shown in table 3, confirm the interviews: the financial performance and productivity of member firms are weaker in hierarchical groups. Model 1 includes the variable indicating that the core firm influenced production decisions, while model 2 includes the variable indicating that the core firm influenced day-to-day operations. Both indicators of the core firm's involvement, proxies for the management style of the core firm, are negative and highly significant lending support for hypothesis 3. Model 3 includes the dummy variable indicating that the core firm is involved in the production decisions of the member firms, and model 2 includes the dummy variable indicating that the core firm is involved in the member firms' day-to-day operations. Again, these results demonstrate that management style is an important predictor of productivity as both test variables are negative and significant. These findings are consistent with transaction cost economics arguments that suggest that interfirm networks positively influence firm outcomes when monitoring and contractual arrangements are informal and that complete integration may not be desirable. That is, while interlocking directorates and interfirm financial ties improve firm performance and productivity, it cannot be assumed that even more integration among firms would necessarily continue to

improved performance. Indeed the results presented in table 3 demonstrate that greater interfirm coordination (measured here as core firm activity in firm operations) can be detrimental to firms.

However, this finding is at odds with conventional understandings of the role business groups played in the development of Japan and Korea. In both the keiretsu and in chaebol, the core firm managed member firms in a highly authoritarian manner. As Steers et al. (1989, p. 47) point out, "Korean CEOs are seldom challenged, however politely; their decisions are absolute." Decision making in Japanese business groups is much more democratic (and has become more democratic in recent decades) but, relative to the management of groups in countries such as Taiwan, remains relatively authoritarian. The authoritarian model is considered ideal by Chinese officials who are guiding the formation of business groups in their country because it is based on the experiences of Japan and Korea, and because a more authoritarian approach is consistent with Chinese management trends over the past four decades. Yet my results clearly indicate that firms in business groups with less authoritarian management styles perform better financially and are more productive. The manager of a petrochemical firm that is managed by an authoritarian core firm summarized this effect: "Before reform, the government ran enterprises with an iron hand. Now the core firm tries to do the same. Economic reform is supposed to mean change, but this is no change. It is the same system with a new manager. Our firm cannot change until we have the resources to change, but also we need the flexibility to make our own decisions. We cannot do this if the core company must approve every decision we make" (March 1997).

By the mid-1990s, the business groups included in these analyses had become structurally similar. Nearly all (more than 90%) had interlocking directorates and a finance company. By contrast, fewer groups were rigidly hierarchical (in 1995, fewer than 40% of core firms were involved in the production decisions and day-to-day operations of firms, compared to about 65% in 1990). One explanation for this structural convergence is state pressure for the groups to adopt certain structural features, such as interlocks and finance companies. Alternatively, it is possible that the more efficient governance structures were being selected by emerging market mechanisms and competitive pressures. Both arguments have merit, and in the case of interlocks and finance companies provide an instance of a situation in which state and market pressures are operating in the same, optimal direction. In the case of the degree to which the groups are hierarchically arranged, policy makers and markets seem to be pushing in opposite directions, and markets appear to be winning. Reformers, drawing on experience in Japan and Korea, have encouraged strong core firms in the groups. The negative performance impact of

this type of management and the tendency of groups to move away from authoritarian management suggests that market selection of nonhierarchical organizational forms is leading to more democratic governance.

On a technical note, the models presented in tables 1–3 use separate equations to demonstrate that three aspects of business group structure (interlocking directorates, a finance company, and the hierarchical structure of the group) affect member firm financial performance and productivity. Table 4 presents estimates of four models that combine indicators of each structural element into the same equation. The results in this table demonstrate the high joint significance of the test variables and demonstrate that the individual effects of the test variables persist when these variables are used to simultaneously predict the dependent variables. Model 1 regresses 1990 profits on the dummy variable indicators that the group had interlocks and a finance company, that the core firm influenced production decisions, and that the core firm influenced day-to-day operations. Model 2 includes the continuous indicators of the percentage of firms involved in the interlocks and the percentage of firms with debt to the finance company along with the dummy variable indicators of whether the group is hierarchically organized. Models 3 and 4 regress output per worker on the same sets of test variables. In all cases, the coefficient estimates for the test variables are of the same relative magnitude as those in the separate equations presented in tables 1–3, although (perhaps because of correlations among the test variables) standard errors tend to be higher and some coefficients for control variables are considerably larger or smaller than in the separate equations.

CONCLUSION

My objective was to examine the effect of business group structure in China's transition economy on the financial performance and productivity of the groups' member firms. I started by observing that one of the most profound components of China's industrial reform has been the reorganization of firms into business groups, a process that began in the mid-1980s. I argued that using multiple indicators of group structure—including indicators of the presence and predominance of interlocking directorates, informal finance arrangements, and the hierarchical organization of the group—would clarify the role that business groups play in determining firm performance in China and would also inform understanding of the importance of these groups and interorganizational relations more generally. Using data on China's 40 largest business groups and their 535 member firms in 1988–90, I evaluated a series of hypotheses drawn from the literature on interfirm relations and found strong support for each hypothesis.

I found strong support for hypotheses that anticipated a positive relationship between the presence and predominance of interlocking directorates and firm performance. Earlier empirical studies of interorganizational relations have focused on the impact of interlocks on firm profits, primarily because data on both the outcome and explanatory variables have been readily available. However, this research has produced inconclusive results because financially troubled firms, in the contexts in which the research has been conducted, are more likely to be interlocked. The inconclusive results in this literature do not indicate that interorganizational relations do not affect firm outcomes; instead they demonstrate that the available data are inadequate for testing propositions about interlocks and performance. By contrast, Chinese firms that are in financial decline are not more likely than other firms to be involved in interlocks. In China, interlocking directorates improve information flow among firms and thus reduce the cost to an individual firm of obtaining and processing information. The result is improved performance over comparable firms also in business groups that do not have access to the interlocks.

To strengthen this finding, I also examined the effects of informal finance arrangements—another interorganizational relation present in the business groups—on firm performance. As Mizruchi and Galaskiewicz (1993, p. 57) note, because literature on interlocks and performance has been controversial, researchers need to begin considering how alternative interorganizational relations affect firm performance. This is possible in Chinese business groups because they constitute a unique type of interfirm network that is defined not by a single tie among firms (such as interlocking directorates) but is interwoven with innumerable linkages, including financing arrangements, personnel exchanges, production agreements, and social ties. I found that interfirm financing arrangements improve both firm profitability and productivity and that the more extensive these relations, the greater the benefit to the firm.

Evidence that interorganizational cooperation improves performance does not, however, imply that complete integration into a single, hierarchical organization is an optimal strategy. Because an extremely large corporation reduces managerial flexibility, we would expect an intermediate (between markets and hierarchies) organizational structure to be not only stable but also most beneficial to firms (Powell 1990). My results—particularly the finding that firm performance declines as central control in the business group increases—provide a limited amount of support for this notion. Because the analyses presented here do not include firms that are not business group members, it is unclear how nongroup members would differ. Within the group, however, the results suggest that more control is not necessarily better. Over much longer time periods, the possibility for movement toward the extremes always exists, particularly as environ-

mental conditions change. In the case of the keiretsu, Gerlach (1992*a*) has raised similar questions about whether this organizational form might be in decline as the Japanese economy has moved beyond the development stage. My results indicate, however, that under at least some conditions (specifically, moderate to high amounts of uncertainty resulting from poorly developed markets and declining state control), firms subjected to less authoritarian organization perform better.

The formation of business groups has been one of the most profound components of China's efforts to engineer industrial growth. The deliberate disengagement of formerly state-owned enterprises from the command of administrative bureaus is, in part, a result of the perception that business groups with specific structural characteristics protected firms in other countries from the shocks and challenges of development. Research on business groups has argued that groups with certain structural characteristics may protect firms from competition, allow them to take advantage of economies of scale, and substitute for more formal financial markets (Hamilton 1991; Leff 1978, 1979). Comparisons between the Chinese case and the emergence of business groups in Japan and Korea following World War II, are inevitable given the geographic proximity of these countries and the deliberate efforts of the Chinese state to reproduce the groups of its Asian neighbors. Little empirical evidence exists to support claims that elements of group structure provided advantages to firms in Japan or Korea (Lincoln et al. [1996] is an excellent exception); my results support the idea that groups with certain structures can improve firm performance.

Extensions of this research to other contexts would clarify the exact conditions under which the relations demonstrated in this study hold. Future research might also expand the scope of the sample to include small and medium-sized groups. My interviews suggest little difference between these and the large groups, but more extensive research could investigate in greater depth the differences that might exist. Future research might investigate more closely the role that a firm's position in the network (e.g., its centrality or connectedness) plays in determining firm outcomes. On the micro level, the processes that lead to the development of interfirm ties might also provide insight into the degree to which the firms are responding to market pressures versus being led by path dependence. An analysis of the emergence of dyads and triads of interfirm exchange ties would answer such questions. Finally, the successful diffusion of the business group concept to China indicates that firms in Vietnam, Eastern Europe, and others undergoing the transition from socialism might benefit from the deliberate formation of business groups with specific structural characteristics.

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