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# Interfirm Relations in China

## Group Structure and Firm Performance in Business Groups

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The networks of interfirm relations that developed in business groups during China's economic transition have been an important part of the country's economic transition. This article examines the process by which interfirm lending and trade ties emerged and evolved in the business groups in the early stages of reform. It studies the effect of business group structure on firm financial performance in the early stages of reform (1988-1990) and later in development (1994-1999). Initially, firms resorted to external resources (e.g., prior connections) to develop alliances. With time, they began to draw on internal resources (e.g., experience) to identify partners. Some business group structures improve member firm performance early in reform, but group membership reduces performance as markets stabilize. The findings underscore the changing significance of interfirm alliances at various stages of economic development. The findings are relevant for both developing countries and countries that developed in previous eras.

**Keywords:** *economic sociology; China; organizations*

The networks of interfirm relations that developed in business groups during economic transition have become an important part of China's emergent economic structure. As part of industrial reform, the Chinese government began in the mid-1980s to encourage firms to form business groups (*qiye jituan*). Business groups are coalitions of firms from multiple industries that interact for long periods

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of time and that are distinguished by elaborate interfirm networks of lending, trade, ownership, and social relations. The organizational structure of a business group resembles a conglomerate, but relatively exclusive internal relations make the groups highly stable and resistant to reorganization. In the early 1980s, Chinese reformers began to separate firms from administrative bureaus and to reduce state support of firms to encourage the formation of business groups. Firms that joined business groups gained significant autonomy, and they also became responsible for finding inputs and marketing their products. As the firms sought sources of goods and capital, they quickly developed stable interfirm exchange ties similar to those found in Japan's *keiretsu* and Korea's *chaebol* (Keister, 1998).

The process by which these networks of relations in business groups formed and the resulting structure of interfirm alliances will likely play an important role in shaping China's postreform economic structure. Similarly, the role that the business groups play in firm behavior—particularly financial behavior—will affect China's continued development given the prevalence of the groups and the critical role that firm financial outcomes occupy in the development process. This article explores both of these processes. First, I examine the factors that contributed to the formation of the exchange ties that define the business groups, including an exploration of the role that social capital played in this process. That is, I explore the factors that encouraged firms to develop lending and trade ties with each other in the early stages of reform. It was these early ties that formed the basis of the groups' structures and that shaped outcomes for firms both immediately and over time. Second, I study how business groups affect firm financial performance. Again, I highlight the role that social networks play in mediating this relationship. Practically, I focus on the effect of the groups on firm outcomes both early in reform and after markets had begun to mature because changes in market development are likely to create different effects at these different stages.

I propose that firms will initially rely on external cues and social networks (from outside the group) to form lending and trade ties in the groups but that they will increasingly draw on internal social network indicators of viability (cues from within the group) in selecting exchange partners. I also propose that in the early stages of reform, certain characteristics of business groups will improve firm performance. Interlocking directorates and the presence of a finance company in a business group, for example, will improve communication and firm access to scarce capital when markets are beginning to develop. Firms in groups with these traits will perform better financially as a result. As markets become more established, however, business group membership will begin to impede firm competitiveness and flexibility, reducing performance of group members. I test these ideas empirically with two data sets. The first data set includes detailed information about lending and trade ties, firm traits, and firm finances for 535 firms in China's 40 largest business groups in the early stages of reform. The second data set includes detailed, longitudinal information about 800 firms (both state-owned enterprises [SOEs] and other firms) in more recent

years. The findings provide support for my arguments and important insight into the formation and function of business groups during economic development.

## The Emergence of Chinese Business Groups

Relations between firms are the building blocks of markets. To carry out market transactions, all firms must interact with each other. When these interactions are repeated, intercorporate alliances of various sorts are often formed, resulting in lasting relations between firms. Business groups are a particular type of intercorporate alliance. They 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, 1994).

Before the mid-1980s, business groups did not exist in China. However, the number of groups increased rapidly in the following years as a result of both the state's encouragement and firms' needs. By the early 1990s, there were more than 7,000 known business groups in China (Reform, 1993). The 1995 assets of state-owned *qiye jituan* were 1.12 trillion yuan (US\$135.70 billion), one quarter of the country's total state-owned assets (Kan, 1996). In addition to its immense size, business group membership carried with it a degree of prestige within China. These groups resembled powerful foreign multinational corporations. To cash in on this additional advantage, firms of all sizes and in all industries had an added incentive to join groups, adding to the quantity and density of existing groups. The conception of business groups was raised by the Chinese government among the heads of Chinese firms as early as 1978, when the nation first embarked on its reform. The Chinese government observed that the *keiretsu* were successful in Japan, and it decided to take a similar approach to developing its own industry. The Communist Party Central Committee first encouraged links resembling those of the Japanese *keiretsu* among Chinese organizations, marking the initialization of a period in which experimental groups were formed.

Business groups became increasingly common starting in the late 1980s. Between 1987 and 1989, Chinese business groups emerged rapidly in the state-owned sector with the encouragement and assistance of the state. Documents issued by related state agencies not only outlined the state's concept of its role in the establishment and subsequent management of the groups but also included information about the nature of the groups that the state would encourage to form. These documents stressed the importance of interdependence in financial arrangements and alluded to the significance of interlocking directorates in improving interfirm communication. As a result, the state gradually reduced its role in firm management to that of a shareholder, with limited liability and limited responsibility, in formerly state-owned firms. The core firm in a business group thus obtained a greater role as much of the state's responsibility was shifted to the core firm as it began to acquire ownership

rights in the other member firms. The 1990s saw a rapid expansion of business groups in all sectors of the economy. The state continued to voice support for the groups and vowed to support them financially. The number of business groups proliferated, but many of them did not survive to the end of the decade.

## The Formation of Interfirm Ties in Chinese Business Groups

Rapid change during transition created informational asymmetries that made it difficult for firms to evaluate the needs, competencies, and reliability of potential trade partners. Buyers and sellers needed to determine whether particular ties were beneficial, but both were reluctant to reveal too much information about their own needs and competencies. The threat of opportunism that made firms reluctant to be too forthcoming with information but the joint hesitation to reveal information made it difficult for firms to assess the reliability of others and often prevented trust from developing. In this section, I explore how firms developed lending and trade ties under these conditions.

### External Influences and Their Declining Importance

Members of China's business groups formed long-term, relatively exclusive lending and trade ties primarily *inside* the groups, but processes *external* to the groups shaped the emergence and evolution of these ties. Evidence from other transition economies suggests that as uncertainty about markets increased, managers turned to those they knew to reduce risk. Thus, managers built new ties on existing relations, creating considerable path dependence in interfirm exchange. In China, the role that social relations (*guanxi*) play in organizing economic activity, particularly in uncertain contexts, has been well documented (Bian, 1997; Kipnis, 1997; Yan, 1996). During China's transition, the influence of *guanxi* (personal ties) was particularly salient in the formation of economic relations (Bian, 1997; Kipnis, 1997).

Evidence from other countries indicates that when uncertainty is high, organizational decision makers turn to those with whom they have dealt successfully in the past to protect themselves from malfeasance and opportunism (Hagen & Choe, 1998; Powell, 1990). That is, existing social capital affects their choices for lending and trade partners. They also target firms with whom their partners are connected because they can more easily ascertain information about the trustworthiness and reliability of these potential partners (Gulati, 1995a; Rousseau, Sitkin, & Camerer, 1998; Sitkin, Rousseau, Burt, & Camerer, 1998). Prior *direct* connections allow organizations to learn about each other's abilities and capacities and, in some cases, to establish an infrastructure of personnel and practices on which the new relation can build. Similarly, *indirect* connections (i.e., common third-party connections) provide either referrals or an indicator that the potential partner has successfully managed prior relations (Baker, 1990; Burt, 1982).

Managers were concerned with cost, but concern with uncertainty and the need to establish long-term strategic advantage gave prior external relations considerable salience. Indeed, laboratory experiments have shown that when uncertainty is high, partners in dyadic exchange relations continue to trade even when lower prices are available elsewhere (Kollock, 1994). I expect the following *even when less expensive alternatives were available*:

*Hypothesis 1:* The greater the number of prior external ties (either direct or indirect) between two firms, the greater the likelihood the firms formed a lending or trade tie in the business group.

During transition, variations in levels of market development provided critical information to managers as they formed exchange ties. Market development in China was gradual and uneven because reformers favored coastal and southern regions and because entrepreneurial firms in some areas quickly took advantage of new freedoms (Jefferson & Xu, 1991). Firms in developed regions had access to more resources and were better able to become suppliers, whereas firms in less developed areas were more likely to become borrowers and receivers. Yet access to resources had significance, for both buyers and sellers, beyond simple availability. High levels of uncertainty encouraged firms to find trade partners with whom they could form stable relations. Firms that needed resources valued suppliers that would be around in the future, and firms that had access to resources were able to take advantage of this position to cultivate dependence on their products that would persist in the future.

To a potential buyer, firms in developed areas appeared to be more reliable, long-term partners because they were more likely to have access to resources in the future. Managers were even willing to pay a higher price to get resources from such firms because of the security the relation provided (Galaskiewicz, 1985; Pfeffer & Salancik, 1978). Moreover, trading with a firm that was likely to be around in the future could reduce the cost of searching for new trade partners, which were particularly high in developing markets.

To potential suppliers, the control of scarce resources created opportunities to reduce risk and to ensure future exchange by fostering dependence on their products (Cook, 1977; Pfeffer & Salancik, 1978). Resource access was particularly important in China given its legacy of supply shortages, and managers quickly learned to exploit resource advantages for security and long-term advantage by cultivating alliances with less advantaged firms. In the early stages of reform, relatively soft budget constraints partially assuaged concerns about compensation from firms with limited resources and further encouraged those in developed regions to exploit firms with limited access to resources.

Thus, I expect that firms located in developed areas were more likely to become suppliers and those in less developed regions were more likely to become buyers simply because resource availability was greater in more developed regions.

However, because firms also valued security and were willing to pay a cost to reduce uncertainty, these relations still occurred when the cost of the relation was greater than alternatives. Of course, suppliers did not eschew relations with strong buyers or buyers in developed regions, but in relations with weaker partners, firms in developed regions had an advantage even if their prices were higher. That is, *even when less expensive alternatives were available*:

*Hypothesis 2:* Firms located in developed regions became lenders and suppliers, and those located in less developed regions became borrowers and customers.

Although continued soft budget constraints provided some reassurance to suppliers that they would receive compensation from their customers, suppliers faced additional risk in exchanging with less advantaged firms. To alleviate this risk, firms in more developed areas relied more heavily on prior direct and indirect connections to identify potential customers in less developed areas. That is, *even if there was a cost involved*:

*Hypothesis 3:* Poor market development increased reliance on prior connections.

## **Internal Factors and Their Increasing Significance**

As the value of information from prior relations declined, the value of information available in the business group grew, and managers increasingly turned to the group for guidance in developing ties. This change is consistent with research that shows that once a set of relations has coalesced into a relatively stable network, the network serves as a source of information on the reliability, competencies, and needs of potential trade partners (Gulati, 1995b). In other words, it is common for managers to begin to rely on emerging social capital inside the network for their information and to guide their decisions. Yet unlike in the West, where interfirm networks are usually defined along a single dimension (e.g., board interlocks, strategic alliances), firms in business groups were linked in multiple ways. In addition to lending and trade relations, firms were connected through ownership ties, interlocking board memberships, social ties, and relations formed through joint production and research efforts. These multiple linkages provided both direct and indirect sources of information about potential trade partners, and the information available through these internal ties became more abundant as the groups aged and linkages multiplied. This suggests that *even when there was a cost involved*:

*Hypothesis 4:* The greater the number of internal direct and indirect nontrade ties between two firms, the greater the likelihood the firms developed a lending or trade tie in the business group.

As in other business groups, social capital developed from trade relations (Granovetter, 1995). Over time, membership in the same group increased the likelihood that the firms were connected by other ties. Expectations that an alliance would continue to trade were cemented, and managers became increasingly reluctant to discontinue economic relations with partners they interacted with in other arenas. In addition, firms often preferred to trade with a known partner, even if it cost more than trading with a potentially opportunistic stranger. Relational embeddedness thus increased the reluctance of firms to abandon lending and trade relations in established business groups, leading to the development of a thick skein of ties that became increasingly stable (Lincoln, Gerlach, & Takahashi, 1992). Social obligations developed relatively quickly in Chinese business groups and internal non-trade ties became a source of pressure or obligation to remain in lending and trade relations, extending the life of the economic tie sometimes indefinitely. For example, social relations or relations such as those that developed between two firms engaged in joint product development affected the formation of lending and trade relations. As a result, I expect the following:

*Hypothesis 5:* The longer the past internal lending or trade relation between two firms in a business group, the stronger the effect of internal nontrade ties on the formation of an exchange tie between the firms.

## **Chinese Business Group Structure and Firm Performance**

China's policy makers proposed from early in reform that business groups with certain structural traits, such as director interlocks and group-specific banks in Japan's *keiretsu* and South Korea's *chaebol*, would protect firms from competition, create economies of scale, and enhance firm performance. Next, I explore whether certain traits did affect firm performance and how these changed over time.

### **Interlocking Directorates Improve Firm Performance**

An important social network that mediated the relationship between business group structure and firm outcomes is the interlocking directorate. Interlocking directorates are not new to China; they existed in government ministries before reform when the same state representative was assigned to the boards of more than one firm. 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 and a form of cooptation or monitoring, interlocks in China primarily function as an information source for the interlocked

firms. The interlocks allow information about technological advances, market opportunities, innovative strategies, and so forth to pass among firms in the group. Empirical research on the relationship between interlocks and firm performance in the United States, however, has been inconclusive largely because the most interlocked firms are those in financial decline. 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. I anticipate that the latter is the case in China, given its unique financial structure:

*Hypothesis 6:* The presence of interlocking directorates will improve firm financial performance.

### **Finance Companies Improve Firm Performance**

In China in the late 1980s, financial markets were unable to distribute funds efficiently, leaving 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. Reformers originally experimented with finance companies in the central industries and later in most other industries. 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 of the group and, if necessary, to meet short-term operating expenses. 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. That is, firms in business groups with finance companies should perform better than those in groups with no finance company:

*Hypothesis 7:* The presence of a finance company will improve firm financial performance.

### **Later Stages of Development: Business Groups Reduce Performance**

In more recent years, the role of China’s business groups has changed as the country’s economic structure and participation in the world economy have changed. After China’s accession into World Trade Organization, the government has continued

to facilitate measures that promote competition both within China and with foreign firms. Large business groups are regarded as major actors in competing with multinational corporations. Following structuring models of the Shanghai Baosteel Group (Bao Gang), the Aluminum Corporation of China and China National Heavy Duty Truck Corporation went through significant changes of their management and operational structures. Unlike in earlier years, business groups are now common among both SOEs and other firms, and a large number of the groups are now listed on stock markets both in China and abroad. The number of business groups in China decreased rapidly in the 1990s, but the organizational firm is still common. The recently established State-Owned Assets Supervision and Administration Commission of the State Council (SASAC) claims that one of the key functions of SASAC is to develop 30 to 50 large enterprises and business groups capable of competing with Western corporations.

Most notably here, the increasing security that developing markets provide firms is likely to reduce the importance of business group membership. Indeed, in the later stages of transition—or the early stages of market development—membership in a business group may hamper competitiveness and flexibility, reducing financial performance for member firms. It is arguably still quite early in China's transition, and the country is likely to continue to undergo important changes. Yet an initial exploration of the role that membership in a business group played in recent years may be instructive:

*Hypothesis 8:* In the early stages of reform, business groups improved financial performance, but in the later stages of development, the groups reduce performance.

## Data and Method

To examine these hypotheses, I collected two data sets; both focus on lending and trade relations and financial performance in China's business groups. The first data set includes biannual 1988-1996 longitudinal data on all business groups in non-sensitive industries that had registered with the state in 1985. I used these data to explore interfirm tie formation and firm performance early in reform. To collect these data, I administered a questionnaire to the financial officer of each of the 40 core firms in face-to-face interviews (in Chinese without a translator) in 1995-1996. I was able to obtain the data from a single source for most business groups because core firms kept detailed records of member firm behaviors and practices. To record the interfirm dyad data, I presented the financial officer with a matrix that arrayed all member firms both vertically and horizontally. This allowed the officer to quickly refer to company records and indicate the presence or absence of a tie. The total number of possible dyads was 16,306; however, because most of these were absent, it was possible to collect a relatively large amount of data quickly.

To explore the effects of business group membership on firm performance later in reform, I collected a second data set. The firms in this data set are different from the firms I studied in the other portions of this article because it was important to use a random sample, and firm births were frequent during China's transition. The data are longitudinal data, and I used information from 1994 and 1999 for 800 Chinese firms. The sample includes 433 SOEs and 367 collective enterprises, joint ventures, private firms, and other types of nonstate companies. The questionnaire had two parts. Part 1 was a set of 92 questions regarding the structure of the enterprise, manager appointment, participation in reform, organizational and management structure, manager incentives, firm strategy, relations with government offices, investment strategies, and related information. The firm's CEO or its representative in the management hierarchy answered these questions. Part 2 was a series of 141 quantitative questions regarding enterprise operations. The firm's accountant answered these questions. I collected information about firm output, production expenses, wages and labor, investments, assets and liabilities, costs, profits, and related traits.

## Equation Specification and Estimation

In analyses of the formation of an interfirm tie, the unit of analysis was the interfirm dyad—that is, the  $n = \sum_{i=1}^{40} \text{nit}(\text{nit} - 1) = 16,306$  ordered pairs of the 535 member firms within the 40 largest business groups (40 separate networks) with every other firm in the same group in each time period.<sup>1</sup> I included only business group members because my focus is voluntary, repeated relations within these groups.<sup>2</sup> I included business group members regardless of whether they had ties. Because membership is not defined by having ties, some firms were not connected to any other firms. Thus, my interest was in the off-diagonal cells in a matrix of the 40 distinct networks, or each of 40 ( $n \times n$ ) matrices at five points in time where the rows ( $i = 1, \dots, n$ ) were senders in a relation and the columns ( $j = 1, \dots, n$ ) were receivers. I arrayed these as column vectors ( $p$ ) such that  $p = \{1, 2; 1, 3; \dots, 1, n; 2, 1; 2, 3; \dots, 2, n; \dots, n - 1, 1; n - 1, 2; \dots, n - 1, n\}$  and modeled the likelihood of an  $(i, j)$  tie. Specifically, I follow Lincoln (1984) and Lincoln et al. (1992) in modeling the presence (yes/no) of each type of *directional* tie (personnel, commercial, and financial) as a function of firm, dyad, and province attributes such that

$$y_{ijt} = \beta y_{jit} + \alpha y_{ijt-1} + \lambda_i' \mathbf{P}_i + \lambda_j' \mathbf{P}_j + \pi_{ij}' \mathbf{R}_{ij} + \gamma_i' \mathbf{X}_i + \gamma_j' \mathbf{X}_j + \rho W y_{ij} + u_{ijt} + \varepsilon_{ijt}$$

where  $y_{ijt}$  is a directional tie from firm  $i$  to firm  $j$ ;  $y_{jit}$  was a reciprocal tie from firm  $j$  to firm  $i$ ; and  $y_{ijt-1}$  was a lagged tie from  $i$  to  $j$ . The dependent variable is a dichotomous indicator that firm  $i$  sent personnel, commercial goods, or capital to firm  $j$  three or more times in time  $t$ .  $\mathbf{P}_i$  and  $\mathbf{P}_j$  are column vectors of province-level variables for provinces in which firms  $i$  and  $j$  were located.  $\mathbf{R}_{ij}$  is a vector of dyad-level variables;  $\mathbf{X}_i$  and  $\mathbf{X}_j$  are vectors of firm-level variables.  $W y_{ij}$  is a dyad autoregressive term included to control bias that might occur because some dyads contained the same

firms.<sup>3</sup>  $\beta$ ,  $\alpha$ ,  $\lambda'$ ,  $\pi'_{ij}$ ,  $\gamma'_i$ ,  $\gamma'_j$  and  $\rho$  are coefficients to be estimated. I used province-level variables and error components to model regional effects.  $u_{ijk}$  and  $\varepsilon_{ij}$  are the region-specific and dyad-specific error terms, respectively. I used fixed effects to control for group-level variation (i.e., 39 group dummy variables) and estimated generalized linear mixed (pseudo-likelihood) equations in SAS that allowed the decomposition of the error term into its fixed and random components.

In analyses of firm performance, the unit of analysis is the firm. 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 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 for each set of test variables (these are not nested models); I also include two equations that combine all test variables to demonstrate their joint effect.<sup>4</sup> The equations are of the form

$$Y_{1990i} = \alpha + \beta'x_i + \gamma' Y_{1988i} + \lambda'G_i + \varepsilon_{it}$$

where  $Y_{1990i}$  is 1990 profits or output per worker,  $\alpha$  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  $\varepsilon_i$  is the stochastic error term. For the estimation of the output per worker equations, I multiplied all variables (both independent and dependent) by the number of workers in 1990 (i.e., the dependent variable is 1990 output, not a ratio).

Table 1 contains variable definitions and descriptive statistics for dyad analyses. The dependent variables were dichotomous indicators of the presence of each of the three exchange ties in the business group.  $\text{Personnel}_{ijt}$  was a dummy variable coded 1 if firm  $i$  sent personnel to firm  $j$  three or more times in the current year and 0 otherwise.<sup>5</sup> I coded the measures of commercial and financial ties similarly. The lagged dependent variable,  $y_{ijt}$ , was equivalent to the dependent variable, measured in the prior time period. A significant positive estimate of the  $\alpha$  coefficient indicates that if firm  $i$  sent the resource to firm  $j$  in one time period, it was more likely to send that resource in the next period. The reciprocal term,  $y_{jit}$ , indicates whether firm  $j$  also sent the resource to firm  $i$ ; a positive estimate of  $\beta$  indicates reciprocity. I entered firm characteristics as a trait of both firm  $i$  and firm  $j$ . A significant positive estimate of  $\gamma'_i$  indicates that the greater the value of  $\mathbf{X}_i$ , the more likely firm  $i$  was to be the sender in the dyadic tie. A positive  $\gamma'_j$  indicates that the greater the value of  $\mathbf{X}_j$ , the more likely firm  $j$  was to be the receiver. I also entered regional characteristics as traits of both firm  $i$  and firm  $j$ . A positive estimate of  $\lambda'_i$  indicates that as the value of  $\mathbf{P}_i$  increased,  $i$  was more likely to be the sender. A positive estimate of  $\lambda'_j$  indicates that as  $\mathbf{P}_j$  increased,  $j$  was more likely to be the receiver. A positive estimate of  $\pi'_{ij}$  indicates that attributes of this pairing make a tie more likely.

**Table 1**  
**Descriptive Statistics for Dyad Variables: 40 Groups, 535 Firms**

Variable	Definition	<i>M</i>	<i>SD</i>
Outcome variables			
Board exchange <sub><i>ij</i>1990</sub>	Firm <i>i</i> sent a board member to firm <i>j</i> ; otherwise 0	.005	.0004
Financial exchange <sub><i>ij</i>1990</sub>	Firm <i>i</i> loaned funds to firm <i>j</i> ; otherwise 0	.010	.0001
Commercial exchange <sub><i>ij</i>1990</sub>	Firm <i>i</i> sold goods to firm <i>j</i> three or more times; otherwise 0	.211	.412
Manager exchange <sub><i>ij</i>1990</sub>	Firm <i>i</i> sent workers to firm <i>j</i> three or more times; otherwise 0	.042	.092
Basic structure			
Core firm <sub><i>i</i></sub>	Firm <i>i</i> is the core firm in the business group; otherwise 0	.075	.263
Finance company <sub><i>i</i></sub>	Firm <i>i</i> is the business group's finance company; otherwise 0	.012	.001
Distance <sub><i>ij</i></sub>	Distance between the cities in which firms <i>i</i> and <i>j</i> are located	534	836
Same city <sub><i>ij</i></sub>	Firms <i>i</i> and <i>j</i> are in the same city; otherwise 0	.199	.399
Uncertainty and power			
Labor markets <sub><i>i</i></sub>	Number of individuals in province employed in private sector divided by number employed in public sector	.141	.070
Commodity markets <sub><i>i</i></sub>	Number of private and collective firms in province divided by number of state-owned firms	.017	.055
Financial markets <sub><i>i</i></sub>	Deposits of foreign banks in province divided by deposits of all banks	.005	.010
Two or more industries <sub><i>i</i></sub>	Firm <i>i</i> is active in two or more industries; otherwise 0	.054	.094
Social ties			
Same prior bureau <sub><i>ij</i></sub>	Firms <i>i</i> and <i>j</i> under same bureau prior to reform; otherwise 0	.651	.424
School ties <sub><i>ij</i></sub>	Managers in firms <i>i</i> and <i>j</i> attended the same college; otherwise 0	.012	.356
New firm <sub><i>i</i></sub>	Firm <i>i</i> was established after 1978; otherwise 0	.012	.111

Note: Dependent variables are measured in 1990, and independent variables are measured in 1988. Includes only off-diagonal dyads in the same business group.  $N = 16,306$  unless otherwise noted. Amounts are for firms sending the resource. Commercial goods include both finished goods and productive inputs. Each measure subscripted *i*, *j*, or *ij* has a transposed dyad counterpart subscripted *j*, *i*, or *ji*.

I measured external direct connections as the number of ties outside the business group between each pair of firms. I used managers' reports to sum within each dyad (a) the number of interfirm (i.e., across the dyad) pairs of managers who were classmates (*tongxue*) in college; (b) the number of interfirm pairs of managers with family, external professional, or other external social connections; (c) an indicator of whether the firms had a lending or trade relation before the business groups formed;

and (d) an indicator of whether the firms were in the same administrative bureau before reform. I measured internal direct connections as the number of nontrade ties in each dyad that originated from contact inside the business group. These ties included ownership ties and ties formed through joint production, research, and marketing. The formation of these ties dates to the establishment of the group, and none began prior to 1985. I indicated indirect ties, both external and internal, as the number of times a pair of firms was connected through indirect associations (via ties to alters). Using separate indicators of each of these ties (e.g., school ties, past lending ties) produced similar substantive results. Tie duration was the number of years the firms had a repeated, internal lending or trade tie.

I measured market development separately for each dependent variable to capture variations in market expansion for the corresponding resource. In the personnel tie models, I measured labor market development as the number of individuals in the province employed in the private sector as a proportion of those employed in the public sector. In the commodity tie models, I indicated commodity market development as the number of private and collective firms as a percentage of the number of state-owned firms. In the financial tie models, I measured financial market development as deposits of foreign banks as a percentage of total bank deposits. I used province-level indicators because municipal data (often collected by various agencies) are less accessible and less internally consistent. Moreover, given China's size and regional variation, marked province-level differences correspond well to differences in opportunities and constraints (Nee, 1996). I followed Walder (1992) in using an ordinal coding of administrative rank.

I controlled for the lagged presence of an *ij* financial tie in the personnel and commercial models to examine interdependence among exchange relations. If one firm loaned capital to another, it was more likely to take an active interest in the survival of the borrower and lend other resources as well (Lincoln et al., 1992). I also controlled for whether the organization was established before 1978 (prior to reform) and whether it was the core firm to indicate other sources of resources that might have affected firm resource needs. Table 2 contains descriptive statistics for firm-level variables. I do not include Pearson correlation coefficients among the regressors to conserve space, but there are no significantly high correlations.

## Results: Tie Formation

The coefficient estimates in Table 3 provide some insight into the process of interfirm tie formation during transition. Table 3 presents the logistic coefficient estimates for models predicting three types of interfirm relations in China's business groups. Each subsample is slightly less than the full set of 16,306 dyads because of missing data. Consistent with the notion that the identity of one's partner matters in a repeated exchange, the findings indicate that prior economic and social relations

**Table 2**  
**Descriptive Statistics for Basic Variables: 40 Groups, 535 Firms**

Variable	Definition	<i>M</i>	<i>SD</i>
Dependent variables			
Profits	Actual firm profits (not remitted profits) in 1990	0.20	8.77
Output	Value of firm output in 1990	4.37	13.64
Independent variables			
Financial exchange density	Ratio of actual financial ties to potential ties	.006	.005
Commercial exchange density	Ratio of actual commercial ties to potential ties	.009	.060
Manager exchange density	Ratio of actual manager ties to potential ties	.001	.001
Board exchange density	Ratio of actual board ties to potential ties	.001	.003
Interlocks	Firms in the group had board interlocks; otherwise 0	.400	.496
Percentage of firms in interlocks	Percentage of firms in the group involved in board interlocks	.195	.295
Finance company	The group had a finance company; otherwise 0	.400	.496
R&D branch	The group had an R&D branch; otherwise 0	.352	.259

Note: R&D = research and development. Monetary values are in 100 million 1990 yuan (\$12.5 million). Dependent variables and density indicators are measured at the firm level, and  $n = 535$ ; other variables are measured at the business group level, and  $n = 40$ . Dependent variables are measured in 1990; group structure variables are measured in 1988.

between firms increased the likelihood that they would establish lending and trade ties in the business groups, even when less expensive alternatives were available. Hypothesis 1 predicted that prior, external direct and indirect interfirm ties increased the likelihood of lending and trade relations in business groups. The results provide strong support for this hypothesis. Coefficient estimates for the number of external direct and indirect ties were significant and in the predicted directions.

Likewise the results support the prediction of Hypotheses 2 and 3. The interactions between market development and reliance on prior connections are consistently positive, suggesting that prior connections were particularly important where market development was weak. Although the presence of resources may lead firms to be senders (rather than to cultivate dependence), research on Chinese business groups suggests otherwise (Keister, 1998, 2001). Managers in firms that were predominantly senders overwhelmingly acknowledged awareness that trade partners might have been dependent on them and nearly always argued that this was desirable. The regression results also suggest that poor market development increases reliance on prior social connections but at a decreasing rate. The interaction terms and squared terms support the idea that reputation is particularly important when uncertainty is high but that this effect reaches a threshold and then decreases.

The notion that organizational decision makers look beyond immediate economic gains, particularly under uncertain conditions, is evident in the cost results in Table 3.

**Table 3**  
**Logistic Regression of Dyad Ties**

	Board Member Exchange <sub>ij1990</sub>		Financial Exchange <sub>ij1990</sub>		Commercial Exchange <sub>ij1990</sub>		Manager Exchange <sub>ij1990</sub>	
	Coefficient	<i>t</i>	Coefficient	<i>t</i>	Coefficient	<i>t</i>	Coefficient	<i>t</i>
Basic structure								
Tie <sub>ij1988</sub> (lagged dependent variable)	.746***	7.94	2.20***	1.43	2.23*	1.37	3.63**	2.43
Reciprocity (tie <sub>ij1990</sub> )	-1.11**	2.90	-0.167***	4.84	1.46*	1.80	0.970***	4.50
Financial exchange <sub>ij1988</sub>	1.51**	3.18	—		0.929***	4.25	.533***	7.04
Core firm <sub>i</sub>	0.774*	1.92	0.016**	2.90	0.846**	2.45	0.113**	1.96
Core firm <sub>j</sub>	-0.247	1.00	-518**	2.00	0.138**	2.23	-0.207***	8.51
Finance company <sub>i</sub>	0.136**	1.74	0.212***	4.33	0.182	1.50	0.352***	3.29
Finance company <sub>j</sub>	-0.213	1.04	-0.285***	0.070	-0.255**	1.80	-0.197***	6.14
Distance <sub>ij</sub>	-0.174*	1.94	-0.345**	2.69	-0.384***	6.06	-0.295***	4.21
Same city <sub>ij</sub>	0.557**	2.63	0.445	0.532	0.108**	2.40	0.160***	5.95
Uncertainty and power								
Market development <sub>i</sub>	0.396**	2.84	0.707***	5.20	0.419***	4.79	0.558***	2.51
Market development <sub>j</sub>	-0.425***	5.24	-0.523**	2.84	-0.458***	4.38	-1.10***	5.61
Two or more industries <sub>i</sub>	0.028**	2.15	0.755**	2.49	0.463***	8.08	1.70**	2.32
Two or more industries <sub>j</sub>	-0.174*	1.84	0.814	1.32	-0.135**	2.46	-0.136***	3.29
Administrative rank <sub>i</sub>	0.136**	2.46	1.18***	8.51	0.066	1.39	0.279**	1.95
Administrative rank <sub>j</sub>	-0.321	0.811	-0.496***	7.04	-0.596	1.53	-0.557*	2.42
Social ties								
Same prior bureau <sub>ij</sub>	0.105***	3.75	0.770***	6.51	0.217**	1.76	0.156***	4.84
School ties <sub>ij</sub>	0.322***	3.44	0.588*	1.87	0.102***	3.43	0.131***	4.33
New firm <sub>i</sub>	-0.171*	1.96	-0.470**	2.11	-0.345***	5.56	-0.709	1.20
New firm <sub>j</sub>	0.324	1.18	1.34***	6.25	0.614	1.32	0.282	1.01
Dyad autoregressive term	0.121***	4.50	0.213**	2.32	0.107***	8.15	0.445***	4.76
<i>n</i>	15,193		15,917		16,941		16,111	
Pearson $\chi^2$	648.90		843.22		445.82		557.60	

Note: All market development, lagged dependent, and reciprocity variables are specified to correspond with the dependent variable (e.g., in models predicting the presence of a manager exchange in 1990, the market variables refer to labor market development and the lagged dependent variable is the presence of a manager exchange in 1988). Included in the regression (but not displayed) are dummy variables for each of the 40 business groups, an indicator of whether each firm is in light (versus heavy) industry, the percentage of profits remitted to the state, actual profits, and an indicator of each firm's total assets.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Not only did firms opt to trade with seemingly stable partners, but they were also willing to forego less expensive alternatives to establish or maintain these relations. The negative effect of the single cost differential variable included in the first model for each tie indicates that firms were less willing to be involved in the repeated exchange tie if the resource was available cheaper elsewhere. Interpreted with the market development coefficients, this result provides evidence that uncertainty was a significant predictor of the presence of a tie despite cost. These results are particularly strong given that the definition of uncertainty is resource specific.

Yet as the structure of lending and trade relations developed in the business groups, the groups increasingly became sources of information for their member firms about the abilities and competencies of potential trade partners. The results in Table 3 support the argument that nontrade ties in the business group, both direct and indirect, increased the likelihood that a lending or trade relation developed. Similarly, the longer the firms were allied, the more weight decision makers gave to other internal connections. These results support Hypotheses 4 and 5.

## **Results: Financial Performance**

Table 4 presents GLS estimates of the equations including the interlocking directorates test variables. Consistent with Hypothesis 6, the analyses suggest that 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. Moreover, the more predominant the interlocks within a business group, the greater the profits and productivity of the member firms. Similarly, the results in Table 5 show that profits are greater for firms in groups with finance companies, as proposed by Hypothesis 7.

The results in Table 6 provide separate estimates for firms in SOEs and other firms because these two organizational forms are considerably different types of entities. The results, although they are preliminary, do provide evidence that in more recent years, membership in a business group is not beneficial to either SOEs or other firms. In fact, the effect of group membership is significantly negative and relatively strong. Cox tests suggest that the apparent increase in strength between 1994 and 1999 is also real. This implies that the negative effect is growing over time. The implications of this finding are that China's economy may be becoming competitive enough that firms that compete openly are stronger than those that remain protected by business groups. Future research will usefully follow trends in these patterns and provide more concrete evidence of longitudinal patterns in the role that business groups play in shaping firm outcomes.

**Table 4**  
**GLS Regressions of Firm Profits: Effect of Interlocks**

	1990 Profits	
	Model 1	Model 2
Group structure (1988)		
Financial exchange density	3.48*** (8.75)	3.80*** (5.92)
Commercial exchange density	0.002*** (8.13)	0.034*** (4.98)
Manager exchange density	0.042* (2.10)	0.053** (2.42)
Board exchange density	1.39 (0.980)	1.53 (0.587)
Had interlocking directorates	1.14** (2.61)	—
Percentage of firms with interlocks	—	1.41*** (3.22)
Had an R&D branch	0.380* (1.44)	0.641* (1.89)
Group control variables (1990)		
Number of second-tier subsidiaries	5.29*** (4.11)	3.193*** (3.81)
Number of third-tier subsidiaries	0.014* (1.75)	0.147 (1.49)
Firm control variables (1990) (log) total assets		
	0.002 (0.68)	0.053 (0.89)
Thousands of workers	0.190 (0.34)	0.014 (0.59)
Core firm	0.075*** (4.11)	4.46*** (4.79)
Total sales in the group	0.016*** (2.55)	0.844*** (7.42)
Foreign located	0.32 (1.44)	0.109 (.592)
Light industry	0.025 (1.48)	0.002 (1.05)
Profits	0.039 (1.64)	1.52 (1.14)
Adjusted $R^2$	0.243	0.248

Note: GLS = generalized least squares; R&D = research and development. 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, percentage of profits remitted to the state, and location in same province as core firm.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 5**  
**GLS Regressions of Firm Profits: Effect of Finance Companies**

	1990 Profits	
	Model 1	Model 2
Group structure (1988)		
Financial exchange density	0.034*** (3.14)	0.023*** (5.35)
Commercial exchange density	0.0104*** (4.30)	0.098*** (3.53)
Manager exchange density	0.011*** (3.25)	2.25*** (3.82)
Board exchange density	0.137** (2.76)	0.115* (2.47)
Had a finance company	1.37** (1.96)	—
Group with finance company, core firm	—	5.46*** (7.01)
Group with no finance company, core firm	—	1.88* (1.82)
Had an R&D branch	0.272** (2.35)	0.474** (2.54)
Group control variables (1990)		
Number of second-tier subsidiaries	3.50*** (5.56)	4.74*** (5.89)
Number of third-tier subsidiaries	1.73*** (3.55)	1.64* (2.24)
Firm control variables (1990) (log) total assets	0.305 (0.93)	-0.585* (1.70)
Thousands of workers	0.004 (0.44)	0.011 (1.33)
Core firm	3.99*** (3.92)	—
Total sales in the group	0.346*** (3.13)	0.334*** (3.59)
Intercept for groups with no finance company	—	-0.028 (0.80)
Intercept for groups with a finance company	—	0.367 (0.57)
Profits (1988)	0.019* (1.89)	0.091 (1.32)
Adjusted $R^2$	0.219	0.251

Note: GLS = generalized least squares; R&D = research and development. GLS estimates of metric regression coefficients; absolute  $t$  statistics are in parentheses. Included in the regression (but not displayed) are dummy variables for being foreign located, being in light industry, having a technology center (a state-supported research division), being in a protected industry, percentage of profits remitted to the state, and location in same province as core firm. Monetary values are in 100 million 1990 yuan (\$12.5 million).

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

**Table 6**  
**GLS Regressions of Firm Profits: Effect of Business Group**  
**Membership in 1994 and 1999**

	1994		1999	
	SOEs	Non-SOEs	SOEs	Non-SOEs
Business group member	-.247* (.140)	-.152* (.092)	-0.457*** (0.017)	-.165*** (.061)
Subordination				
City	-.302* (.130)	—	-0.275 (0.332)	—
County	-.312 (.266)	-.050 (.095)	0.057 (0.093)	.094 (.165)
Firm traits				
Assets (logged)	.201** (.070)	.205*** (.035)	1.073*** (0.185)	.095 (.057)
Age	.002 (.004)	-.014** (.006)	0.009 (0.010)	.011 (.010)
Number of workers (thousands)	.063*** (.017)	-.000 (.000)	0.319*** (0.047)	.109* (.048)
Manager traits				
Party official	.025 (.733)	.027 (.089)	-0.180 (1.862)	-.074 (.155)
Age	-.006 (.010)	-.007 (.007)	0.023 (0.026)	.016 (.012)
Secondary school	.025 (.113)	-.003 (.070)	0.245 (0.286)	-.077 (.121)
Postsecondary school	.141 (.193)	.050 (.147)	0.817 (0.490)	-.014 (.256)
Adjusted R <sup>2</sup>	.145***	.171***	0.350***	.224***

Note: GLS = generalized least squares; SOE = state-owned enterprise. GLS estimates of metric regression coefficients; standard errors are in parentheses.  $N = 433$  firms. These are different firms than those included in previous analyses in this article. Included in the regression (but not displayed) are dummy variables for industry, province, being foreign located, and percentage of profits remitted to the state.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Conclusion

I had two objectives in this article. First, I explored the factors that affected the formation of lending and trade relations in Chinese business groups in the early stages of reform. Second, I examined 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 the factors that influence the formation of ties in these groups are important to understanding the emergent

structure of the groups and ultimately China's new economy. I also proposed 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. Finally, I drew an important distinction between early and later development in studying the relationship between group structure and firm financial performance. In short, I proposed that certain elements of group structure would benefit firms early in reform, but as markets became more stable, group membership would become detrimental to firm well-being.

My findings provided strong support for these arguments. The results show that early in reform, firms sought to reduce uncertainty by exchanging with those with whom they had prior direct or indirect connections. They also traded with those that had secure access to scarce resources, even when less expensive alternatives are available. These findings provide evidence that organizational decision makers seek power through dependent exchange ties. Consistent with research on social dilemmas, these findings also demonstrate that reputation influenced lending and trade even when less expensive alternatives were available. Perhaps most important, my results show that the processes underlying exchange formation vary over the life of the business groups. In the early stages of development, processes originating outside the groups had the strongest influence on the formation of ties. As time passed, the role of external social relations and other external indicators of the trustworthiness and reliability of potential partners decreased. Yet processes originating within the business groups became more important. Firms increasingly sought to ally with group members with whom they had other ties and who were central players in the network of interfirm ties within business groups.

I also found important support for my arguments regarding the effect of business groups on firm financial performance. I found a positive relationship between the presence and predominance of interlocking directorates and firm performance in the early stages of development. The finding provides support for the argument that interlocking directorates improve information flow among firms, reducing the cost to an individual firm of obtaining and processing information. I also found that having a finance company improved profitability for member firms but that an extremely hierarchically organized group reduces performance.

Because conditions in China were similar in many ways to other transition economies, these results provide important information about the process of economic transformation more generally. Relatively high uncertainty, changing sources of uncertainty, market failure, managers who are not accustomed to markets, and expanding competition were prevalent in China as they are in many transition economies. The strong but declining role of the state, the continued importance of bureaucratic power, and hardening budget constraints were also typical of a transition economy. My findings

suggest that regional differences in market development during transition may be institutionalized and thus shape economic exchange after transition. Similarly, the continued importance of bureaucratic power during transition may cause the posttransition economic structure to reflect prereform advantages. Perhaps most consequential for understanding transition economies, however, is the finding that internal ties became increasingly important predictors of economic relations, even at a financial cost. Thus, although business groups may be advantageous early in reform, increasing internalization of ties may create inefficiencies that have negative long-term consequences. Although the transition context is unique, these results also speak to the process by which interfirm relations emerge and thus to the general process by which social structures come into being. The somewhat unique transition context required some modifications of existing theory, but much of what we know of organizations from other contexts remained true. My results highlight the critical role that social relations play in the formation of economic ties, particularly under uncertainty. The results also confirm in a unique setting the notion that external connections decline in salience and internal relations become more important as interfirm networks develop.

## Notes

1. This is equivalent to the  $n(n - 1) = 285,690$  dyads minus dyads containing firms in different groups.

2. Firms outside business groups did develop lending and trade ties, but the ties they formed seldom coalesced into the close-knit relations that are characteristic of relations in business groups.

3.  $W_{ij} = \sum_p W_{pq} y_{ij}$ , where  $p$  and  $q$  are dyads and  $W_{pq} = 1/n_p$  if dyads  $p$  and  $q$  share a common firm and 0 otherwise.  $W_{ij}$  is the mean of the dependent variable over all dyads that include firm  $i$  or firm  $j$  (excluding  $ij$ ).

4. The random effects model decomposes the error term as follows:  $\epsilon_{it} = \alpha_i + \rho_j + \gamma_t + \lambda_{it}$ , where  $\epsilon_{it}$  is the total stochastic component for firm  $i$  in time  $t$ ,  $\alpha_i$  is the error component associated with firm  $i$ ,  $\rho_j$  is the component associated with group  $j$ ,  $\gamma_t$  is the component associated with time period  $t$ , and  $\lambda_{it}$  is the stochastic component. Although intertemporal correlation is minimal in panel data, preliminary tests indicated that errors were correlated between 1988 and 1990.

5. I chose three as the cutoff because fewer exchanges did not indicate an ongoing exchange relation, and after three exchanges, preliminary analyses suggested that the firms were likely to continue to trade.

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