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Exchange Structures in Transition: Lending and Trade Relations in Chinese Business Groups

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The networks of interfirm relations that developed in business groups during economic transition are central to China's reform and are becoming an important part of the country's emergent economic structure. Using a recent and original data set that includes direct observations of economic choices made by firms, the process by which these interfirm lending and trade ties emerged and evolved in the early stages of reform is explored. Initially, information from sources external to the network dominated the formation and direction of exchange relations. Firms turned to their prior connections, took advantage of market position, and drew on bureaucratic power to develop alliances. Over time, internal influences gained importance, and managers increasingly drew on internal nontrade relations and other indicators inside the business group to identify lending and trade partners. The results demonstrate the central but changing role that social relations and environmental cues played in the creation of economic structure during China's transition. This study also contributes to an understanding of the processes of organizational adaptation to a major economic transition and interfirm alliance formation more generally. The findings reveal that firms select exchange partners of known reputation and solicit relations that reduce uncertainty, even when there is a cost involved.

The emergence of business groups is one of the most dramatic changes to China's industrial structure resulting from economic reform. A necessary component of economic transition from central planning is the transformation of lending and trade relations between the state and industry (Walder 1995). Business groups (qiye jituan) were the primary vehicle through which the Chinese state and large industrial enterprises re-defined their ties (Keister 2000; Li 1995). Business groups are coalitions of firms from multiple industries that interact over long periods 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 (Granovetter 1995; Powell 1990). In the early 1980s, Chinese reformers began to separate firms from administrative bureaus and to reduce state support of firms to enemies of Social Sciences for data assistance. This research was supported by grants from the National Science Foundation (SBR-9633121), the U.S. Department of Education, the Cornell University East Asia Program and Center for International Studies, IBM, and the Institute for Research in the Social Sciences at the University of North Carolina at Chapel Hill.
courage 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 intercorporate exchange ties similar to those found in Japan’s keiretsu and Korea’s chaebol (Keister 1998).

The networks of relations that developed within China’s business groups will likely shape reform and the country’s post-reform economic structure, but the process by which these ties developed and the resulting structure of relations has attracted little research attention. Business groups decreased interdependence between the state and firms, which facilitated growth during transition by increasing firm accountability, reducing the need for government monitoring, improving incentives for performance, and minimizing political maneuvering (Kornai 1992; Walder 1995). Relations within China’s business groups also increased growth and productivity by improving the flow of information among member firms and creating economies of scale (Keister 2000). Following reform, relations in the business groups will likely continue to shape firm performance (Lincoln, Gerlach, and Ahmadjian 1996), corporate governance (Strachan 1979), levels of regional development (Orru, Biggart, and Hamilton 1997), and the nature of foreign competition (Ghemawat and Khanna 1998; Granovetter 1994). Decisions that firms made early in reform about lending and trade ties will affect China’s economic structure for decades because these ties quickly began to solidify into stable interfirm alliances. Yet the factors that influenced firm decision-making at this pivotal point have not yet been explored systematically.

I explore the formation of interfirm ties in Chinese business groups during reform. Research on economic transition shows that as central control declined and markets developed, the conditions and incentives managers encountered changed dramatically. At the start of reform, budget constraints were relatively soft and markets had just started to emerge (Jefferson and Rawski 1994; Schaffer 1998). Within a decade, budget constraints hardened, markets replaced central planning nearly completely, and compe-
tition was pervasive (Walder 1995). Managers were increasingly concerned with efficiency and productivity (Rawski 1994), but long-term security and strategic advantage also affected their decisions (Jiang 1993; Nee 1992). Studies of transition show that these changes shaped firm behavior and growth, but the impact of transition on interfirm ties has not been explored. In contrast, research in Western organization theory shows that firms develop stable interfirm ties to reduce uncertainty and related risks (Galaskiewicz 1985; Mizruchi and Stearns 1988; Palmer, Friedland, and Singh 1986). Firms initially use external cues to identify trade partners, but over time, relations within a network become more salient sources of information about the reliability of trade partners (Gulati and Gargiulo 1999). These ideas provide a useful starting point for a study of interfirm relations in China, although they require modification to account for conditions unique to China.

I investigate the changing role that factors external to and within Chinese business groups played in the formation of alliances among member firms. I identify factors unique to the Chinese context and explore how these factors affected the formation of interfirm relations. I focus on such influences as rapidly developing markets, changing sources of uncertainty, the legacy of a strong state, and the importance of social connections. I propose that managers drew on prior relations and took advantage of uneven market development to establish lending and trade ties in the early stages of reform. Firms in developed regions capitalized on access to resources to form ties with less advantaged firms, and those in less developed areas accepted these ties because they provided security. Early in reform, bureaucratic power from a firm’s position in the country’s administrative hierarchy also continued to be an advantage and to signal status. As time passed, external indicators became less salient, and firms increasingly turned to indicators internal to the business groups for information about potential lending and trade partners. Nontrade relations in the group gained importance, and their influence increased with the duration of the tie. To examine these ideas empirically, I use 1988–1996 longitudinal data on the
transformation of all dyadic lending and trade relations in 40 of China’s early business groups. I focus on three common ties: lending of capital, buying and selling commercial goods, and trading personnel. I follow all 535 component firms, whether they formed ties or not, to explore the evolution of the structures of 40 separate business groups. I also draw on interviews that I conducted with managers in the member firms to develop the model and interpret the findings.

REFORM AND THE EMERGENCE OF BUSINESS GROUPS

Prior to reform, all Chinese enterprises were state-owned and overseen by a complex system of administrative bureaus. The state used firms to generate revenues, and it freely redistributed resources to enact policies and to subsidize unprofitable firms (Jefferson and Xu 1991). Firms had soft budget constraints; they were not forced to cover expenses from sales and income, and they received credit from state-owned banks for reasons unrelated to risk (Kornai 1986). Managers were not concerned about survival, but like firms in other redistributive economies (Kornai 1979), they faced constant shortages of physical resources despite pressure to increase production. While firms were highly dependent on the state, the state also depended on firms to provide scarce inputs to other enterprises and to provide employees with jobs, housing, medical care, and other social services (Walder 1983, 1995). The complexity of monitoring a large number of firms created dramatic and pervasive informational asymmetries, and managers responded by hoarding resources and bargaining for favorable treatment (O’Brien 1992; Walder 1992). Pressure to meet increasing output targets with unreliable inputs, changing political whims, and inconsistent payoffs from bargaining created substantial uncertainty.

In 1978, the state initiated large-scale industrial reform, and at least three important changes occurred that affected firm behavior. First, budget constraints began to harden. Firms were gradually allowed to retain profits, and the contract responsibility system gave managers control of most business decisions. Even in the largest firms, the state reduced its role to that of a shareholder, and firms were increasingly forced to meet operating expenses from revenues (Jefferson and Xu 1991). Second, the nature of uncertainty facing managers changed. The effectiveness of bargaining and political maneuvering declined, and uncertainty arising from shortages was reduced as markets developed (Jefferson and Rawski 1994; Wong 1986). Yet uneven market development posed new challenges and created new forms of uncertainty. Product and labor markets developed slowly, beginning on the coasts and near major cities, and remained local at least initially (Groves, et al. 1995; Naughton 1995; Yi 1994). Financial markets developed even more slowly as the state limited the operations of private and foreign banks and regulated stock trading until the 1990s (Goldie-Scott 1995; Gong 1995). Third, competition gradually increased, and even the largest firms found themselves competing for resources with innovative state firms, nonstate firms, and foreign companies (Naughton 1992).

To help firms contend with rapid change and to reduce state-firm interdependence, the state encouraged business groups to form (People’s Republic of China [PRC] 1980). While the business group concept may be unfamiliar to Western observers, these networks are pervasive in many Asian economies (Lincoln, Gerlach, and Takahashi 1992). China’s business groups quickly became a viable organizational form similar to business groups in other countries. Like the keiretsu and chaebol, China’s groups are interfirm coalitions with a strong core or parent company surrounded by highly interlinked firms in related industries. Historically, business groups have formed during transition or development when firms welcome the protection of stable relations, and the groups tend to persist if the state does not outlaw them as collusive (Keister 2000). Because they are coalitions rather than independent legal entities, business groups do not pay taxes or issue stocks. Yet they are stable structures with distinct boundaries distinguished by long-term lending and trade ties among member firms that are legally independent. While keiretsu are either vertically or horizontally organized,
China's business groups are all related by relatively vertical relations (Keister 2000). They are not all vertically integrated, but the structure of the groups tends to be more vertical than horizontal. In Chinese groups, the core firm is usually industrial, often owns a portion of the subsidiaries, and exercises varying degrees of control over members depending on ownership. The state relinquished control of the business groups, but it continued to observe and advise them and retained partial ownership in some member firms, particularly in protected industries.

Chinese reformers studied the keiretsu and chaebol and actively formed similar groups in China, as the Japanese state did in earlier decades.¹ In the early 1980s, Chinese reformers dismantled the bureaus that oversaw firms prior to reform and transferred firm control to business groups (Keister 2000). They typically selected groups of firms from the same bureau, designated a core firm, and aided in developing the business group's administrative component (PRC 1986). While it was rare early in reform, some firms also voluntarily formed business groups, and the state encouraged this outside of sensitive industries such as defense. All business groups registered with the state and were considered a group once this process was complete. The reformers targeted state-owned industrial firms because they accounted for 50 percent of total national output and 80 percent of exports and employed 102 million workers in the 1980s (Jefferson and Rawski 1994). Yet collectives (jiti), joint ventures (hezi or sanzi), and private firms (siren) also joined business groups.² By 1985, 58 business

1 The Japanese state encouraged the formation of the zaibatsu (an early business group) in the 1880s and the post-World War II keiretsu. The Japanese and Korean states have also provided business groups with tax incentives, subsidies, and various forms of protection from foreign competition (Granovetter 1995).

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

groups had formed, and by 1993, more than 7,000 existed. In 1993, 50 percent of firms were group members by some estimates, and group assets exceeded 135 billion U.S. dollars (Li 1995).

Firms joined business groups to gain autonomy, to capitalize on economies of scale, to compensate for market failures (Goto 1982), to gain control of their environments (Cook 1977), to affect political change and develop joint products (Mascarenhas 1989), and for prestige (Keister 1998). Firms could join groups independently, and membership overlap between former bureaus and business groups faded quickly. Firms also independently established the stable lending and trade relations that came to define the groups. Cross-shareholding began in the 1990s after the opening of China's stock markets, but mergers were rare as property rights were not well-defined until later in reform (C. Xie 1996). While the core firm maintained detailed records of firm activities and aided in management, neither the core firm nor the state interceded in the formation of interfirm relations in the business groups because hundreds of ties quickly developed at all organizational levels. Like business groups in Asia, Latin America, and the Middle East, all firms in China's business groups were connected to at least one other firm in the group through some form of lending, trade, ownership, joint production, or other stable formal relation. Member firms were also connected through social relations, although family ties and other social ties are less pervasive in Chinese business groups than they are in Korea's chaebol (Steers, Shin, and Ungson 1989) or Taiwan's guanxi qiye (Numazaki 1991).

THE FORMATION OF RELATIONS IN 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 (Keister 1998). 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 (Williamson 1985). The threat of opportunism that accompanied
transition 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 (Coase 1937; Granovetter 1985). How did managers in business groups decide which ties to pursue or avoid? What influenced which firms to become suppliers of resources and which to become receivers? How did these processes vary by resource? I develop a series of hypotheses to address these questions.

EXTERNAL INFLUENCES: THEIR SIGNIFICANT BUT DIMINISHING 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. Similar patterns developed in Hungary where managers, facing equally uncertain conditions, hedged by diversifying assets and drawing on people and other resources that had been reliable prior to transition (Stark 1996). 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 was particularly salient in the formation of economic relations (Bian 1999; Kipnis 1997; Xin and Pearce 1996) as it had been during Taiwan’s post-World War II economic restructuring (Numazaki 1991).

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 in order to protect themselves from malfeasance and opportunism (Granovetter 1985; Hagen and Choe 1998; Powell 1990). 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, and Camerer 1998; Sitkin et al. 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 and Knez 1982; Raub and Weesie 1990). My interviews suggested that Chinese managers sought information from prior relations such as classmates, relatives, friends, political allies, and former trade partners. The CEO of a mining group explained the importance of prior relations:

It is difficult to know who you can trust since reform. All the rules have changed, and everybody is concerned with making money. When I find a company I feel I can trust, it is a relief. Naturally I would exchange with that company again because it saves me time in the end. Often this means borrowing from a company I traded with before or getting the things I need from an old friend.

As this quote indicates, 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; Lawler and Yoon 1993, 1996). Thus, I expect that:

Hypothesis 1. Even when less expensive alternatives are available to the borrower or customer, the greater the number of prior external direct and indirect ties between two firms, the greater the likelihood that the firms develop a lending or trade relation 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 and Rawski 1992; Naughton 1995). Firms in developed regions had access to more resources and were better able to become suppliers, while 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 (Aiken and Hage 1968; Galaskiewicz 1985; Pfeffer and 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. As one manager explained:

Finding what we need can be difficult because we are trying to overcome years of having the state provide everything. We often get materials from the same companies. We even borrow money from the same companies. Once we find a company that can get us what we need, we stick with them. Sometimes this even means paying more for a product, but at least we know that the next time we need the same thing, that company will be there.

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 and 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. A manager in Liaoning explained:

There is a great deal of competition in China now, and many firms will go bankrupt in coming years. We can improve our chances of survival if other firms need our products and cannot get them from elsewhere. We look for firms that are unable to find what they need elsewhere, and we encourage them to develop exclusive relations with us.

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:

Hypothesis 2A. Even when less expensive alternatives are available, firms located in developed regions become lenders and suppliers, and those located in less developed regions become borrowers and customers.

While 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. As markets developed, however, reliance on prior connections became less important. That is:
Hypothesis 2B. Even if there is a cost involved, poor market development increases reliance on prior connections, but at a decreasing rate.

Before reform, a firm’s rank in the state administrative system indicated the level of bureaucracy to which the firm reported for tax and control purposes; it also signaled a great deal about the firm’s status among other firms (Walder 1989, 1992). Although the administrative rank system was abolished early in reform, former rank continued to determine access to resources, political influence, and thus status (Walder 1995). As firms formed lending and trade ties, those with higher prior administrative ranks were more likely to garner controlling positions, and those with lower prior ranks were likely to remain dependent. This is consistent with research that shows that organizational decision-makers look to the environment for other cues about the reliability and trustworthiness of potential partners. Various benchmarks can be used to gauge a firm’s legitimacy and trade worthiness (Buchko 1994; DiMaggio and Powell 1983; Oliver 1990). Because former rank was such an indicator in China, I expect that:

Hypothesis 3. Even if it means paying more, the higher the administrative rank of a firm prior to reform, the more likely the firm becomes a lender or supplier in a business group; the lower the prior rank of a firm, the more likely the firm becomes a borrower or customer.

Over time, budget constraints hardened, bureaucratic control of firms declined, markets developed, competition increased, and bankruptcy became more common. Firms increasingly focused on reducing costs and improving efficiency (Jefferson and Rawski 1994). Uncertainty did not disappear, but market development reduced the degree of uncertainty resulting from the transition. Simultaneously, the value of prior relations (e.g., firms from a prior administrative bureau, prior trading partners) became increasingly obsolete. Thus, I anticipate that:

Hypothesis 4. The effect of external ties, market development, and administrative rank decrease over time.

The Increasing Significance of the Business Group

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). 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 research and production efforts. These multiple links 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 business groups aged and links multiplied. This suggests that:

Hypothesis 5. Even when there is a cost involved, the greater the number of internal direct and indirect nontrade ties between two firms, the greater the likelihood that the firms develop a lending or trade relation in the business group.

As in other business groups, social relations 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 et
al. 1992). My interviews suggest that social obligations developed relatively quickly in Chinese business groups and that internal nontrade 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 consequence, I expect that:

Hypothesis 6. 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.

Positional embeddedness (i.e., a firm’s position in the overall network) also began to provide information to the focal firm and potential partners that shaped alliances. Connections to others who are well-connected (centrality) afforded the focal firm better access to information about other firms and made it more visible to potential partners (Freeman 1979; Gulati and Gargiulo 1999). As a manager in Yunnan explained, “Some partners are just better than others in terms of how much information they can give. Those with good connections certainly make better partners.” Research from the West demonstrates that while centrality increases the set of direct and indirect relations available to the firm with information (Gulati and Gargiulo 1999; Powell, Koput, and Smith-Doerr 1996), a central position also captures information beyond the effect of direct and indirect ties. Centrality increases awareness of the structure of the overall network (Krackhardt 1990), and it improves the focal firm’s visibility (Podolny 1993; Podolny and Stuart 1995). Centrality signals a firm’s willingness to trade and its effectiveness at managing lending and trade ties. It also indicates that other firms have evaluated the firm and have decided to trade with it. Trading with a more central firm is thus likely to confer legitimacy on the receiver. Centrality is particularly important in uncertain environments because it introduces reputational information beyond what direct and indirect relations provide (Gulati and Gargiulo 1999; Podolny 1993; Podolny and Stuart 1995). Thus, I expect that:

Hypothesis 7. Even when less expensive alternatives were available to the receiver, the greater a firm’s centrality in the network, the more likely it is to be the supplier in lending and trade relations in the business group; the lower a firm’s centrality in the network, the more likely it is to borrow capital or receive goods.

Just as firms came to rely less on external information sources and as external signals of legitimacy declined over time, firms increasingly relied on internal sources of information and legitimacy signals. The value of information available from inside the business group increased and gradually began to play a more central role in shaping alliance formation. This suggests that:

Hypothesis 8. The effects of internal ties, relationship length, and network centrality on the likelihood of a lending or trade tie increase over time.

**Tie Content**

Because China’s markets developed at different rates, the types of resources that firms exchanged affected the nature of the relations that developed. Financial markets were particularly slow to develop because the state delayed financial reform longer than other types of reform (Goldie-Scott 1995). Thus, uncertainty in lending continued longer than in other types of exchange, and reputation remained important in lending longer than in other exchange relations. Likewise, because the Chinese legal system was not well developed in the early stages of economic transition, relying on trusted relations was often an effective way to increase the likelihood that a loan would be repaid. Moreover, concern with reputation increases with the degree of risk involved in the relationship (Kollock 1994), and lending capital is relatively high risk. The importance of trust in financial exchange has been documented in various countries including the United States (Lamoreaux 1994), England (Allen 1993; Cottrell 1980), Scotland (Allen 1993; Munn 1981), Germany (Tilly 1966), other European economies (Cameron
et al. 1967; Mayer 1990), and several Asian and Latin American countries (Fields 1995; Steers et al. 1989; Strachan 1979; Whitley 1990). Thus, I expect:

**Hypothesis 9.** The impact of external relations, market development, and administrative rank is stronger and lasts longer in the development of lending relations than it does in trade relations.

### RESEARCH DESIGN

**DATA**

To examine these hypotheses, I collected quantitative and qualitative data on in-group lending and trade relations in China’s early business groups. The quantitative data were biennial 1988–1996 longitudinal data on all business groups in nonsensitive industries that had registered with the state in 1985. To study early tie formation and evolution, I observed groups that formed early and studied them over time. I used records from the Chinese Economic and Trade Commission (*Jingji Maoyi Bu* or ETC) to determine that in 1985 the first groups had completed official state registration procedures and to identify all business groups registered in nonsensitive industries (40 groups and their 535 member firms). 3 Prior to 1985, groups had begun to form, but none had registered. In addition to the 40 groups in nonsensitive industries, 18 business groups had formed in sensitive industries (e.g., national security, defense, proprietary technologies). I excluded these groups because the state maintained close control of interfirm relations in them, maintained a majority ownership share in their member firms, and closely guarded their records (Bureau of State Asset Management 1995; Dong and Hu 1995). I begin this study in 1988 when firms had had three years to develop ties, and I observe the firms through 1996 to capture changes over time. I did not add business groups that formed after 1985 because longitudinal data on these would not have been sufficient. 4

To collect the quantitative 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. Because the average number of firms per business group was small and core firm managers knew managers in the member

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3 I am grateful to Gary Hamilton for sharing this list, which he had obtained from the ETC. The initial list contained basic 1990 business group and firm data such as address, industry, assets, and size. I stayed in China in 1995–1996 and, with the assistance of the Shanghai and Chinese Academies of Social Sciences (SASS/ CASS), I met with a statistician at ETC. With his aid, I used public records to verify that this was an inclusive list of business groups registered in 1985 and to compile additional publicly available data on business groups. The list of groups has been published elsewhere (Keister 2000; Li 1995).

4 I paid particular attention to the potential for sample selection bias. My data collection and analysis methods were designed to deal with these issues. I did not select the sample according to whether the firms had particular relations. Berk (1983) explains that sample selection bias in estimating linear models originates with the assumptions that the endogenous and exogenous variables are related linearly and that the mean of the disturbances is zero. Systematically omitting observations according to their value on Y alters the expected values for the observed Ys, and the original regression line no longer fits the data. This undermines both external and internal validity and is problematic even if the researcher is prepared to confine causal inferences to the portion of the population selected for the study. Although nonlinear models do not make the classical assumptions underlying Berk’s discussion, sample selection can still distort the shape of nonlinear equations. To avoid sampling on the dependent variable, I did not sample firms according to whether they had ties. Rather I included all business group members. As a result, having (or not having) a particular tie did not affect whether a firm was included in my analyses. These strategies are consistent with Lincoln’s (1984) recommendations for studying dyads within a network of this sort. By definition, nongroup members could have no within-group ties. Because nongroup members were less likely to form the long-term, stable relations that were typical in the business groups, however, including nongroup members in the analysis would likely have strengthened the observed associations.
firms well, they easily answered questions about their backgrounds and relations. For 28 member firms, the core firm did not have complete data for a member, and I interviewed the financial officer in those firms to complete the questionnaire. In 13 additional cases, the core company had incomplete records, and I was unable to interview the member firm’s financial officer (the financial officer was unavailable or I was unable to locate the firm). I recorded missing data for the affected questions for these firms.5

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 possible dyads was 16,306; however, because most of these were absent, it was possible to collect a relatively large amount of data fairly quickly. I carefully distinguished missing data (e.g., ties about which the financial officer did not have information) from absent ties (e.g., ties that the financial officer knew were missing), and I emphasized this difference to respondents. When managers turned over, I treated the current manager as the relevant source of ties. When firms changed business groups, I allowed them to matriculate from the survey, and I did not add firms over time. There was no discernible difference in the quality of firm records between the early and later periods, given managers’ relatively intimate knowledge of each other, and there was little change in the number or types of nontrade ties reported over time.6

In 1990, the 40 business groups I studied owned 68 percent of total Chinese business group assets.7 Because these were the first groups to form and because business groups typically grew during the late 1980s, in 1990 these 40 were the largest groups. Their core firms were located in 15 of China’s 29 provinces and in Beijing, Tianjin, and Shanghai (municipalities under direct central government jurisdiction). The member firms were located in all provinces, independent municipalities, and autonomous regions. Most of the firms were former state-owned enterprises, but many business groups also included joint ventures and collective enterprises. The firms were in various industries, including manufacturing and services, as well as China’s central, or pillar, industries (energy, transportation, communications). The firms were typical of business group members in terms of industry, geographic spread, and the levels of competition they faced. Compared to firms not in business groups, these firms tended to be more heavily indebted, slightly larger, have more state shares, and to have somewhat softer budget constraints (Lee and Hahn 1999).

To better understand the mechanisms by which interfirm ties formed, I also conducted less structured qualitative interviews (in Chinese) with the general manager (or the vice president for operations in about 10 percent of cases) in each of the 40 business groups. In about 15 percent of firms two managers were available, and I interviewed both. I also selected a random sample of 35 small, medium, and large business groups in Shanghai, a coastal city that began to develop early, and conducted qualitative interviews in these. Finally, I selected 12 additional business groups in underrepresented cities and industries and conducted qualitative interviews in these groups to further expand my understanding of the groups. In these interviews, I asked managers a standard series of questions about such issues as business group–firm interactions, government intervention in the group, labor practices, and characteristics of the managers. I also allowed the managers to direct these conversations toward issues that I may have neglected. In many business groups, the fi

5 All 40 business groups participated and were cooperative. Early in reform before competition accelerated, managers were less protective of company information than they were in more recent years. My connections with CASS and SASS added legitimacy that increased positive response.
6 Over the study period, reported personnel ties ranged from .078 to .083, where .078 is the percentage of possible personnel ties that actually had formed in the first year and the percentage varies each year. The range of reported commercial ties was .1 to .3, and financial ties ranged from .0099 to .010.
7 Author's calculation (sum of assets recorded in current data set as a percentage of State Statistical Bureau estimates of business group assets).
nancial officer also gave me copies of non-sensitive company literature and firm financial records. I did not include information from these interviews in the quantitative data set.

**Equation Specification and Estimation**

My unit of analysis was the interfirm dyad, that is the

\[ n = \sum_{i=1}^{40} n_{i} (n_{i} - 1) = 16,306 \]

ordered pairs of the 535 member firms within the 40 largest business groups (40 separate networks) with every other firm in the same business group in each time period.\(^6\) I included only business group members because my focus is voluntary, repeated relations within these groups.\(^7\) I included business group members whether they had ties or not. 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 × n) matrices at five points in time where the rows (i = 1, . . . n) were senders in a relation and the columns (j = 1, . . . n) were receivers. I arrayed these as column vectors, p, such that p = {1, 2; 1, 3; . . . 1, n; 2, 1; 2, 3; . . . 2, n; . . . n − 1, 1; n − 1, 2, . . . 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, financial) as a function of firm, dyad, and province attributes such that:

\[
y_{ij} = \beta y_{ji} + \alpha y_{ij-1} + \lambda_{i} p_{i} + \lambda_{j} p_{j} + \pi \mathbf{R}_{ij} + \gamma_{i} x_{i} + \gamma_{j} x_{j} + \rho W_{ij} + u_{ij} + e_{ij},
\]

where \( y_{ij} \) is a directional tie from firm i to firm j; \( y_{ji} \) is a reciprocal tie from firm j to firm i; and \( y_{ij-1} \) is 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. \( p_{i} \) and \( p_{j} \) are column vectors of province-level variables for provinces in which firms i and j were located. \( R_{ij} \) is a vector of dyad-level variables; \( X_{i} \) and \( X_{j} \) are vectors of firm-level variables. \( W_{ij} \) is a dyad autoregressive term included to control bias that might occur because some dyads contained the same firms.\(^10\) \( \beta, \alpha, \lambda, \pi, \gamma, \rho \) and \( p \) are coefficients to be estimated. I used province-level variables and error components to model regional effects; \( u_{ij} \) and \( e_{ij} \) 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 (Wolfinger 1993).\(^11\)

Table 1 contains variable definitions and descriptive statistics.\(^12\) The dependent variables were dichotomous indicators of the presence of each of the three exchange ties in the business group. Personnel\(_{ij} \) 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.\(^13\) I coded the

\[^{10}\] \( W_{ij} = \sum W_{pq} y_{pq} \) where p and q are dyads and \( p \neq q \). \( W_{pq} = 1/n_{pq} \) 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). This method is similar to the spatial autoregressive model used in contagion models (Doreian 1980; Land and Deane 1992; Tolnay, Deane, and Beck 1996).

\[^{11}\] Because the business groups were not nested in regions, it was not possible to use random effects models to control for the contextual effects of group and region.

\[^{12}\] The number of regressors in these models is large, but the large number of observations provides ample degrees of freedom. Including potentially relevant variables provides a more conservative test of hypotheses when there are sufficient degrees of freedom (Blalock 1979; Johnston 1984).

\[^{13}\] 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. I experimented with higher cut-


<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dependent Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel tie_{ij}</td>
<td>$1 = \text{firm } i \text{ sent workers to firm } j \text{ 3 or more times; otherwise 0.}$</td>
<td>.080</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.071)</td>
</tr>
<tr>
<td>Commercial tie_{ij}</td>
<td>$1 = \text{firm } i \text{ sold commercial goods to firm } j \text{ 3 or more times; otherwise 0.}$</td>
<td>.211</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.412)</td>
</tr>
<tr>
<td>Financial tie_{ij}</td>
<td>$1 = \text{firm } i \text{ loaned funds to firm } j; \text{ otherwise 0.}$</td>
<td>.010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.0001)</td>
</tr>
<tr>
<td><strong>External Influences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External direct ties_{ij}</td>
<td>Number of direct ties outside business group between managers in firms $i$ and $j$; otherwise 0.</td>
<td>.110</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.104)</td>
</tr>
<tr>
<td>External indirect ties_{ij}</td>
<td>Number of indirect ties outside business group between managers in firms $i$ and $j$; otherwise 0.</td>
<td>.870</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.356)</td>
</tr>
<tr>
<td>Labor markets_{i}</td>
<td>Number of individuals in province employed in private sector divided by number employed in public sector.</td>
<td>.141</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.070)</td>
</tr>
<tr>
<td>Commodity markets_{i}</td>
<td>Number of private and collective firms in province divided by number of state-owned firms.</td>
<td>.017</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.055)</td>
</tr>
<tr>
<td>Financial markets_{i}</td>
<td>Deposits of foreign banks in province divided by deposits of all banks.</td>
<td>.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.010)</td>
</tr>
<tr>
<td><strong>Internal Influences</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal direct ties_{ij}</td>
<td>Number of direct ties inside the business group between firms $i$ and $j$; otherwise 0.</td>
<td>.540</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.276)</td>
</tr>
<tr>
<td>Internal indirect ties_{ij}</td>
<td>Number of indirect ties inside the business group between firms $i$ and $j$; otherwise 0.</td>
<td>.221</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.148)</td>
</tr>
<tr>
<td>Centrality_{ij}</td>
<td>Number of links weighted by centrality of partners (Bonacich centrality, normalized).</td>
<td>.460</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.142)</td>
</tr>
<tr>
<td>Established pre-1978_{i}</td>
<td>$1 = \text{firm } i \text{ was established before 1978; otherwise 0.}$</td>
<td>.012</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.111)</td>
</tr>
<tr>
<td>Core firm_{i}</td>
<td>$1 = \text{firm } i \text{ is the core (or central) firm in the business group; otherwise 0.}$</td>
<td>.075</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.263)</td>
</tr>
</tbody>
</table>

Notes: Numbers in parentheses are standard deviations. Only off-diagonal dyads in the same business group are included; $N = 16,306$. Personnel ties include both white- and blue-collar workers; 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 $ji$. Independent variables are measured at $t - 1$.

measure of commercial and financial ties similarly.\textsuperscript{14} The lagged dependent variable, $y_{ijt}$, was equivalent to the dependent variable, $y_{ijt}$, measured in the prior time period.\textsuperscript{15} A significant positive estimate of the 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, $y_{jiti}$, indicates whether firm $j$ also sent the resource to firm $i$; a positive varied across dyads, the mean of $X_{ij}$ does not always equal the mean of $X_{ji}$. As the means in Table 1 indicate, there was considerable variation on each dependent variable because not all dyads had ties.

\textsuperscript{14} As all firms were represented the same number of times in the set of all dyads, the mean of $X_i$ always equals the mean of $X_j$, but as the presence of directional relations from firm $i$ to firm $j$ did not materially alter the results.
Table 2. Pearson Correlation Coefficients between Variables in the Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) External direct ties $t_{ij}$</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>(2) External indirect ties $t_{ij}$</td>
<td>.44</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) Labor markets$_j$</td>
<td>.01</td>
<td>.02</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) Commodity markets$_j$</td>
<td>.03</td>
<td>.00</td>
<td>-.37</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) Financial markets$_i$</td>
<td>-.00</td>
<td>-.01</td>
<td>.20</td>
<td>.28</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) Administrative rank$_i$</td>
<td>.45</td>
<td>.21</td>
<td>-.00</td>
<td>-.12</td>
<td>.19</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) Internal direct ties $t_{ij}$</td>
<td>.05</td>
<td>.31</td>
<td>-.15</td>
<td>-.32</td>
<td>.01</td>
<td>.15</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) Internal indirect ties $t_{ij}$</td>
<td>.11</td>
<td>.13</td>
<td>.11</td>
<td>.08</td>
<td>.19</td>
<td>.04</td>
<td>.58</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9) Centrality$_j$</td>
<td>.38</td>
<td>.27</td>
<td>.19</td>
<td>.12</td>
<td>.00</td>
<td>.00</td>
<td>.27</td>
<td>.45</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) Established pre-1978$_i$</td>
<td>.29</td>
<td>.07</td>
<td>-.00</td>
<td>.59</td>
<td>.10</td>
<td>-.18</td>
<td>.37</td>
<td>-.11</td>
<td>-.07</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>(11) Core firm$_i$</td>
<td>.69</td>
<td>-.40</td>
<td>.03</td>
<td>-.06</td>
<td>.06</td>
<td>.47</td>
<td>.56</td>
<td>.61</td>
<td>-.01</td>
<td>-.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

An estimate of $\beta$ indicates reciprocity. I entered firm characteristics as both a trait of both firm $i$ and firm $j$. A significant positive estimate of $\gamma'_j$ indicates that the greater the value of $X_j$, the more likely firm $i$ was to be the sender in the dyadic tie. A positive $\gamma'_i$ indicates that the greater the value of $X'_i$, 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 $P'_i$ increased, $i$ was more likely to be the sender. A positive estimate of $\lambda'_j$ indicates that as $P'_j$ 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 2 presents Pearson zero-order correlation coefficients among the regressors.

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 (1) the number of interfirm (i.e., across the dyad) pairs of managers who were classmates (tongxue) in college, (2) the number of interfirm pairs of managers with family, external professional, or other external social connections, (3) an indicator of whether the firms had a lending or trade relation before the business groups formed, and (4) 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.

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16 I did not control for whether a firm had ties to nongroup members because there were very few extra-group ties in the early stages of reform. My interviews also suggested that there was little connection between the rare external ties firms had and the structure of lending and trade relations in the business groups. In preliminary analyses, I controlled for firm exports, but because I found no consistent effect, I omitted this from the analyses.

17 Reported numbers of interfirm nontrade connections did not increase over time. Relatively low manager turnover during this time made changes in leadership rare. Controlling for changes in management did not improve model fit.
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.\(^{18}\)

I measured centrality within the business groups using Bonacich’s (1987) eigenvector measure of network centrality. This measure, which I calculated in UCINET and transferred to SAS as a standardized variable, is greater for other organizations that are linked to many other organizations that are also highly connected. The Bonacich measure of centrality has been widely used in research on interfirm relations that attempts to represent organizational position in a network (Gulati and Gargiulo 1999; Mizruchi 1993; Podolny 1994). The variable cost minus cost elsewhere indicates whether the resource was available cheaper elsewhere. I used managers’ accounts of the cost of the resource (the interest rate for lending relations) and the cost the firm would pay if they were to use the next most likely source of the good or capital to create the indicator. The alternative cost was widely known because most exchange was conducted within the business group. If the two firms did not trade, I coded the cost as the cost if the trade were to exist (again, this was widely known as all exchange considered here occurred in the same business group).

I controlled for the lagged presence of an if 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.

RESULTS

EXTERNAL PROCESSES ENCOURAGED LENDING AND TRADE

Researchers have documented the role that interfirm relations in business groups play in coordinating economic activity, but little is known about the processes that produce these ties. The coefficient estimates in Table 3 provide some insight into these processes. 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 (Granovetter 1985), the findings indicate that prior economic and social relations 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.

The importance of social connections (i.e., guanxi) has long been observed in China. Yet evidence that economic actors, particularly corporate decision-makers facing increasing competition and decreasing survival possibilities, would pay a cost to trade with others of known reputation is significant for two reasons. First, researchers have recently argued that the importance of guanxi has declined in recent years (Bian 1997; Guthrie 1998). Second, students of China’s transition have argued that power is being transferred from those with bureaucratic power to those

\(^{18}\) Using a dummy coding of administrative rank had no noticeable effect on the results.
Table 3. Coefficients from the Logistic Regressions of Three Types of Interfirm Relations on Selected Explanatory Variables: Business Groups in China, 1988 to 1996

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Hypothesis* (Direction)</th>
<th>Personnel In Model 1</th>
<th>Personnel In Model 2</th>
<th>Commercial In Model 3</th>
<th>Commercial In Model 4</th>
<th>Financial In Model 5</th>
<th>Financial In Model 6</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External Influences</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External direct ties(_{ij})</td>
<td>1 (+)</td>
<td>.045***</td>
<td>.044***</td>
<td>.405***</td>
<td>.406***</td>
<td>.682***</td>
<td>.416***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.010)</td>
<td>(.009)</td>
<td>(.117)</td>
<td>(.118)</td>
<td>(.124)</td>
<td>(.123)</td>
</tr>
<tr>
<td>External indirect ties(_{ij})</td>
<td>1 (+)</td>
<td>.118***</td>
<td>.111***</td>
<td>.655***</td>
<td>.557***</td>
<td>.644***</td>
<td>.744***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.035)</td>
<td>(.030)</td>
<td>(.112)</td>
<td>(.100)</td>
<td>(.111)</td>
<td>(.202)</td>
</tr>
<tr>
<td>Market development(_j)</td>
<td>2A (+)</td>
<td>.706***</td>
<td>.745**</td>
<td>.120***</td>
<td>.122**</td>
<td>1.032***</td>
<td>.700***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.211)</td>
<td>(.261)</td>
<td>(.019)</td>
<td>(.050)</td>
<td>(.231)</td>
<td>(.082)</td>
</tr>
<tr>
<td>Market development(_j)</td>
<td>2B (-)</td>
<td>-.650***</td>
<td>-.366***</td>
<td>-.120***</td>
<td>-.191***</td>
<td>-.150***</td>
<td>-.244***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.202)</td>
<td>(.114)</td>
<td>(.017)</td>
<td>(.021)</td>
<td>(.023)</td>
<td>(.019)</td>
</tr>
<tr>
<td>Market development(<em>j) \times direct ties(</em>{ij})</td>
<td>2C (+)</td>
<td>-.260***</td>
<td>-.436***</td>
<td>-.221**</td>
<td>-.188***</td>
<td>-.518***</td>
<td>-.067**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.010)</td>
<td>(.124)</td>
<td>(.315)</td>
<td>(.035)</td>
<td>(.007)</td>
<td>(.010)</td>
</tr>
<tr>
<td>Market development(<em>j) \times indirect ties(</em>{ij})</td>
<td>2C (+)</td>
<td>-.260***</td>
<td>-.436***</td>
<td>-.221**</td>
<td>-.188***</td>
<td>-.518***</td>
<td>-.067**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(.010)</td>
<td>(.124)</td>
<td>(.315)</td>
<td>(.035)</td>
<td>(.007)</td>
<td>(.010)</td>
</tr>
<tr>
<td>(Market development(<em>j) \times direct ties(</em>{ij}))^2</td>
<td>2C (-)</td>
<td>-.000***</td>
<td>-.000***</td>
<td>-.000***</td>
<td>-.000***</td>
<td>-.000***</td>
<td>-.000***</td>
</tr>
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<td>(.000)</td>
<td>(.000)</td>
<td>(.000)</td>
<td>(.000)</td>
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<tr>
<td>(Market development(<em>j) \times indirect ties(</em>{ij}))^2</td>
<td>2C (-)</td>
<td>-.003**</td>
<td>-.003**</td>
<td>-.003**</td>
<td>-.003**</td>
<td>-.003**</td>
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<td></td>
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<td>(.000)</td>
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<tr>
<td>Administrative rank(_i)</td>
<td>3 (+)</td>
<td>.120***</td>
<td>.033***</td>
<td>.221**</td>
<td>.832**</td>
<td>.158***</td>
<td>1.201***</td>
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<td>Administrative rank(_j)</td>
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<td>-.025**</td>
<td>-.089**</td>
<td>-.270***</td>
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<td>(.004)</td>
<td>(.018)</td>
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<tr>
<td>External direct ties(_{ij}) \times time</td>
<td>4 (-)</td>
<td>-.144***</td>
<td>-.024***</td>
<td>-.135**</td>
<td>-.015***</td>
<td>-.655*</td>
<td>-.132***</td>
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<tr>
<td></td>
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<td>(.022)</td>
<td>(.007)</td>
<td>(.008)</td>
<td>(.004)</td>
<td>(.363)</td>
<td>(.036)</td>
</tr>
<tr>
<td>Market development(_i) \times time</td>
<td>4 (-)</td>
<td>-.144***</td>
<td>-.024***</td>
<td>-.135**</td>
<td>-.015***</td>
<td>-.655*</td>
<td>-.132***</td>
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<td>(.007)</td>
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**Internal Influences**

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<tr>
<th>Independent Variable</th>
<th>Hypothesis* (Direction)</th>
<th>Personnel In Model 1</th>
<th>Personnel In Model 2</th>
<th>Commercial In Model 3</th>
<th>Commercial In Model 4</th>
<th>Financial In Model 5</th>
<th>Financial In Model 6</th>
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<tr>
<td>Internal direct ties(_{ij})</td>
<td>5 (+)</td>
<td>.227*</td>
<td>.170***</td>
<td>.049</td>
<td>.122</td>
<td>.147***</td>
<td>.225***</td>
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<td>(.027)</td>
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<td>(.550)</td>
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<tr>
<td>Internal indirect ties(_{ij})</td>
<td>5 (+)</td>
<td>.147***</td>
<td>.227***</td>
<td>.105**</td>
<td>.100</td>
<td>.006*</td>
<td>.001</td>
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<td>(.008)</td>
<td>(.019)</td>
<td>(.100)</td>
<td>(.003)</td>
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<td>Tie duration(<em>{ij}) \times direct ties(</em>{ij})</td>
<td>6 (+)</td>
<td>.060**</td>
<td>.043*</td>
<td>.181**</td>
<td>.019**</td>
<td>.002**</td>
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<td>(.023)</td>
<td>(.020)</td>
<td>(.108)</td>
<td>(.004)</td>
<td>(.000)</td>
<td>(.000)</td>
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<tr>
<td>Tie duration(<em>{ij}) \times indirect ties(</em>{ij})</td>
<td>6 (+)</td>
<td>.154</td>
<td>.003</td>
<td>.701**</td>
<td>.702**</td>
<td>.999**</td>
<td>1.103**</td>
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<tr>
<td></td>
<td></td>
<td>(.400)</td>
<td>(.541)</td>
<td>(.361)</td>
<td>(.105)</td>
<td>(.100)</td>
<td>(.400)</td>
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<tr>
<td>Centrality(_i)</td>
<td>7 (+)</td>
<td>.245***</td>
<td>.300***</td>
<td>1.890***</td>
<td>.280**</td>
<td>1.523***</td>
<td>1.616*</td>
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<td>(.054)</td>
<td>(.295)</td>
<td>(.100)</td>
<td>(.174)</td>
<td>(.100)</td>
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<tr>
<td>Centrality(_j)</td>
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<td>-.072</td>
<td>-.059</td>
<td>-.115**</td>
<td>-.151*</td>
<td>-.1030***</td>
<td>-.2301***</td>
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<td>(.077)</td>
<td>(.011)</td>
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<td>(.222)</td>
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Table 3 continued on next page
### EXCHANGE RELATIONS IN CHINESE BUSINESS GROUPS

**Table 3 continued**

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Hypothesis (Direction)</th>
<th>Personnel$_{ij}$ \ Model 1</th>
<th>Personnel$_{ij}$ \ Model 2</th>
<th>Commercial$<em>{ij}$ / Commercial$</em>{ji}$ \ Model 3</th>
<th>Commercial$<em>{ij}$ / Commercial$</em>{ji}$ \ Model 4</th>
<th>Financial$_{ij}$ \ Model 5</th>
<th>Financial$_{ij}$ \ Model 6</th>
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<tr>
<td><strong>Cost of Resource</strong></td>
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<td></td>
<td></td>
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<tr>
<td>Cost minus cost elsewhere$_{ij}$</td>
<td>All (−)</td>
<td>−.402***</td>
<td>−.012*</td>
<td>−.401***</td>
<td>−.099***</td>
<td>−.362**</td>
<td>−.045*</td>
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<tr>
<td></td>
<td></td>
<td>(0.053)</td>
<td>(0.006)</td>
<td>(0.047)</td>
<td>(0.012)</td>
<td>(0.153)</td>
<td>(0.026)</td>
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<tr>
<td>(Cost minus cost elsewhere)$_{ij}^2$</td>
<td>All (+)</td>
<td></td>
<td>.001***</td>
<td></td>
<td>.006**</td>
<td></td>
<td>.001**</td>
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<td></td>
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<td>(0.000)</td>
<td>(0.002)</td>
<td></td>
<td>(0.000)</td>
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<tr>
<td>(Cost minus cost elsewhere)$_{ij}^3$</td>
<td>All (−)</td>
<td></td>
<td>−.0001***</td>
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<td>(0.000)</td>
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<td>(0.000)</td>
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<tr>
<td>Reciprocity (tie$_{ij}$)$_b$</td>
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<td>.912*</td>
<td>1.522***</td>
<td>.081</td>
<td>2.840</td>
<td>−1.281***</td>
<td>−1.59***</td>
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<td></td>
<td></td>
<td>(0.401)</td>
<td>(0.411)</td>
<td>(0.162)</td>
<td>(1.80)</td>
<td>(1.65)</td>
<td>(0.005)</td>
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<td>Tie$_{ij}$ in 1988 (lagged dependent variable)</td>
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<td>3.873***</td>
<td>3.987***</td>
<td>3.550**</td>
<td>2.324***</td>
<td>1.360***</td>
<td>2.382**</td>
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<td></td>
<td></td>
<td>(7.12)</td>
<td>(8.61)</td>
<td>(1.28)</td>
<td>(1.817)</td>
<td>(3.24)</td>
<td>(0.900)</td>
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<tr>
<td>Financial tie$_{ij}$</td>
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<td>.130***</td>
<td>1.160**</td>
<td>.121***</td>
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<td></td>
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<td></td>
<td></td>
<td>(.621)</td>
<td>(.010)</td>
<td>(.401)</td>
<td>(.012)</td>
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<td>Established pre-1978$_i$</td>
<td></td>
<td>.420</td>
<td>.370</td>
<td>1.402***</td>
<td>1.521***</td>
<td>1.821</td>
<td>.484</td>
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<td>(1.75)</td>
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<td>Core firm$_i$</td>
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<td>.540***</td>
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<td>.260**</td>
<td>.008***</td>
<td>.009***</td>
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<td></td>
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<td>(.012)</td>
<td>(.101)</td>
<td>(.176)</td>
<td>(.100)</td>
<td>(.001)</td>
<td>(.001)</td>
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<tr>
<td>Dyad autoregressive term</td>
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<td>.144**</td>
<td>.188***</td>
<td>.005***</td>
<td>.287**</td>
<td>.202**</td>
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<td></td>
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<td>(.100)</td>
<td>(.055)</td>
<td>(.030)</td>
<td>(.001)</td>
<td>(.115)</td>
<td>(.060)</td>
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<tr>
<td>Number of cases</td>
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<td>16,111</td>
<td>15,941</td>
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<td>15,917</td>
<td>15,917</td>
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<tr>
<td>Pearson $\chi^2$</td>
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<td>608.35</td>
<td>830.25</td>
<td>610.26</td>
<td>911.12</td>
<td>614.47</td>
<td>978.89</td>
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</table>

**Notes:** Numbers in parentheses are standard errors. Included in the regression (but not displayed) are dummy variables for each of the 40 business groups, an indicator of profits/assets, and indicators of ownership structure, industry, percent profits remitted to the state, geographic proximity to Beijing, geographic distance between the firms, and total assets.

*Hypothesis refers to the argument being tested by the explanatory variable; sign indicates the predicted direction.

$^b$ "Market development" and "market" variables are equivalent. The market development and reciprocity variables are specific to the dependent variable (e.g., in models predicting the presence of a personnel tie, the lagged dependent variable is the presence of a personnel tie, and the market development variables refer to labor market development).

$^p < .05$  $^{**}p < .01$  $^{***}p < .001$ (two-tailed tests)

with market power (Nee 1996). My results suggest not only that social connections continue to matter in China, but also that power relations with origins in the previous system are still meaningful (both prior administrative rank and joint membership in a prior bureau affect exchange). These findings also support Oberschall's (1996) argument that drawing general conclusions about China and about economic transitions generally can be misleading if the evidence is based exclusively on individuals.

Figure 1 uses the coefficient estimates in Table 3, Model 4 to illustrate the strength of the relationship between external social relations and the development of commercial exchange relations. The bars in this figure represent the predicted probability of a commercial trade tie at cost levels ranging from −100 to 100 yuan. The variable indicating the number of external ties is evaluated at 1 for the curve labeled “had prior ties.” This variable is evaluated at 0 for the curve labeled “no prior ties.” Figure 1 indicates that at all cost differential levels, firms that had prior ties were more likely to trade commercial goods than were firms that did not have prior ties. Indeed, the slopes of the curves
suggest that as costs decline elsewhere, the difference in the probability of a tie increases dramatically. Graphs of the probability of personnel exchanges and lending relations are similar.

Market development also affected the formation of exchange relations. The results presented in Table 3 support the idea that where uncertainty was high, firms adapted by developing repeated exchange relations with those with better access to resources. The results also support the idea that firms sought to foster dependence on the resources they controlled when conditions were relatively certain. Hypothesis 2A predicted that firms located in developed regions became lenders and suppliers, while their counterparts in less developed regions were more likely to become buyers or borrowers. The market development indicators are all in the proposed direction and highly significant. This finding supports the argument that uncertainty can shape the structure of interorganizational relations. In China, inequalities in market access may be perpetuated by interfirm relations that develop during transition, making it increasingly difficult for firms located in poorly-developed regions to improve their status, even in the long run.

Likewise the results support the prediction of Hypothesis 2B. 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), my interviews suggest otherwise. 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 condi-
tions, is evident in the cost results in Table 3. 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. Again, this result remains in Models 2, 4, and 6, which introduce additional indicators and the more complex cost variables.

The results indicate that the effect of uncertainty on exchange was considerably stronger than the effect of cost. Figure 2 diagrams the relationship among commodity market development, resource cost, and the likelihood of exchange. I used the coefficient estimates from Table 3, Model 4, to calculate the predicted probability of exchange between pairs of firms at levels of commodity market development (sender’s location) ranging from 0 to 1 and cost differences (the difference between the cost paid and the cost elsewhere) varying from -100 to 100 (evaluated at the mean for other variables). The graph indicates that the probability of a tie was high at high levels of development (regardless of cost) and at low levels of development when the good was more expensive elsewhere. Only when the level of market development was low and the resource was available cheaper elsewhere, did the likelihood of a tie decline. In other words, firms were likely to trade, regardless of cost, if the sender was located in a developed area (i.e., had secure access to the resource). Only when the sender did not have secure access to the resource did the likelihood of the exchange decline.

These results have implications for organization theory and for understanding organizational decision-making during eco-

19 Graphs of the relationship between labor market development and personnel exchange, and between financial market development and the capital loans, exhibit similar trends.
nomic transition and the process of transition more generally. While research on market transition has been accumulating in recent years, most evidence about how transition occurs is derived from research on individuals or economic aggregates (Bian 1997; Nee 1996; Y. Xie and Hannum 1996; Zhou, Tuma, and Moen 1997). Important exceptions exist (Guthrie 1997; Nee 1992), but direct observations of the economic choices made by actors during transition are rare (Oberschall 1996). My results concern one of the most fundamental economic decisions made during transition: the decision to trade, not just once but repeatedly, with another actor. The results suggest that although cost is an important determinant of exchange, environmental uncertainty matters even more. To minimize long-term costs, firms opted to trade with others that would be stable trading partners. This indicates much about the decision-making of organizational decision-makers and also implies that firms located in relatively developed areas will enjoy advantages in exchange that are likely to persist post-transition. One strategy often used by the Chinese government to gradually introduce reform is to introduce a change in only a few test areas, followed by the universal introduction of the policy if the test is successful. Reformers have used this strategy when introducing various reforms including the manager responsibility system, financial reform, labor reform, and housing reform. While gradual reform has clear advantages over more rapid reform typical in other transition economies, the exchange advantages enjoyed by those in the early-developing regions might create long-term inequities.

Although influences external to the business group were clearly related to the formation of lending and trade ties within the business group, the importance of these influences decreased over time. Interacting the indicators of external ties, market development, and former administrative rank with a continuous indicator of year (included in Model 2 for each dependent variable) produced a consistent negative effect. This finding is particularly relevant when considered with the increasing importance of influences originating inside the group.

**Internal Influences Grew Stronger with Time**

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 5 and 6.20 Likewise, the results suggest that more central firms in the business groups were more likely to become suppliers in lending and trade relations, again net of the cost of the resource. A manager in a company that manufactured cardboard shipping crates suggested that centrality was a cue that managers actively sought in potential trade partners:

A firm that has a lot of trade partners cannot hide what sort of partner it is. I hear more about firms that deal with many others than I do about those that are relatively isolated. It only makes sense. But I also seek out firms that have a lot of partners, not only because I can save myself some time by trusting that other companies would only continue to deal with a company if the company is good. Besides, it looks good to be involved with well-known firms.

**External Factors Guided Lending Relations Longer**

In addition to the general patterns I described above, there were important differences in the process by which financial ties formed. Hypothesis 9 predicted that the effects of prior social connections were strongest in the formation of lending relations: Trust is more important in lending relations

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20 I use lagged values of the explanatory variables to approximate temporal ordering and reduce the potential for reverse causality. Although Hypothesis 5 could be tested in both directions by including internal nontrade ties as an additional dependent variable, the additional analyses add little additional information.
than in trade relations because lending relations allow the borrower to postpone fulfilling his portion of the agreement. In the trade of commercial goods, reputation and trustworthiness are important, but they tend to be less critical than they are in financial relations because the exchange of goods for money often takes place simultaneously. Of course, when credit is extended, trust gains importance, but the extension of credit was rare in early reform in China relative to its use in the West. Likewise, in the trade of personnel, the supplier rarely sent workers without compensation or the receipt of other workers in exchange. Relative to other similarly sized coefficients, the coefficient estimates for prior relations in Table 3 are consistently higher for financial ties than for commercial ties and consistently higher for commercial ties than for personnel ties. In Figure 3, I use coefficient estimates from Table 3 to compare the likelihood of a tie to the cost difference across resource type (evaluated at the mean for variables not in the figure). The graph suggests that firms assumed greater cost to trade with familiar partners in financial ties than they did in commercial or personnel relations. The figure also shows that for personnel exchanges, cost differential has a more dramatic negative effect on the likelihood of an exchange than it does for either commercial or financial exchange.

Similarly, firms that made loans to other organizations developed an interest in the success and survival of the borrower. The direction of control in debt relations gives the lender control over the borrower. Both theoretical and empirical evidence support the notion that the borrowing firm is dependent on the lender, and because of the risk involved in lending, the lender may become involved in other operations of the borrower. Research in the West indicates that borrowers may offer board seats to the lenders in order to co-opt the source of control, and the increased likelihood that the lender has a seat on the board of a client attests to the lenders power in affecting other behavior of the borrower (Lincoln et al. 1992; Mizruchi and Stearns 1994). This logic explains why there was interdependence in lending and trade relations in the early Chinese business groups. That is, firms that loaned capital to others were likely to also be suppliers of personnel and commercial goods to the same customer.

CONCLUSION
Lending and trade relations in China’s emergent business groups provide a unique op-
portunity to study the processes that generate interfirm relations. My results indicate that processes external to the business groups as well as processes originating within the groups influenced the formation of interfirm lending and trade ties. Chinese 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. Combined with qualitative evidence that suggests that managers cultivated such dependence, the findings provide evidence that organizational decision-makers seek power through dependent exchange ties. Consistent with research on social dilemmas, my findings also demonstrate that reputation influenced lending and trade even when less expensive alternatives were available. Evidence that economic actors avoid arms-length transactions and are willing to assume direct costs to continue trading with established partners raises doubts about the assumptions made by market theorists that economic actors prefer trade across a market.

Perhaps most relevant to understanding business groups, the findings demonstrate that the processes underlying the formation of lending and trade relations vary over the life of the business groups. Over the first decade in which China’s business groups existed, changes were already evident in the processes that lead firms to ally with each other. In the early stages of development, processes originating outside the groups had the strongest influence on the formation of ties. As time passed, however, the importance of external social relations and other external indicators of the trustworthiness and reliability of potential partners decreased. At the same time, processes originating within the business groups became more important. Firms increasingly sought to ally with business group members with whom they had other ties and who were central players in the network of interfirm ties within business groups.

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 were 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 post-transition 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 if at a financial cost. Thus, while 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 general 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 about 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. Exploring the relevance of ideas from organization theory in a transition economy facilitates an examination of the idea that actors will forego less expensive alternatives in favor of trading with known others when uncertainty is high, a notion that has previously been studied only in laboratories. Perhaps most generally, these findings contribute to our understanding of the process by which social structure emerges and highlight the importance of uncertainty reduction in that process.
Lisa A. Keister is Assistant Professor of Sociology at the Ohio State University. She is author of Chinese Business Groups (Oxford University Press 2000), Wealth in America (Cambridge University Press 2000), and "Engineering Growth: Business Group Structure and Firm Performance in China's Transition Economy" (American Journal of Sociology, 1998, vol. 104, pp. 404–440). She is the recipient of the National Science Foundation's Faculty Early Development Career Award, which she is using to study financial market development in China. In addition to her work on China, she also studies wealth inequality in the United States.

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