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KEIRETSU NETWORKS AND CORPORATE PERFORMANCE IN JAPAN*

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Using data on 197 large Japanese firms over a 24-year period, we study how profitability is affected by firm integration in big-six horizontal keiretsu networks. Combining measures of financial and commercial dependence on a keiretsu group with the governance ties of equity ownership, director transfers, and shacho-kai (presidents' council) membership, we replicate previous studies showing that group firms have lower average profitability than independents. Such findings, however, cannot be taken at face value, because the group effect varies with the prior performance of the firm. Weak companies benefit from group affiliation (they recover faster), while strong ones do not (they are subsequently outperformed by independent firms). Thus, there is much less variability in the performance of keiretsu firms as compared with independents. However, this redistribution effect decays in the second half of the 1980's during a period spanning deep structural changes in the Japanese economy. Before then the effect is evident for all five measures of firm ties to big-six keiretsu groups. Yet one such tie, shacho-kai membership, distinctively shapes the intervention process. Shacho-kai standing appears to be a near-sufficient condition for redistribution. For shacho-kai firms, ad hoc business and governance ties (with one exception) add nothing to the odds of intervention. For firms lacking shacho-kai seats, however, ad hoc ties strongly condition those odds. Moreover, redistribution is a pervasive and continuous process that touches all shacho-kai participants. When the intervention target is an independent firm, by contrast, the redistribution process affects the weakest and the strongest group members; average performers are left alone. These and other findings, we argue, run counter to a simple main bank model of keiretsu organization and action, and favor instead a model of the big-six groups as complex network structures.

Keiretsu networks, the webs of relations that envelop many Japanese companies, continue to fascinate, mystify, and frustrate both the managers and policymakers who contend with them in trade and diplo-

matic dealings and the academics who study them. These complex interfirm networks reveal the embeddedness of the Japanese economy: the infusion of market exchange with rich social relations of a noneconomic nature (Fruin 1992; Granovetter 1985). Embedded transactions of the kind *keiretsu* represent distort the operation of market mechanisms, producing patterns of allocation and return that appear suboptimal by traditional economic criteria. Yet few current observers are at ease with the claim that Japanese companies evolved into world-class competitors *despite* rather than *because* of their *keiretsu* entangle-

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ments. The issue is all the more frustrating to conventional economic thought because the hypotheses most congenial to it—that *keiretsu* clusterings promote joint profit maximization by dint of monopoly/monopsony rents or greater transactional efficiency—are seemingly at odds with the available empirical evidence.

Much research to date on *keiretsu* networks in Japan deals with *structure*: the composition of interfirm groupings, the ties binding companies to one another (cross-shareholding, interlocking directorates), and the transformation of these relations over time (Gerlach 1992; Lincoln, Gerlach, and Takahashi 1992; Okumura 1983). The *consequences* of these networks, for individual firms embedded in them and for the Japanese economy as a whole, are less studied, and firm conclusions are scarce. What difference, if any, do the *keiretsu* make in the behavior and performance of Japanese companies? Are they, particularly the big-six horizontal or intermarket groups on which our inquiry focuses, best cast as dinosaurs—survivors from a prior stage of Japanese industrialization that have scant significance today beyond the sharing of some familiar corporate names and logos? This position has been widely held in recent years, for example, by Japanese business and government spokespersons eager to play down the role of *keiretsu* in Japan's hard-to-penetrate markets and huge trade surpluses.

We find that *keiretsu* networks have a substantial impact, although it is not the "joint profit maximization" that economists usually attribute to coalitions of firms. Our evidence, building on that of other recent work, testifies that *keiretsu* groupings yield the consequences associated with a variety of forms of collective action: They enhance the viability of the group as a whole by realigning its members' prospects and resources. The *keiretsu*, it appears, equalize the fortunes of their members, smoothing inequality in financial returns across participating firms at any given time, and perhaps over time as well, for any given company. These adjustments amount to "taxing" prosperous members to guarantee the survival and hasten the recovery of financially troubled affiliates.

Our purpose is to demonstrate these claims using a panel data set for the years 1965 to

1988 on the largest 200 Tokyo Stock Exchange-listed manufacturing firms in 1980 in Japan.¹ We use multiple measures for the degree of integration of each firm in the "big-six" horizontal or intermarket enterprise groupings (*kigyo shudan*).² The outcome we examine is the profitability of the individual corporation in a single year as measured by returns-on-assets. Our goal is to evaluate *keiretsu* effects on corporate financial performance by exploring the form these effects take across different dimensions of big-six *keiretsu* attachment.

BACKGROUND

Prior Work on Keiretsu Effects

A number of arguments support the hypothesis of joint profit maximization by Japanese *keiretsu* groupings. Conventional economic reasoning has portrayed such networks as cartel-like alliances that enjoy substantial market power (Hadley 1970). One sophisticated model was Caves and Uekusa's (1976: 61) view of the big-six groups as clusters of large firms charging each other "efficient" prices (i.e., prices in line with their respective opportunity costs) while collectively extracting monopoly/monopsony rents in their transactions with outsiders.

¹ We selected 1980 as the benchmark year for defining our sample of top 200 firms because it fell near the middle of our 1967 to 1988 series. Also, 1980 was a time of relative stability in the Japanese economy, in contrast with the Nixon and oil shocks of the early 1970's and the *endaka* (high yen) and bubble economy turbulence of the late 1980's.

² The "big-six" horizontal groups include the reincarnation of the prewar *zaibatsu* (family-centered holding companies)—Mitsui, Mitsubishi, Sumitomo—and the postwar bank-centered, groups—Fuyo, Dai-Ichi Kangyo, and Sanwa. These highly diversified clusterings often share names and logos (Mitsubishi, Sumitomo, etc.) and include major financial institutions, trading companies, and industrial producers (Gerlach 1992; Orru, Hamilton, and Suzuki 1989). The vertical *keiretsu* are in turn formed by large companies (often affiliated with the big-six horizontal groups) leading their own networks of suppliers, distributors, and other affiliates (e.g., Hitachi or Toyota; see Ahmadjian 1995; Aoki 1988; Asanuma 1989).

Later analysts have been less enamored of market domination arguments and more inclined to stress the potential advantages of cost reduction and coordination that groups confer on their members (Goto 1982; Imai 1988; Okumura 1983). Such research has drawn heavily on recent developments in organizational economics (transaction cost and agency models) arguing that groups economize on information and control through regularized communication and exchange (Williamson 1985). Yet *keiretsu* groupings are also claimed to avert the pitfall of overorganization by keeping their contractual arrangements implicit and their modes of monitoring and intervention informal and flexible. As Nakatani (1984) observed, while transaction cost and agency theory offer arguments regarding interfirm clusterings quite different in substance from the claims of market power theories, their assessment of the economic impact on any given firm is ultimately the same: grouping raises profits. The presumed causal mechanism, however, is enhanced efficiency, not inefficient monopoly/monopsony rents.

Although agency and transaction cost accounts of Japanese business groupings remain fashionable in studies of the vertical *keiretsu* (e.g., the Toyota supply network), where the case for an efficiency payoff is *prima facie* more compelling (see Asanuma 1989; Sako 1992), the evidence for the big-six horizontal groups disputes the joint profit maximization claim (Aoki 1988:225). Econometric analyses of financial performance data on large Japanese manufacturing firms, conducted first by Caves and Uekusa (1976) and later by Nakatani (1984), yielded consistently significant *negative* effects of big-six affiliation on profits.³ Moreover, to measure variations among firms in strength of ties to a group, Caves and Uekusa (1976:75) included in their analysis the share of a company's equity held by fellow group

members. This, too, bore negatively on corporate profitability. Caves and Uekusa's early acknowledgment that group alignment is a continuous variable, not the sharp dichotomy of affiliate and independent assumed in most other studies, is an important precedent that we follow and extend.

The difficulty with the claim that *keiretsu* alliances maximize joint profit is that it frames the question of how groups affect performance in overly simplistic terms: Affiliation is thought to raise or lower the profitability of an average firm. The reality is more complex. What group membership does to or for a Japanese company depends on the circumstances peculiar to that firm, the circumstances of other firms with whom it has strong ties, the broader state of the economy, the strategic concerns of the industry or group, the policies and actions of government ministries such as the Ministry of Finance or the Ministry of International Trade and Industry, and a host of other related constraints (Schaede 1995).

Keiretsu groupings, spearheaded by the main banks and principal firms that are central nodes in the interorganizational network, effectively smooth out shocks and dislocations in those sectors of the economy they dominate. Such practices highlight the embedded character of Japanese economic exchange. Financial and commercial transactions mesh with social relations in a "*thick and complex skein*" (Caves and Uekusa 1976:59, italics added). Companies adjust their terms of trade according to their bonds with transaction partners, factoring into price and contracting decisions such nonmarket considerations as equity norms or the well-being of the immediate partner and other stakeholders. Thus, prices, wages, and rates of return are set, not so much by what the market will bear, but according to what seems fair and proper given the identities of the transacting parties and the needs of the multi-firm community as a whole.

The Case of Keiretsu-Engineered Turnarounds

How Japanese companies adapt their economic behavior to the needs and circumstances of their *keiretsu* partners, the broader intercorporate network, and the Japanese

³ Roehl (1988) gives evidence that the effect of big-six membership on corporate financial performance was positive in the early postwar period (the 1950's), but negative thereafter. This reinforces the impression that *zaibatsu* (family-centered) companies played a key role in Japan's early industrialization and postwar reconstruction, but a diminishing one in the later postwar period.

economy at large is not easily observed. But the responses of *keiretsu* partners when a member company encounters major adversity—financial distress or scandal—brings that adaptation process into high relief. The events that unfold in such crises have been dramatically recounted in a number of important case studies.⁴ What generally happens is that the group, typically led by the target company's main bank, engineers a bailout and turnaround. Loans are rolled over, and new financing is arranged. Member companies maintain or increase their equity in the troubled firm. Directors are dispatched from the main bank and major trading partners to the firm's board. Group suppliers and customers adjust their terms to favor the target firm and transfer technical personnel to its operating divisions. The group may in addition mandate exclusive purchases from the target firm's product line until the crisis has passed (e.g., Sumitomo purchased Mazda cars during Mazda's collapse following the oil crisis).

How effective are these interventions in reversing the fortunes of troubled firms? The anecdotal reports suggest that they often succeed, but hard evidence was scarce until an important study by Hoshi, Kashyap, and Scharfstein (1991). From the population of Tokyo Stock Exchange-listed manufacturing firms, Hoshi et al. selected companies that had experienced severe financial distress—firms whose operating income was greater than their interest payments in one year but less in the following two. This selection criterion produced a sample of 167 firms that had undergone distress during the period of observation (1965 through 1988), although data problems reduced the final sample to 121. Their regression analyses showed that firms with group ties invested more than independent firms in the period following the

onset of difficulty and subsequently enjoyed stronger sales growth.

The work of Hoshi et al. (1991) was a major advance in research on the economic consequences of *keiretsu* groups. Combined with the case study literature on bank-led bailouts and other interventions aimed at altering the fates of troubled companies, it makes clear that the Caves and Uekusa (1976) and Nakatani (1984) analyses of the economic effects of big-six *keiretsu* affiliation, pioneering as they may have been, were seriously misspecified. As we argue above, the economic impact of a *keiretsu* affiliation is highly firm- and sector-specific. For distressed firms, dependence on a group yields real benefits: Bankruptcy risk is attenuated, normal operation (e.g., ongoing investment) continues and recovery accelerates. What Hoshi et al. do not directly address is the cost to the group, and particularly its leaders (the main bank, major customers, strong performers), incurred by the intervention. In the long run, the successful rescue and turnaround of a business partner may pay for itself, for example, in loans and contracts otherwise lost to failure, but in the near term the burden on the rescue team may be severe. Seen in this light, the apparent lackluster financial performance of big-six firms starts to make sense. Group members pay an insurance premium for the safety net that insulates each of them from the never-too-distant spectre of business adversity.

Yet groups may place ceilings on the performance of their strongest members for reasons other than the implicit insurance contract that diverts assets to their kindred in need. Affiliates whose earnings are sharply up in one accounting period may find themselves reined in the next as partners respond to high earnings as a signal that the company is extracting rents from its purchase and supply relationships. Such norms governing rates of return may be set by the group as a whole or, particularly in the case of the vertical *keiretsu*, imposed by a dominant "parent" firm. Discussing T. Boone Pickens's⁵ abortive attempt to secure a seat on the board

⁴ See Gerlach's (1992:199) review of the Sumitomo group's rescue of Sumitomo Machinery in 1954, Pascale and Rohlen's (1983) discussion of the Mazda turnaround by the Sumitomo group, Kester's (1990:70) treatment of the Mitsubishi group's intervention to save Akai Electric, and Sheard's (1991) case study of the Japanese aluminum industry. Although many such interventions take place with the grateful acquiescence of the turnaround target, instances of resistance can be found (see Brauchli 1991).

⁵ Pickens, Chief Executive of Mesa Petroleum, was one of the most colorful corporate raiders of the 1980's takeover boom.

of a Toyota supplier (Koito), Zielinski and Holloway (1991) observe:

Although Pickens was the largest individual shareholder, Toyota and five other stable shareholders controlled 63 percent of the company. The car firm has supplied Koito's president, a vice-president, and one director. But the relationship goes much deeper than that. According to the Pickens camp, Toyota effectively controls the price, the delivery time, and, thus, the profits of Koito. If Koito makes too much profit in one year, it will be asked to reduce it in the next period by discounting its sales. (P. 201)

While T. Boone Pickens is not a particularly credible authority on Japanese supply relations, his highly publicized effort to gain a seat on Koito's board focused attention on the web of constraints that *keiretsu* networks place on their member firms. It is a reasonable proposition that groups not only pool risks to safeguard one another's survival prospects, but that they also act on norms of equity and common welfare to cap the successes of their strongest members. In industrial goods markets, high margins for any one firm are attainable only at the expense of trading partners. When these partners are large companies organized in *keiretsu* groups, the pressures in the wake of an extraordinarily good year to adjust parts and materials prices in a direction favorable to suppliers or customers are likely to be strong. Moreover, trading partners acting in concert can dictate the profit margins of target firms dependent on those transactions simply by adjusting the prices of their own purchases and sales.

Keiretsu Structures and the Process of Intervention: Main Bank Ties or Complex Networks

Two types of interfirm ties define *keiretsu* networks: (1) economic resource dependencies or transactions with the members of a group, and (2) the control or governance ties that overlay and structure those dependencies (Lincoln et al. 1992; Pfeffer and Salancik 1978; Williamson 1985). Transactions are further divisible as financial and commercial: dependence on group banks for borrowed capital, and dependence on group manufacturers and trading firms as buyers and sellers of products and services.

Of the governance ties, two have Western counterparts: partial equity ownership by group financial institutions and commercial corporations, and *keiretsu* representation on the board of the targeted company (Mintz and Schwartz 1985). The resemblance to Western patterns, however, is superficial. The structure of stable corporate cross-shareholdings and the transfer or dispatch of managers to insider director positions (as opposed to Western style outside director interlocks) are distinctively Japanese maneuvers (Lincoln et al. 1992). Moreover, a third governance structure—the *keiretsu* presidents' council, or *shacho-kai*—has no counterpart in the Western economies. The *shacho-kai* is a regularly convening association (e.g., the Mitsubishi *kinyo-kai* or Friday Club) of the *shacho* (presidents) of the *keiretsu* member firms. While what precisely transpires in council meetings is shrouded in secrecy, most knowledgeable observers characterize the *shacho-kai* as a loose, voluntary association that symbolizes and supports the identity of the group as a whole, but involves itself sparingly in the decision-making of individual companies (Gerlach 1992). By no account is the *shacho-kai* a *keiretsu* "board of directors," and Japanese managers are quick to point out that behaving like one would place a council in direct violation of Japan's antimonopoly law.

In our view, the significance of the *shacho-kai* lies less in what such councils actually do than in its designation of the core membership of the *keiretsu* network. *Shacho-kai* companies typically have a longer and closer association with the *keiretsu* group and are more likely to use the group name and logo (e.g., the Mitsubishi three diamonds or the Sumitomo *igeta* or well-frame). Beyond this inner circle, however, numerous firms lacking *shacho-kai* seats are tied to the group through their financial and commercial transactions and through various forms of monitoring and governance. Similar ties, of course, connect companies that occupy seats on the same *shacho-kai*. Many observers feel that such business relations play a larger part in the cohesion and coordination of the *keiretsu* than does the generally passive presidents' council itself.

If the *shacho-kai* does not serve the "headquarters" function for the group as a whole,

what, if anything, does? Only in the case of the vertical manufacturing *keiretsu*—the pyramidal webs of suppliers or distributors at whose apex stands a Toyota, Toshiba, Matsushita, or Nippon Steel—is there no ambiguity as to which company is the central node in the network or its monitoring and disciplining agent. Within the big-six horizontal groups, however, the issues of centrality and agency are less clear. One school of thought, embraced by financial economists, dispenses with the other possibilities and singles out a key player—the main bank. This is typically one of Japan's 11 large commercial or “city” banks (*toshi ginko*). In the simplest version of this story, no “*keiretsu* network” exists: only sets of stable financial transactions between an array of corporations and the large banks on whose financing they depend (see Flaherty and Itami 1984). Owing to the high leveraging of large Japanese manufacturing firms, the banks are exposed to risk and therefore seek to monitor the management of their client firms. Securing an equity stake (limited to 5 percent under Japanese law since 1987) and representation on a company's board are natural responses to that risk exposure, and such moves position the bank for intervention should the client firm fall on bad times.

This model of a big-six *keiretsu* grouping as reducible to a set of bank-client dependencies is less interesting sociologically than that we favor of a far-flung web of overlapping financial, commercial, and governance relations issuing from a central core to pull in large segments of the Japanese economy. In our view, the main-bank model is an extreme simplification that molds reality to the stark and simplistically dyadic agency-theoretic perspectives of corporate finance economics (Perrow 1986). Curiously, there is an analogous argument in the Marxist tradition on the role of financial institutions in advanced capitalist economies that Mintz and Schwartz (1985) label “bank control theory.” Despite the sharply different ideological cast, this Marxist framework, too, treats large financial institutions as central nodes in the economy, using equity ownership and director interlocks to influence corporate decision-making in dramatic and forceful ways when a client company runs into trouble. Also noteworthy is

that bank control theory “posits the segregation of the economy into financial groups, each composed of companies that remain under the control of a financial institution” (Mintz and Schwartz 1985: 73).

As a factual matter, the pure main-bank model cannot withstand strong scrutiny as a description of *keiretsu* organization and action. The histories of the big-six *keiretsu*—from their prewar origins as family-controlled *zaibatsu*, through the postwar breakup of their holding companies, to their reunification through cross-shareholding and mutualistic business dealings—belie the suggestion that, aside from banks and corporations managing their reciprocal resource dependencies, there is nothing here of note. Moreover, ample evidence exists that trading companies and large manufacturers have occasionally played key roles in orchestrating bailouts and other forms of *keiretsu* intervention (Sheard 1989).

Bank monitoring and control figure importantly in the *keiretsu* intervention story, but they do not explain the whole of it. We do not question that group banks typically take the lead in rescuing and restructuring troubled member firms. Indeed, we attribute the decay of the redistribution pattern after 1985 (later in Table 3) mainly to the collapse of bank borrowing as a source of corporate finance from 1986 to 1989. At issue is whether the bank is a *delegated* monitor, orchestrating an effort to rescue a company to whom the group as a whole is committed through a slew of obligations and dependencies, or whether the bank acts in its own self interest to prop up a client whose failure might put at risk its own financial health.⁶

Kester's (1991) comments on the Mitsubishi Bank-led reorganization of Akai Electric, a Mitsubishi Electric affiliate

⁶ The 5-percent legal ceiling on the equity a bank can own in a Japanese corporation ensures that when the bank intervenes it does so on behalf of a broad coalition of investors and business partners. This contrasts with the German “main bank” system, where such limits do not exist. For example, Deutschebank owns 25 percent of Daimler-Benz. Deutschebank has been criticized for unilaterally imposing restructuring solutions on troubled client firms without the consensus and consultation of other stakeholders (*Financial Times*, January 17, 1994).

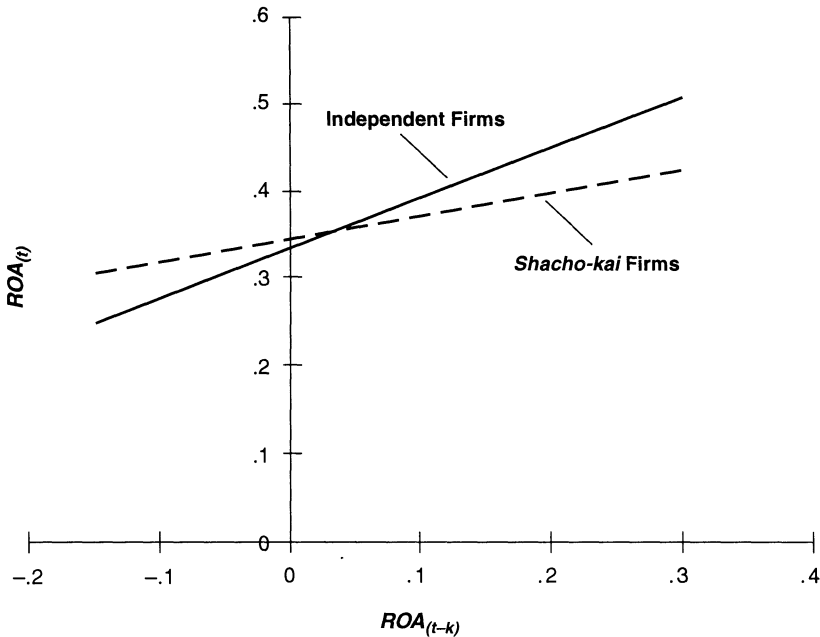


Figure 1. Regression of Return-on-Assets (ROA) at Time t on ROA at Time $t-k$ for Shacho-kai and Independent Firms

brought close to bankruptcy by the yen's sharp rise in 1986, frame the issues well:

For a deeply troubled company like Akai, the lion's share of credit must go to the overall effectiveness of the rescue effort mounted by the Mitsubishi group. And it was a group effort in every sense of the word. Although the bank may have been the prime mover at the outset, the actual execution of the rescue plan was customer/vendor led. Consequently, the fundamental thrust of the restructuring was less that of generating cash in the short run to satisfy creditor demands than one of preserving Akai's role in the Mitsubishi group's global network of trading relationships. Rather than restructuring financial claims against the firm, effort was focused on restructuring Akai's function as a purchaser, supplier, and owner of assets used to support transactions occurring in a vertical chain of electronics production and marketing inside the Mitsubishi group. (Pp. 72-73)

METHODS

Modeling the Intervention Effect

An empirical model of the pattern of *keiretsu* intervention and redistribution is the core of our analysis. On top of an abundance of anecdotal and case study evidence, Hoshi et al. (1991) demonstrated that ties to a big-six

group boost the fortunes of a troubled Japanese company. For this segment of the Japanese economy, the Caves and Uekusa (1976) and Nakatani (1984) studies clearly miss the mark: Group ties enhance, not impair, financial performance. Yet interventions on behalf of a failing partner are not cost free. Banks tolerate lower returns on their capital; purchasers buy at higher prices while suppliers sell at lower; valuable know-how, capital, and labor are diverted from the helping firms to the target firm. Thus we advance the following hypothesis: *The impact of big-six keiretsu affiliation on a Japanese firm's profitability is conditioned on the prior performance of that firm: Weaker firms do better, but stronger firms do worse.*

For our analysis of *keiretsu* effects on corporate profitability, this hypothesis suggests a negative interaction between *keiretsu* group affiliation and prior performance, conditional on prior performance being lagged a length of time sufficient for an intervention to occur and its economic impact to become apparent.

Figure 1 shows how such a negative interaction connotes redistribution. The regression line of return on assets for firm i at time t (ROA_{it}) on that firm's ROA at time $t-k$ is

flatter for group firms compared to independents, and, at a point just to the right of the intercept, the lines cross. Thus, for firms with low ROA at time $t-k$ (e.g., near-zero or negative profitability), big-six affiliation is a net plus. For firms above that zero-threshold, on the other hand, group participation forecasts lower subsequent performance. Another way to read the figure is that group firms simply undergo more change while the independents show more inertia. As a linear equation:

$$ROA_{it} = \alpha + \beta'x_{it} + \gamma ROA_{it-k} + \delta G_{it} + \lambda G_{it} * ROA_{it-k} + \varepsilon_{it}, \quad (1)$$

where: α is the constant term, β is a vector of regression slopes, x_{it} is a vector of control variables for firm i at time t (asset size, etc.), ROA_{it-k} is return on assets lagged k years, G is the strength of a firm's tie to a big-six *keiretsu* group, and ε_{it} is the stochastic error term. The difference between group and nongroup firms in the ROA_{it} on ROA_{it-k} slopes is measured by λ , and δ is the difference in the intercepts. Our specific predictions are:

$$\delta > 0, \text{ and} \quad (2)$$

$$\lambda < 0. \quad (3)$$

Thus, the slope of current profitability on prior profitability is flatter for group firms than for independents and the intercept is larger. At values of ROA_{it-k} exceeding 0, independents go on to outperform their *keiretsu*-affiliated counterparts.⁷

For a set of large Japanese firms, we search over a 24-year period for systematic evidence that *keiretsu* groups orchestrate redistributions of the sort our model describes. Upon finding such evidence for the sample as a whole, we then investigate whether distinct dimensions of affiliation with a group (governance ties versus transactional dependencies, main bank debt versus trading part-

nerships, formal *shacho-kai* seating versus ad hoc business relations) trigger different patterns of intervention. These analyses revolve around a core theme: that the big-six *keiretsu* are complex networks of overlapping financial, commercial, and governance relations and that intervention is genuinely a group activity.

The Sample

We assembled data on the largest 200 manufacturing firms in Japan in 1980 and observed these firms over the period 1965 through 1988. Three firms were lost to mergers, reducing the sample size to 197.⁸ This period covers several major shocks and transitions in the Japanese economy. The Arab oil boycott in 1973 and the subsequent economic slowdown ended a 15-year period in which growth rates exceeded 10 percent. Nineteen eighty-five marked the onset of the

⁸ Our chief data sources are the NEEDS tape, which contains financial information on Tokyo Stock Exchange-listed firms (*Nikkei Databank Bureau* 1989), *Keiretsu no kenkyu* (various years), and *Kaisha nenkan* (various years). The largest 200 industrial firms in Japan in terms of company sales were identified from a list in *Nihon kigy shudan bunseki* (various years). *Kaisha nenkan* provided information on the affiliations of a firm's outside directors and the former affiliations of current directors who were transferred by other companies. *Jinji koshin roku* (various years) provided additional biographical data on the backgrounds of directors. The top 10 shareholders in each industrial firm and the amount of their holdings were coded from *Keiretsu no kenkyu*. Similar information on each financial firm was coded from *Kaisha nenkan*. Each industrial firm's leading lenders and the amounts of their loans were also coded from *Keiretsu no kenkyu*. Trading ties were also coded from *Kaisha nenkan*, which gives the names of each firm's leading suppliers and customers. *Shacho-kai* membership was coded from *Industrial Groupings in Japan* (Dodwell Marketing 1982). Information on assets in 1980 and age of each company (years since founding) were taken from the 1989 *Nikkei* source. Three firms were eliminated from the sample: (1) Lion, which was formed by a merger in 1980 that greatly increased its size; (2) Daikyo Oil, which merged with Maruzen to form Cosmo in 1986; and Sumitomo Forestry, for which some critical information was missing from *Keiretsu no kenkyu*.

⁷ Obviously, the threshold of 0 profitability is arbitrary, although it is close to empirical reality (see Figures 1 and 2). Moreover, despite the low priority Japanese firms presumably attach to profit, they are extremely sensitive to the reputational costs of *akaji*—going in the red. The 0 threshold for ROA_{it-k} merely signifies that there is some level of prior profitability below which *keiretsu* firms subsequently outperform independents.

endaka shock years, when the yen doubled against the dollar and precipitated a decline from which Japan rebounded into the “bubble” economy phase of explosive growth and asset inflation (1987 to 1990). This was also a period of major institutional change: rapid deregulation of financial markets, a massive shift from debt to equity financing of investment brought on by a soaring stock market, movement of low value-added production to other countries, and increased job mobility in labor markets.

These and other developments (in particular, intensifying U.S. pressure to make Japanese markets more open and transparent) prompted much speculation that the end was at hand for such traditional and exotic Japanese economic institutions as permanent employment and the *keiretsu*. Indeed, although we present some analyses from the entire 1965 to 1988 period, most of our results are limited to 1985 and earlier. We truncate our panel at 1985 because of strong evidence that the pattern of *keiretsu* intervention decayed after 1985. Inclusion of the post-1985 years markedly weakens the evidence favoring our arguments. We plan a subsequent investigation to determine whether, in the aftermath of boom and recession, restoration of the historical intervention pattern is underway.

Measurement of Big-Six Ties

A core feature of our research program on *keiretsu* networks is an effort to conceptualize and measure the specific dimensions of integration with the big-six groups along which Japanese companies are arrayed. As Gerlach (1992:78–79) notes, Japanese inter-organizational networks are *multiplex*—the same underlying structures account for quite distinct kinds of surface relations. We focus on the extent to which diverse manifestations of *keiretsu* attachment have similar or divergent effects on individual firms.

Keiretsu ties through Shacho-kai membership. The clearest criterion for assigning firms to a group/nongroup dichotomy is whether the firm in question has a seat on the *shacho-kai* (president’s council) of one of the big-six groups.⁹ Of the 197 firms in our

sample, 87 are council members and 110 are independents. *Shacho-kai* affiliations have been remarkably stable in postwar Japan, and few additions or deletions transpired over the 1965 to 1988 period.

Keiretsu ties through “ad hoc” transactions and control. *Shacho-kai* affiliation provides the only unambiguous criterion for classifying Japanese firms as big-six affiliates. Yet by no means does it exhaust the big-six sphere of influence. In addition, we examine four distinct ad hoc¹⁰ *keiretsu* ties that signal affiliation, but with less certainty and formality than does *shacho-kai* seating: (1) the selection of *keiretsu* group firms as trading partners, (2) the amount of borrowing from group banks, (3) the extent of shareholding by group banks and corporations, and (4) the selection of board members from the management of big-six firms. Purchase and supply and lending relations represent economic transactions with group companies. We view equity and director interlocking as *keiretsu* control relations that are superimposed on the network of business dealings but do not entirely conform to it (Lincoln et al. 1992).

We measure a firm’s ad hoc ties to a *keiretsu* group as the proportions of the firm’s trading partners, equity, debt, and directors held by the *shacho-kai* member companies of its

and independents. Nakatani’s (1984) elaboration of the *Keiretsu no kenkyu* classification scheme has been criticized as too encompassing. Basing his qualitative classification on composite criteria, moreover, Nakatani could not ascertain whether particular dimensions of group integration (the fraction of group-held equity versus *shacho-kai* membership) had contrasting effects on individual firms. Hoshi et al. (1991) used both the dichotomous Nakatani classification and the fractions of debt and equity controlled by the firm’s main bank. This procedure equates group involvement with main bank dependence, however, and ignores the network of commercial trading relationships among nonfinancial *keiretsu* firms.

¹⁰ The term “ad hoc” is not a wholly satisfactory label, but it conveys the idea that such relations are less formal and less permanent, and emerge, not from any consensus action by the extant group (required for extending *shacho-kai* membership to a newcomer), but on a case-by-case basis through the actions of individual *shacho-kai* firms.

⁹ *Shacho-kai* membership was also the basis for Caves and Uekusa’s 1976 classification of groups

dominant group. For *shacho-kai* firms, in no instance was the group with the largest share not also the group on whose council the company was represented. In these cases, this measure taps a firm's centrality in the exchange and control relations within a single group's *shacho-kai* elite. But the measure also has meaning for *shacho-kai* independents: It assesses their degree of economic integration in and administrative control by a dominant big-six group.¹¹

Unlike *shacho-kai* membership, which has been essentially constant over our period of observation, big-six involvement in the trade, lending, equity, and boards of the firms in our sample varies by time. Because these data are fairly easily computed from the *Nikkei* NEEDS tape and similar sources (see note 8), we have measurements on the equity and debt variables at two- to three-year intervals from 1965 to 1988. The trade and director data are much more difficult to obtain with accuracy, and we have these measures for just two years: 1978 and 1987.¹²

Dependent Variable: Return-on-Assets

Like the Caves/Uekusa and Nakatani studies, our dependent variable is the profitability of the firm as indexed by return-on-assets. This measure is computed for all the 197 firms at

¹¹ The measure can be represented as: I_R , where $R = E$ (equity), D (debt), T (trade), Dr (directors). $I_R = (R_{ij}/R_i | R_{ij} > R_{ik})$, where $i = 1, \dots, 197$ firms, $j = 1, \dots, 6$ groups, $k = 1, \dots, 6$ groups (but $j \neq k$), R_{ij} is the sum (of equity, debt, etc.) in firm i held by group j , R_i is the total (equity, debt, etc.) in firm i . For example, I_E is the proportion of firm i 's total equity held by group j given that j is the group with the largest share of i 's equity.

¹² The 1978 values are assigned to observations from 1965 to 1980. The 1986 values are assigned to observations from 1981 to 1988. Alternative ways of using these measurements (e.g., entering one and excluding the other from the regression, taking their average over the full period) gave virtually identical results. Note that the majority of variation in these data is across units, not over time (cf. Gerlach 1992:128). Our GLS estimates of the panel regressions show the cross-sectional variance component to be six times larger than the time-series component (.00027 to .00030 versus .00047 to .00051). See Lincoln et al. (1992) on the difficulty of accurate coding of director dispatches among Japanese firms.

each of the 24 observational periods. We have also done regressions using return-on-equity and sales growth as the dependent variables and obtained generally similar results.¹³

Control Variables

Given the widespread characterization of big-six firms as old, conservative, and risk-averse, we include a particularly important control missing from the Caves and Uekusa (1976) and Nakatani (1984) analyses—the date of company founding. We also include both total assets (natural log) and the percentage growth in sales over the past year.¹⁴ Another control is the debt/equity ratio of the firm. In the postwar period, Japanese companies in general and big-six firms in particular have relied heavily on debt financing. We must not confound effects of a firm's internal debt structure with those of its debt *relationships* with *keiretsu* banks. To adjust for industry composition, our regressions include 14 dummy variables that represent detailed industry categories.¹⁵ We also add the year of

¹³ The numerator of *ROA* is net income from operations before taxes. The *ROE* results display a strongly similar pattern to those for *ROA* and are in some instances stronger. However, because *ROE* and the debt/equity ratio share a common denominator, we obtain less plausible coefficients for debt/equity and total assets as compared with the *ROA* regression. The pattern of group effects on sales growth is similar to that for *ROA* and *ROE*, but is substantially weaker.

¹⁴ In other analyses, we used total sales instead of sales growth. The results were quite similar, although symptoms of multicollinearity arose with total sales and asset size in the same regression. The credibility of our evidence for *keiretsu* effects depends heavily on our ability to control scale and growth differences between group and nongroup firms. Although the effects of *keiretsu* interventions might indeed show up in sales growth figures as well as profitability (we find such effects but they are small), many of the mechanisms through which groups assist their members (e.g., price reductions by *keiretsu* suppliers or the sale of cross-held shares) benefit the troubled company without affecting its sales.

¹⁵ *Shacho-kai* firms comprise 8 of 15 steel companies, 4 of 7 oil companies, 8 of 14 nonferrous metals companies, 5 of 7 shipbuilders, 17 of 32 chemicals firms, but only 9 of 24 electrical and precision machinery firms and 4 of 17 automobile producers.

observation to control for trends over this period. Finally, dummies are entered for 1973, 1974, 1975 (the first oil shock years), and for the 1985, 1986, 1987 *endaka* period.

The means, standard deviations, and zero-order correlations for all variables are given in Table 1. Particularly noteworthy are the correlations with the five measures of *keiretsu* ties. Consistent with our arguments for the distinctiveness of the *shacho-kai* core, we find *shacho-kai* firms differing from companies with high levels of ad hoc group attachment. *Shacho-kai* seating is associated with large asset size and early founding, but firms with ad hoc attachments are relatively smaller and (with the exception of debt) younger. Not surprisingly, then, the correlations between the dummy for *shacho-kai* and the measures of ad hoc ties are rather weak. Consistent with a theme that cross-shareholdings best map the web of *keiretsu* relations, the strongest such correlation is with equity holding. Evidence that *shacho-kai* memberships are a poor guide to big-six debt and trade relations is often cited by Japanese spokespersons eager to rebut foreign claims that *keiretsu* business relationships are particularistic and exclusionary. In keeping with the notion that equity ties and director ties map governance networks that overlay financial and commercial resource dependencies, both bear moderate positive relationships to the debt and trade variables, and are themselves correlated at .592. With the puzzling exception of debt, the *keiretsu* measures are positively related to the debt/equity ratio, and, as prior studies show, inversely related to *ROA*.

REGRESSION ANALYSES

Group Firms Average Lower Profitability

Table 2 presents OLS regressions of corporate returns-on-assets on selected explanatory variables for our sample of 197 firms observed over the 24-year period from 1965 to 1988. This is a pooled cross-section/time-series analysis in which all 4,728 firm-years are distinct observations. OLS is inefficient and gives biased standard error estimates with data such as these, but it was the method used by prior researchers whose work we wish to replicate. (Later we use a more sophisticated procedure.)

Table 1. Means, Standard Deviations, and Zero-Order Correlations for Variables Used in the Analyses: 197 Japanese Industrial Firms, 1965–1988

Variable	Mean	Standard Deviation	Total Assets	Percent Sales Growth	Firm Age	Debt/Equity Ratio	Shacho-kai	Debt Tie	Trade Tie	Equity Tie	Director Tie	Return-on-Assets
<i>Control Variables</i>												
Total assets	277,632	441,610	1.000	-.234	.236	.114	.345	-.173	-.092	-.070	-.103	-.233
Percent sales growth	.1146	.1449	—	1.000	-.110	-.011	-.050	.012	-.055	.008	.013	.316
Firm age	56.518	22.823	—	—	1.000	-.039	.160	.081	-.055	-.156	-.121	-.157
Debt/equity ratio	.0044	.0082	—	—	—	1.000	.105	-.010	.043	.054	.063	-.127
<i>Measures of Big-Six Ties</i>												
Shacho-kai (1 = yes)	.4416	.4966	—	—	—	—	1.000	.146	.071	.218	.032	-.165
Debt tie	.2284	.1322	—	—	—	—	—	1.000	.101	.223	.137	-.039
Trade tie	.2607	.2121	—	—	—	—	—	—	1.000	.275	.239	-.116
Equity tie	.1482	.1306	—	—	—	—	—	—	—	1.000	.592	-.075
Director tie	.0565	.0878	—	—	—	—	—	—	—	—	1.000	-.059
Return-on-assets (ROA)	.0725	.0630	—	—	—	—	—	—	—	—	—	1.000

Table 2. OLS Regressions of Return-on-Assets (ROA) on Measures of Big-Six *Keiretsu* Ties and Control Variables: 197 Japanese Industrial Firms, 1965–1988

Explanatory Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	.114*** (6.87)	.112*** (6.74)	.102*** (6.14)	.103*** (6.20)	.106*** (6.40)
<i>Control Variables</i>					
Calendar year	-.005** (2.94)	-.004** (2.71)	-.003 (1.75)	-.003* (2.09)	-.004* (2.39)
Firm age/1000	-.320*** (7.91)	-.312*** (7.66)	-.329*** (8.16)	-.341*** (8.39)	-.331*** (8.17)
Ln Assets	-.003*** (3.60)	-.004*** (3.99)	-.005*** (4.90)	-.004*** (4.58)	-.004*** (4.30)
Percent sales growth	.112*** (16.69)	.112*** (16.68)	.112*** (16.74)	.112*** (16.73)	.112*** (16.76)
Debt/equity ratio	-.745*** (7.23)	-.746*** (7.25)	-.718*** (7.01)	-.715*** (6.94)	-.707*** (6.85)
<i>Measures of Big-Six Ties</i>					
<i>Shacho-kai</i>	-.010*** (5.57)	-.009*** (5.03)	-.008*** (4.51)	-.007*** (3.88)	-.009*** (5.02)
Debt tie	—	-.013* (2.01)	—	—	—
Trade tie	—	—	-.027*** (6.87)	—	—
Equity tie	—	—	—	-.032*** (4.67)	—
Director tie	—	—	—	—	-.040*** (4.04)
Adjusted R ²	.225	.230	.233	.228	.228

Notes: Table entries are OLS estimates of metric regression coefficients; absolute *t*-statistics are in parentheses. Included in the regression (but not in the table) are 14 dummy variables for industry classification, 3 dummies for the oil shock years of 1973, 1974, and 1975, and one dummy for the first *endaka* year (1985).

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

Table 2 reports five separate regressions of ROA, rotating the measures of big-six affiliation (the dummy variable for *shacho-kai* seating and the four ad hoc indices), but retaining the same control variables. The pattern is strong: Indexed by all five big-six ties, affiliation is associated with lower profit margins. The negative influence of calendar year taps the slowing of growth in the Japanese economy and the corresponding secular decline in corporate profitability. Older firms are less profitable, as are firms that have large assets (although asset size in the denominator of the dependent variable, ROA, cautions against strong conclusions in this regard). Recent sales growth, by contrast, drives profits sharply up. Finally, the ratio of

debt to equity, as expected, is negatively related to profitability.¹⁶ We do not report the coefficients on the 14 industry dummies or the 6 dummies coded for the oil shock and *endaka* years.

So, using a somewhat different set of firms, a longer panel, and more nuanced

¹⁶ This negative association between ROA and the debt-equity ratio is typical of Western firms as well and is sometimes thought to signal fiscal difficulty. That interpretation is much less justified in Japan. The high debt loads of Japanese firms with strong main bank relationships bespeak a strategy of high investment and growth at the expense of short-term net earnings. Of course, by loaning more, the bank's own interests are better served by a long-term growth strategy.

measures of group affiliation we obtain outcomes that parallel those from prior studies of the impact of big-six groupings on corporate financial performance in Japan. Yet from here on, our analyses suggest that this negative main effect of big-six membership is a misspecification of the causal processes.

Estimating the Redistribution Model

Early on, our analyses of these data revealed that the evidence for *keiretsu* intervention effects became more pronounced if the three years following 1985 were deleted from the panel. Table 3 therefore presents GLS regressions for the full 1967 to 1988 period and for 1967 to 1985 only. Despite the considerable increment in degrees of freedom, fewer of the relevant effects in the longer series are significant and their absolute magnitude is smaller. The contrast between the longer and shorter periods is especially pronounced in the case of big-six debt dependence: Adding the post-1985 years attenuates that effect far more sharply than is true of the other four measures of *keiretsu* ties. As we discuss below, this pattern accords with the view that the salient institutional changes in the *keiretsu* environment were financial deregulation and the abandonment of debt for equity financing.

Two years seems like a reasonable interval for an enterprise group to monitor falling profitability and other signs of trouble in a member firm. Therefore, we took the average of the one- and two-year lags in *ROA* to represent our lagged dependent variable (ROA_{it-k}). We use random effects generalized least-squares to estimate models of the form of equation 1 over the panel of 197 firms by 22 (19) years (Judge et al. 1985).¹⁷ As be-

fore, the *shacho-kai* dummy appears in every equation reported in each table, but the other ties measures are rotated.

Model 1 shows a predictably strong main effect of lagged *ROA*. Of greater interest is its negative interaction with the *shacho-kai* dummy variable. Note also that the main effect of *shacho-kai*, with the interaction included in the model, is now *positive*. These empirical estimates generated Figure 1: For *shacho-kai* firms, the effect of lagged profitability (the inertia in the system) is just half that for independent firms. Moreover, the positive main effect (the shift in the intercept) retells the Hoshi et al. (1991) story: For firms whose prior profitability lies in the region of zero and below, a *shacho-kai* seat is a definite net plus.¹⁸

The remaining regressions in Table 3 retain the *shacho-kai* terms, but include as well the main and interaction terms for each of the four continuous big-six tie measures. The results are unambiguous: the *shacho-kai* effects are preserved (if in general diminished) while the same configuration of positive main effects and negative interactions with lagged *ROA* ($\delta > 0$; $\lambda < 0$) appears for each of the measures of ad hoc *keiretsu* tie. Of particular importance to a theory of the big-six groups is that the redistributive effect of *keiretsu* trading partnerships is larger (judged by the *t*-statistics) than is that of debt ties, although in the 1967–1985 panel both are significant. In the 1967–1988 panel, the re-

term as follows: $\varepsilon_{it} = \alpha_i + \rho_t + v_{it}$ where ε_{it} is the total stochastic error for the observation on firm *i* at time *t*, α_i is the error component associated with the *i*th firm, ρ_t is the component for the *t*th period, and v_{it} is the component unique to that observation.

¹⁸ As in the Caves and Uekusa (1976) and Nakatani (1984) studies, we find the redistribution effects of the individual groups to be generally similar. Coding and entering in the regression dummies for each group yields, in all six cases, the same pattern of significant positive main effects and negative interactions. An F-test for overall heterogeneity of the slopes cannot be rejected. However, the differences we do observe across the six groups were consistent with a hypothesis that the prewar *zaibatsu* (Mitsui, Mitsubishi, Sumitomo, and, to a lesser degree Fuyo) are more aggressively interventionist than the postwar bank-centered groups (DKB and Sanwa).

¹⁷ The fixed-effects model using dummy variables to control for firm or time differences is not appropriate since some explanatory variables are time-invariant (e.g., *shacho-kai*; see Hausman and Taylor 1981). OLS gives inefficient estimates of slopes and (negatively) biased estimates of standard errors with pooled cross-section/time series data because it fails to take into account the error components common to the same firms in different periods and different firms in the same periods. We used the Fuller-Battese routine available in the SAS package, TSLSREG. The random effects model decomposes the regression error

Table 3. GLS Regressions of Return-on-Assets (ROA) on Measures of Big-Six *Keiretsu* Ties and Control Variables: 197 Japanese Industrial Firms, 1967–1988 and 1967–1985

Explanatory Variable	Model 1		Model 2		Model 3		Model 4		Model 5	
	1967–1988	1967–1985	1967–1988	1967–1985	1967–1988	1967–1985	1967–1988	1967–1985	1967–1988	1967–1985
Intercept	-.017 (1.14)	-.038* (2.19)	-.021 (1.36)	-.040* (2.33)	-.013 (.88)	-.033* (1.96)	-.016 (1.04)	-.037* (2.16)	-.017 (1.14)	-.039* (2.22)
<i>Control Variables</i>										
Calendar year	.008*** (3.92)	.009*** (3.79)	.007*** (3.69)	.008*** (3.32)	.007*** (3.68)	.007*** (3.36)	.008*** (3.78)	.008*** (3.53)	.008*** (3.95)	.009*** (3.80)
Age of firm	-.010 (.25)	.001 (.04)	-.015 (.39)	-.006 (.17)	-.014 (.37)	-.003 (.09)	-.013 (.33)	.001 (.03)	-.015 (.39)	-.004 (.12)
Ln Assets	-.003*** (4.06)	-.003*** (3.58)	-.003*** (3.58)	-.003** (3.04)	-.003*** (4.17)	-.003*** (3.71)	-.003*** (4.06)	-.003*** (3.44)	-.003*** (4.10)	-.003 (3.62)
Sales growth	.108*** (30.01)	.100*** (28.52)	.107*** (30.00)	.100*** (28.56)	.108*** (30.27)	.101*** (29.13)	.108*** (30.04)	.100*** (28.62)	.108*** (30.07)	.100*** (28.63)
Debt/equity ratio	.018 (.32)	.044 (.81)	.012 (.21)	.014 (.26)	.004 (.08)	.010 (.19)	.000 (.00)	-.001 (.03)	.011 (.19)	.026 (.48)
ROA (lagged)	.767*** (67.79)	.884*** (75.71)	.780*** (58.93)	.953*** (69.53)	.797*** (65.76)	.954*** (77.82)	.788*** (62.10)	.927*** (71.35)	.782*** (59.90)	.910*** (67.69)
<i>Measures of Big-Six Ties</i>										
Shacho-kai	.005* (2.22)	.014*** (5.47)	.004 (1.59)	.007** (2.78)	.002 (1.02)	.007** (2.97)	.003 (1.27)	.009*** (3.35)	.005* (2.26)	.014*** (5.50)
Shacho-kai × ROA (lagged)	-.077** (2.89)	-.185*** (6.72)	-.066* (2.32)	-.107*** (3.71)	-.032 (1.17)	-.090** (3.24)	-.040 (1.40)	-.113*** (3.86)	-.078** (2.89)	-.186*** (6.76)
Debt tie	—	—	.017* (2.22)	.057*** (7.02)	—	—	—	—	—	—
Debt tie × ROA (lagged)	—	—	-.104 (1.42)	-.600*** (7.99)	—	—	—	—	—	—
Trade tie	—	—	—	—	.018*** (3.63)	.045*** (8.59)	—	—	—	—
Trade tie × ROA (lagged)	—	—	—	—	-.301*** (5.20)	-.628*** (10.70)	—	—	—	—
Equity tie	—	—	—	—	—	—	.019* (2.02)	.047*** (4.69)	—	—
Equity tie × ROA (lagged)	—	—	—	—	—	—	-.341*** (3.40)	-.653*** (6.49)	—	—
Director tie	—	—	—	—	—	—	—	—	.009 (.79)	.026* (2.08)
Director tie × ROA (lagged)	—	—	—	—	—	—	—	—	-.270* (2.15)	-.486*** (3.92)
Adjusted R ²	.816	.854	.818	.856	.819	.857	.818	.855	.818	.855

Notes: Table entries are GLS estimates of metric regression coefficients; absolute *t*-statistics are in parentheses. Included in the regression (but not in the table) are 14 dummy variables for industry classification, 3 dummies for the oil shock years of 1973, 1974, and 1975, and one dummy for the first *endaka* year (1985).

p* < .05 *p* < .01 ****p* < .001

distributive effect of a big-six debt tie is not significant while that of trade, while weaker than in the 1967 to 1985 data series, remains strong. This evidence, we argue, disputes a simple main bank model of the *keiretsu* while favoring instead a complex network model, wherein commercial alliances are as powerful as banking ties in creating a social infrastructure for *keiretsu* intervention in an affiliated firm's affairs. The redistributive effect of equity linkage to a big-six group is also strong, whereas that for director transfer appears somewhat less so. Because equity and director networks are heavily determined by the matrix of business transactions, a plausible conjecture is that *keiretsu* intervention is conditioned less on the surface governance relations and more on the underlying economic exchange (Lincoln et al. 1992). Indeed, although not presented here, a regression for *ROA* that simultaneously includes all five measures of big-six ties and their interactions with prior performance suggests this is so: The redistributive effects of the governance ties are attenuated, whereas those of business exchange remain strong.

Our findings for the late 1980's fit a common view that in this period the structure and functioning of *keiretsu* networks—particularly their financial dimension—began breaking down, a process that has continued in subsequent years.¹⁹ Some important structural changes took place in the mid-1980's Japanese economy. Deregulation of the stock market was accelerated and a corporate bond

market was established (Zielinski and Holloway 1991), making it easier for firms to finance investment without reliance on group banks and insurance companies.

During the 1986 to 1989 period, Japanese corporations radically reduced their dependence on bank borrowing, even though total investment during this period doubled over the previous time interval (Kobayashi, Endo, and Ogishima 1993:8). The greatly diminished role of banks in corporate finance from 1986 to 1989 is very likely a factor in the disappearance in that period of the redistribution pattern among big-six affiliated firms.

Another conjecture is that the economic slowdown in the *endaka* aftermath explains the change revealed in our results for the post-1985 period. In reaction to the currency revaluation, Japanese economic growth fell from 4.9 percent in 1985 to 2.5 percent in 1986, its lowest rate since the oil shock recession of 1974. With many firms struggling to survive, it may have been more difficult to reverse the declines of companies experiencing severe distress. Yet Japanese growth was back to 4.6 percent in 1987, and the longer and deeper oil shock slowdown in 1974 does not similarly disturb our findings. Our best speculation is that the combination of deregulation, structural change, and macroeconomic shock explains the fast decay of the redistribution pattern among the big-six *keiretsu* after 1985.

Redistribution Lowers Inequality

This redistributive process, whereby *keiretsu* groups “tax” (or otherwise burden) healthy members to subsidize the performance of weaker colleagues or to enforce group norms restricting rates of return, implies profit homogeneity across *keiretsu* firms. Indeed, we see inequality reduction as a likely rationale for the persistence of the big-six *keiretsu*, which, like other communal aggregates (e.g., unions), pursue the welfare of the collectivity even at considerable cost to some members. We do find less cross-firm variability in average ROA_{it} (the mean computed over 24 years) in the *shacho-kai* sample. The variance is .00055 for group firms and .004 for independents. The corresponding coefficients of variation (the variance divided by the mean) are .009 and .049—by this mea-

¹⁹ As each year of data after 1985 is added to the analysis the pattern decays more (results not shown). To explore this further, we divided the entire panel into five-year intervals and calculated the same regressions. Our basic results (negative interactions of big-six ties with lagged *ROA* but positive main effects) are sustained for every five-year period with the exception of 1984 to 1988, where the interaction was either null or positive. As we send off this final version of our paper to *ASR*, we have produced some preliminary regressions on an updated panel through 1992. Examining the five-year period, 1988 to 1992, we find evidence of a reemergence of the redistribution pattern. This coincides with the collapse of stock prices on the Tokyo Stock Exchange, and the resumption of bank borrowing in 1990 and 1991 as the dominant source of corporate external finance (Kobayashi, Endo, and Ogishima 1993).

sure, the variability in financial performance across independent firms proves to be five times that of *shacho-kai* companies.

Also argued as a rationale for the big-six *keiretsu* groups' adjustment of member firms' performance toward an acceptable average level is that the smoothing of peaks and troughs from each firm's business cycle yields smaller annual fluctuations and steady incremental earnings growth. Large, diversified American corporations commonly "manage" their earnings through transfer pricing, the strategic timing of asset sales, and other devices that avoid surprises and keep Wall Street expectations in check.²⁰ General Electric, for example, times any write-off of losses and charges to coincide with spikes in operating earnings, thus avoiding reported income too high to be surpassed the following year (Smith, Lipin, and Kumar 1994). Although Japanese companies are subject to less pressure from the investment banking community, they nonetheless take great pains to avoid losses and maintain steady growth. The *keiretsu* network may, in this and other things, be a functional substitute for the vertically integrated and diversified American corporation. The perplexing difference, of course, is that a *keiretsu* has no visible overarching headquarters function managing interdivision relations and financial flows. Nor, again, is it altogether clear who has rights to participation in a *keiretsu* community and who does not.

The evidence for the hypothesis that *keiretsu* groups dampen temporal fluctuations in their members' earnings is, however, mixed. With the coefficient of variation in return-on-equity as their dependent variable, Caves and Uekusa (1976:80) observed negative effects for the three ex-*zaibatsu* groups (Mitsui, Mitsubishi, and Sumitomo) and positive effects for the three bank-centered groups (Fuyo, Dai-Ichi Kangyo, and Sanwa), none of which reached statistical significance. Yet Nakatani (1984) reported fairly

strong and significant evidence that big-six membership tempers *ROA* variability. This was the basis for his conclusion regarding the risk-sharing function of Japanese enterprise groups: that they assure financial stability over long spans of time, thus enabling Japan's large corporations to honor their lifetime commitments to employees.

Our own evidence on this point, like that of Caves and Uekusa (1976), is decidedly mixed. Using two forms of the dependent variable—a five-year moving variance in a panel analysis and a stationary variance computed over the entire 1967 to 1985 period in a cross-sectional analysis—we obtain strong and significant negative effects of the *shacho-kai* dummy and the four measures of big-six ties. Yet when we substitute a coefficient of variation (which Caves and Uekusa used) or include mean *ROA_{it}* as a right-hand side regressor (the Nakatani method), the pattern disappears—the *shacho-kai* effects flip to positive as do the director and equity effects. The other effects stay negative. While our inability to replicate Nakatani's findings is perplexing, we see some inconsistency between the hypothesis that group intervention lowers cross-firm inequality and the complementary one that it confers long-term stability on individual firms. Except for bailout targets, who thereby avert disastrous crashes, how groups compress variance in earnings across their member companies is easier seen than is their role in reducing uncertainty for any given firm. Consistent strong performers, for example, may experience *more* financial volatility if the price of group affiliation is absorption of the shocks of unpredictable and episodic rescues.

Keiretsu Intervention in the Shacho-kai Elite

Does the *shacho-kai* (president's council) have any special significance for the intervention and redistribution process? The anecdotal literature makes clear that a firm need not be a *shacho-kai* member in order to be targeted for intervention. The Sumitomo turnaround of Mazda, the Mitsubishi rescue of Akai Electric, and many other cases in the genre testify that long-term business dealings and partial governance relations suffice to draw the support of the network when a

²⁰ This suggests that firm size, like *keiretsu* membership, interacts negatively with prior performance. Modeling this possibility we did find a moderate effect of this sort in our sample, although it did not diminish the evidence for *keiretsu* intervention effects. To avoid collinearity, we exclude the size interaction from the results presented here.

noncouncil company is in trouble. Indeed, a plausible hypothesis is that the *shacho-kai* affiliation of a troubled firm has no net impact on the likelihood of intervention. From this perspective, the only noteworthy feature of *shacho-kai* companies is that they are more central in the *keiretsu* web of interfirm exchange and control relations.

Yet we propose that *shacho-kai* firms are qualitatively, not simply quantitatively, distinct. They represent the nerve center and inner circle of the *keiretsu* network. They are the dominant players and permanent members of a mutual aid society, and that status guarantees them help in time of trouble as well as ongoing scrutiny of their affairs. The actual business they do with one another at any given time may not condition the group's commitment or support the way it does in the case of a noncouncil firm.

This reasoning is at odds with a theory of groups as reducible to bank monitoring and control. Since big-six banks are only slightly more likely to lend funds within than outside the group, evidence for a unique *shacho-kai* effect suggests that something other than financial dependencies is at work—that the *shacho-kai* forms a self-conscious clique of firms whose reciprocal commitments stem from long association and strong collective identity. Such evidence emerges from our Tables 2 and 3, which show that the intervention effect of *shacho-kai* affiliation holds up under numerous controls.

But there is another, stronger test of the proposition that *shacho-kai* membership in and of itself entitles a firm to intervention: If a council seat guarantees assistance to a firm in distress, the presence or absence of other ties should make no additional difference. For firms lacking formal council status, however, their day-to-day involvement with the group through borrowing, trading, equity, and director transfer relations should be critical to whether the group will claim them as its "own" and regard them as eligible for intervention.

Our data strongly favor these arguments: The roles of ad hoc big-six ties in intervention diverge sharply for *shacho-kai* and independent firms. Specifically, *shacho-kai* companies, as we suggest, enjoy automatic entitlement. Independent firms qualify only if their business dealings with the group are

extensive. Table 4 gives GLS estimates computed separately for the subsamples of 87 *shacho-kai* and 110 non*shacho-kai* firms. With one exception—director ties—the redistribution effects of the ad hoc ties are weak to nonexistent in the *shacho-kai* set and notably stronger in the set of independents.

Why does the measure of *keiretsu* director control behave differently? It is likely that the placement of managers from one company on the board of another is integral to the *process* of intervention. *Shacho-kai*, trade, debt, and equity ties are stable relations that increase the odds of assistance when a partner firm encounters trouble; director dispatch, as the analysis by Kaplan and Minton (1994) shows, is typically a present or past response to that trouble (also see Kester 1991:71). The fact that big-six representation on a company's board has the same implications for intervention among *shacho-kai* and independent firms may testify that this is less a condition for targeting than it is the instrument whereby the group works its will on problem partners.

One other issue bearing on the contrast between *shacho-kai*-based intervention effects and those associated with ad hoc ties deserves mention in this section. Although the form of redistribution as we have modeled it is linear (see equation 1), we have also done analyses relaxing that assumption. While space constraints preclude our presenting those results in detail, we find that the function relating ROA_{it} to ROA_{it-k} takes a pronounced S- or logistic-shape among firms with strong ad hoc ties. In other words, on these dimensions of big-six affiliation, group and independent firms differ only at the extremes of ROA_{it-k} (e.g., below 0 percent and above 20 percent). Short of these thresholds there is very little evidence that group ties make a difference. The clearest example is that of trade partnerships, which we present as Figure 2.²¹

²¹ Using the estimates from a regression containing both nonlinear and interaction terms, we plotted in Figure 2 the function of ROA_{it} on ROA_{it-k} at two hypothetical levels of big-six tie—0 percent and 50 percent (i.e., no trading partners from the dominant big-six group and half of all trading partners from that group). The corresponding plots for debt, equity, and director ties are similarly S-shaped, but are somewhat less clear-cut than that for trade.

Table 4. GLS Regressions of Return-on-Assets (ROA) on Measures of Big-Six *Keiretsu* Ties and Control Variables: 87 *Shacho-kai* Firms and 110 Independent Firms, 1967–1985

Explanatory Variable	Model 1		Model 2		Model 3		Model 4	
	<i>Shacho-kai</i>	Independent	<i>Shacho-kai</i>	Independent	<i>Shacho-kai</i>	Independent	<i>Shacho-kai</i>	Independent
Intercept	.000 (.02)	-.076*** (3.61)	.012 (.58)	-.065** (3.13)	.010 (.50)	-.08*** (3.68)	.013 (.62)	-.086*** (3.90)
<i>Control Variables</i>								
Calendar year	.006** (2.45)	.013*** (4.29)	.006** (2.53)	.012*** (4.26)	.006* (2.41)	.01*** (4.50)	.007* (2.56)	.016*** (4.96)
Age of firm	.021 (.47)	-.010 (.17)	.018 (.40)	-.028 (.48)	.027 (.57)	.00 (.15)	.013 (.29)	.001 (.01)
Ln Total assets	-.003*** (3.48)	-.003* (2.40)	-.004*** (4.10)	-.003** (2.71)	-.004*** (4.01)	-.004** (2.48)	-.004*** (4.29)	-.004** (2.63)
Percent sales growth	.069*** (16.55)	.118*** (22.93)	.070*** (16.72)	.121*** (23.75)	.070*** (16.67)	.11*** (23.02)	.069*** (16.62)	.119*** (22.83)
Debt/equity ratio	-.009 (.18)	.005 (.04)	.003 (.05)	-.067 (.60)	-.001 (.03)	-.11 (.97)	.001 (.03)	.024 (.21)
ROA (lagged)	.723*** (16.54)	.973*** (58.85)	.633*** (20.26)	.979*** (67.26)	.670*** (23.15)	.96*** (59.19)	.681*** (27.43)	.927*** (55.71)
<i>Measures of Big-Six Ties</i>								
Debt tie	.030 (.01)	.075*** (6.81)	—	—	—	—	—	—
Debt tie × ROA (lagged)	-.279 (1.87)	-.756*** (7.68)	—	—	—	—	—	—
Trade tie	—	—	-.001 (.17)	.058*** (7.62)	—	—	—	—
Trade tie × ROA (lagged)	—	—	.061 (.68)	-.866*** (10.73)	—	—	—	—
Equity tie	—	—	—	—	.016 (1.52)	.07* (4.18)	—	—
Equity tie × ROA (lagged)	—	—	—	—	-.146 (1.26)	-1.11*** (7.08)	—	—
Director tie	—	—	—	—	—	—	.012 (.70)	.040* (2.26)
Director tie × ROA (lagged)	—	—	—	—	—	—	-.656* (2.54)	-.593*** (3.75)
Adjusted R ²	.724	.879	.724	.882	.725	.879	.725	.877

Notes: Table entries are GLS estimates of metric regression coefficients; absolute *t*-statistics are in parentheses. Included in the regression (but not in the table) are 14 dummy variables for industry classification, 3 dummies for the oil shock years of 1973, 1974, and 1975, and one dummy for the first *endaka* year (1985).

p* < .05 *p* < .01 ****p* < .001

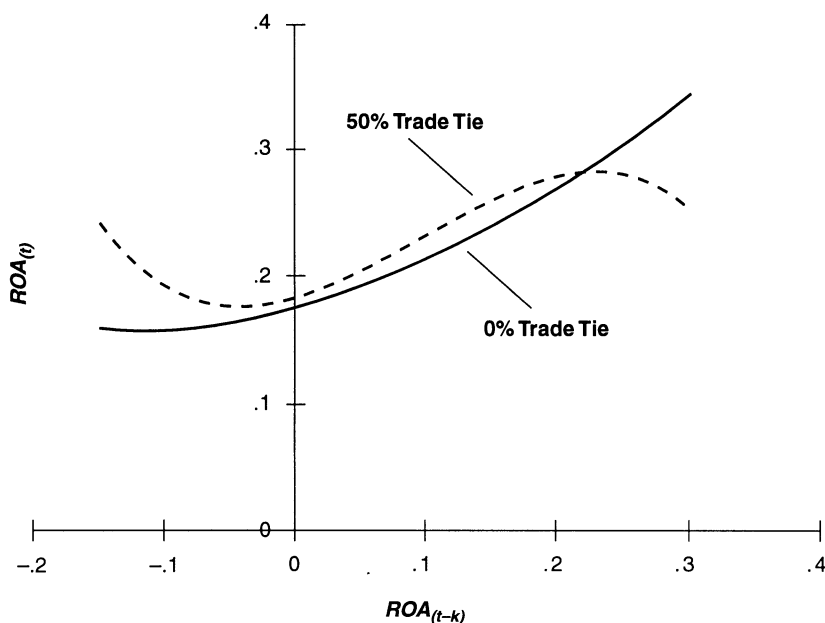


Figure 2. Regression of Return-on-Assets (ROA) at Time t on ROA at Time $t-k$ at 0-Percent and 50-Percent Trading Partner Ties to a Big-Six Group

The S-shaped intervention pattern does not obtain, however, in the case of *shacho-kai* firms (not shown). There, the linear specification of equation 1 describes the data fairly well. Substantively, this implies that interventions within the *shacho-kai* elite are incremental and routine; for nonmembers doing business with the group interventions are by contrast episodic and timed to crisis or signs of excess.

CONCLUSIONS

We have built on a diverse body of prior evidence that Japanese corporations with ties to the big-six horizontal *keiretsu* are, on the one hand, less profitable than unaffiliated firms and, on the other hand, more likely to recover rapidly from financial distress. We have produced a set of strong empirical results documenting the strength and form of *keiretsu* interventions and their significance for the structure and functioning of the big-six groups. The oft-cited finding that big-six firms are weaker financial performers than are comparable independents has been offered as testimony for their “dinosaur” status—that such groups are a declining structural form and hold few attractions for

younger, nimble, and aggressive firms on the leading edge of the modern Japanese economy. But the implication that group affiliation is a cultural-historical residue serving no current economic function and a dead-weight drag on the performance of the average Japanese firm is flat wrong—or if true at all applies only since 1985, when the onset of deregulation and asset inflation set the stage for the heady and chaotic “bubble economy” and the subsequent recession and stagnation from which Japan has yet fully to emerge. The fact is that some Japanese firms derive substantial benefit from their *keiretsu* affiliations and others pay a price. Groups allocate resources among their members according to a long-term vision of collective welfare. They provide a safety net for their weak members, police profiteering by imposing penalties when a member firm does too well, and insulate their membership from the harsh scrutiny of tax authorities and investment analysts by managing the reporting of profits and losses to show steady, incremental growth.

Establishing that Japan’s horizontal *keiretsu* fine-tune and align the performance of their member firms was the starting point for our analysis. From there we sought to an-

swer a central question about the structure and behavior of the big-six groups: Are the groups true interorganizational networks bundling together financial institutions and industrial firms in a web of direct and indirect, commercial and financial, control and exchange relations, or are they merely hub-and-spoke pairings of industrial firms with leading banks who help their clients through rough patches chiefly to safeguard their own investment interests? The preponderance of our evidence favors the complex network model. The strong effects we find of group-based purchase and supply transactions, plus the evidence that interventions within the *shacho-kai* elite require no supplementary business ties and are linear in form (i.e., incremental and pervasive) dispute a reductionist model of big-six interventionism as simple bank control.

We see the big-six *keiretsu* groups as far-flung, richly coupled *networks*, and we interpret their economic role as one of collective action maximizing the joint welfare (or utility) of the membership by restraining both the bearing of risks and appropriation of returns by individual firms and substituting what appears to be a group-administered allocation plan. The actions of groups in this regard are collectively "rational" for the existing membership as a whole, though not necessarily rational for its strongest members. Indeed, why the best-performing corporations in a big-six group maintain their membership is, at least to economists viewing firms as rational utility maximizers, perhaps the greatest puzzle posed by the *keiretsu* phenomenon. The argument that today's strongest firms keep their membership as a hedge against tomorrow's failure is one answer that accords with the common view that Japanese business, if not the Japanese as a people, are risk-averse (Aoki 1988:280). But this reasoning assumes a degree of corporate self-interest seeking, unconstrained by social commitments and normative rules, that is scarce in Japan. The network structures within which Japanese economic action is embedded allow corporations limited degrees of freedom to chart their own course, to freely pick and choose alliances (or whether to align at all) on the basis of unilateral calculations of advantage. There is a collective logic to the *keiretsu* phenomenon that, in our

view, is not reducible to rational optimizing on the part of individual firms.

How *keiretsu* networks structure the behavior and performance of Japanese companies is a question of some current policy and theoretical importance. The implications for policy are clear: If stable intercorporate relations of the kind typical of the big-six horizontal groups are linked to the competitive strategies, performance, and openness of the Japanese economy they bear strong scrutiny from international trading partners disturbed by Japan's trade surplus and the unofficial but pervasive barriers to penetration of Japanese markets. Policy relevance of a very different kind is posed by the question of whether *keiretsu* structures like those so common in Japan should be copied by Japan's leading competitors and trading partners. Whether they generate genuine efficiencies by economizing on information and contracting costs or whether (by absorbing risk and excluding competitors) they simply give Japanese firms an advantage over Western competitors, there is much talk currently in North America and Europe of the need to establish similar arrangements to enhance competitiveness with the Japanese (Ferguson 1988). Such discussions tend not to be informed by systematic research and would benefit, we believe, from further investigation and a better understanding of the past and present roles of *keiretsu* networks in the Japanese economy.

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