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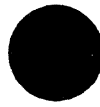


THE JAPANESE FINANCIAL KEIRETSU AS A
COLLECTIVE ENFORCEMENT MECHANISM

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Abstract

This article rationalizes the crossholdings of debt and equity within the Japanese financial keiretsu as a private enforcement mechanism. Our rationale complements previous explanations on the economic efficiency of the keiretsu by suggesting an explicit mechanism through which cooperation is sustained over time. The allocation of control rights implicit in its financial structure is shown to support relational contracting among self-interested managers through tacit threats of expulsion from control. The mode of enforcement shifts from mutual enforcement among group members to a more hierarchical mode under main bank leadership when a firm moves into financial distress.

The model is consistent with the extent of preferential intragroup trading, the remarkable stability of the structure of financial keiretsu over time and the pattern of corporate reorganization observed within the groups.

1 Introduction

Most larger firms in Japan are affiliated with a financial keiretsu. The main features of these groupings are extensive intragroup trade and a capital structure with elaborate crossholdings of debt and equity, a strong domination for the group's main bank in corporate borrowing, and high levels of gearing in member firms. This article analyses the peculiar pattern of control allocation in the financial keiretsu as a collective (but privately organized) enforcement mechanism designed to facilitate transactions between member firms. We suggest that the pattern of financial contracting within the groups implies that the mode of enforcing cooperation in transactions is contingent on firm performance. When the firm is doing well, enforcement is achieved collectively through the reciprocal shareholdings. In states with low performance, control rights are transferred to creditors, and enforcement is shifted to a more hierarchical form with the group's main bank as the chief actor.

In most complex transactions conflicts are bound to occur. Trading agents cannot easily anticipate and ex ante resolve contractually all potential conflicts. Even if they could foresee all relevant contingencies, contractual agreements may not satisfactorily be enforced by a public court, either because relevant variables are not verifiable by a third party or because agreements are of a kind which are not enforceable by a court.¹ In these situations, some other arrangement must resolve the indeterminacy of the allocation: agents may delegate the right to make allocative decisions in contingencies not contracted upon to one of the parties (residual control rights) or to third party arbitration (see Tirole, 1988).

We interpret the Japanese financial keiretsu as an intermediate mechanism where agents in a coalition enjoy control rights only conditional on collective approval, thus creating a mutual enforcement mechanism for resolution of bilateral and multilateral conflicts. We suggest that this arrangement may support a broad range of functions which have been identified in the literature on the keiretsu, such as facilitating bilateral trade between member firms, and encouraging investment in relation-specific assets. The financial keiretsu may also allow credible exchange of information or coordinate research efforts, and enforce timely and coordinated reorganization of firms in financial distress.

In principle, the same private mechanism we describe could also be used to support entrenchment in the form of mutual takeover defence and inefficient risk-sharing among member firms. In fact, our rationale does not necessarily contradict any of the previous explanations. Rather, by analysing the allocation of control within the financial keiretsu, we provide a "missing link", an explicit governance mechanism, and attempt to explain their stability over time.

The predictions of our model are in general agreement with the structure and composition of the groups in terms of number and size of member firms as well as their dispersion across industries. In particular, the analysis highlights the significance of the regular meetings between representatives of group companies. They serve both as loci for coordination of intragroup transactions, permitting exchange of information or governance of joint research projects, as well as private courts which ensure compliance within cooperative arrangements.

The article starts out with a brief history and characterization of the financial keiretsu, emphasizing how financial contracts allocate property rights. The second section discusses previous explanations for the

existence of the financial keiretsu. In the third section our rationale for the crossholding arrangement and the internal lending relationships is outlined. We then compare our justification for the groups with empirical observations and previous explanations. The final section discusses the wider implications of our interpretation for the understanding of Japanese business practices and society.

2 Legal Informality and the Financial Keiretsu

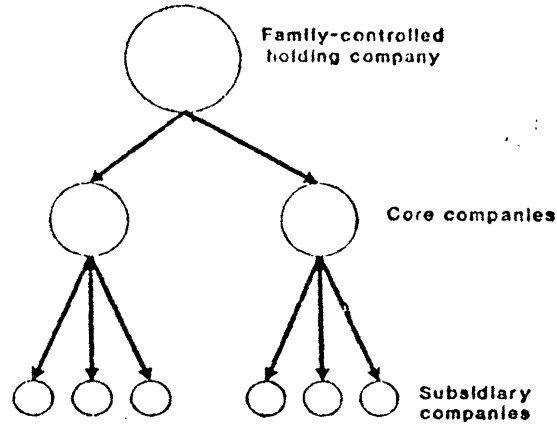
Perhaps the most conspicuous feature of the Japanese legal system is the predominance of informal conflict resolution.² Legal informality in Japan is reflected in relatively low levels of litigation, in particular in comparison with the United States.³ The informal nature of conflict resolution is perhaps even more pronounced in the commercial sector. Prior to the Meiji restoration in 1868, contracts played little or no role in commercial transactions (Hirschmeier and Yui, 1979). In the reform and modernization of Japanese society, a number of legal concepts and institutions were imported, primarily from German civil law tradition. However, public enforcement based on contracts never took root in Japanese commercial life. Transactions were enforced chiefly through reputation and hierarchical enforcement in the family-controlled zaibatsu groupings, i.e., strategic decisions were often made, and management appointed and fired, by the family-controlled holding company. These groups of firms emerged around the large trading houses in 19th century Japan. Their importance grew steadily and peaked in the late 1930s and early 1940s. Following World War II, the zaibatsu groups were dismantled under the US occupation in an attempt to reform the Japanese economic and political system. The goal was to establish a public enforcement system based on US precedent. The

Commercial Code, for example, was modelled directly on state legislation in the United States. Furthermore, the US administration dissolved the holding companies under the control of the zaibatsu families and largely eliminated other ownership ties within the groups. Several thousand managers were fired, and family-held equity was confiscated and distributed to the general public.⁴

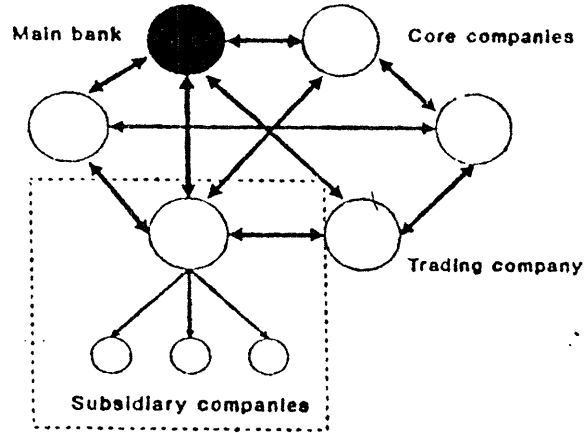
Interestingly, these reforms seem to have had little impact on how commercial transactions were undertaken and enforced ex post. The early fifties saw a brief period of widely held firms, but by the mid-sixties the zaibatsu groupings had been reincarnated in the shape of the financial keiretsu. The family-controlled holding companies were replaced by a complex network of reciprocal shareholdings. The previous zaibatsu banks and the large commercial banks, the so-called city banks, played a central role in the restoration of the groupings. Several government institutions were also actively involved in this process. Figure 1 illustrates how a more horizontal arrangement has taken the place of the hierarchical structure of the pre-WW II zaibatsu.

Figure 1 Zaibatsu and Financial Keiretsu Compared*

THE ZAIBATSU GROUPINGS BEFORE WORLD WAR II



POST-WAR FINANCIAL KEIRETSU



*Arrows indicate ownership ties. Double arrows indicate cross-shareholdings. The enlarged square indicates that a group firm can also be a member of an industrial keiretsu.

Most firms listed on the Japanese stock exchanges are members of a financial keiretsu⁵ (for thorough discussions of these arrangements, see Clark (1979), Sheard (1986), and Aoki (1988)). Member firms (20-45 in the larger keiretsu) are interconnected through a complex network of reciprocal ownership as well as lender-borrower and buyer-seller relationships (see Table 1).⁶ Within the financial keiretsu, there are also personal interlockings in the form of a limited exchange of board directors.⁷ Furthermore, representatives on different levels in the core companies meet on a regular basis in the so-called Presidents' Clubs⁸.

Table 1: Intragroup Financing Patterns in Leading Financial Groups (1985)

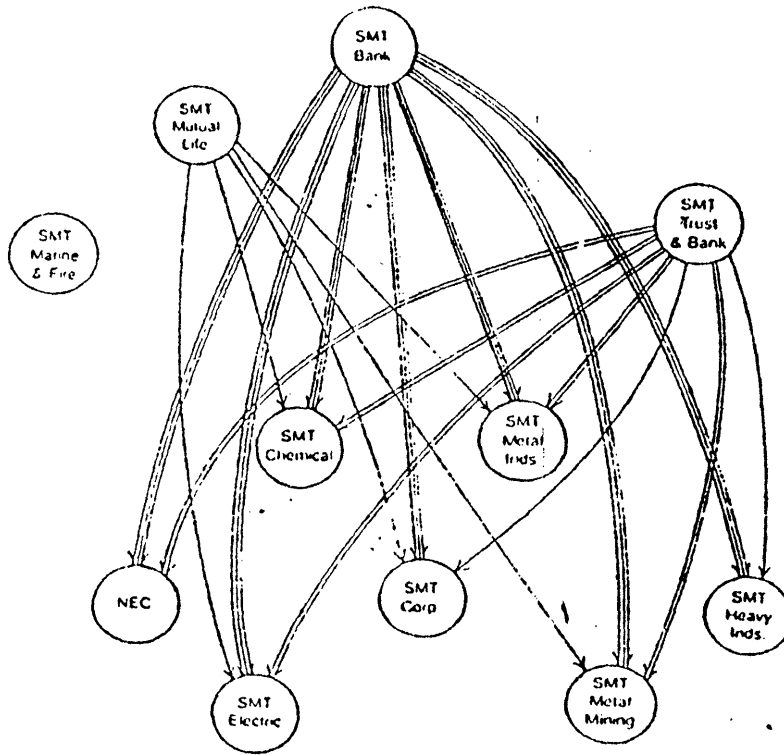
	Mitsui	Mitsu- bishi	Sumi- tomo	Sanwa	Fuyo	Dai-Ichi Kangyo
Number of firms	24	28	21	44	29	47
Group members' share of total group equity	18	25	25	17	16	13
Group bank's share of total bank finance in group companies	21	22	28	20	18	12

Source: Aoki, Masahiko, 1988, Information, Incentives and Bargaining in the Japanese Economy, Cambridge: Cambridge University Press

Each financial keiretsu typically has one member company in every important industry and attempts to avoid direct competition between group companies (Clark, 1979). The division of labor is well developed, and there is a strong preference among member firms for intragroup trade⁹. The most

advanced specialization and the strongest cohesion can be found in the financial keiretsu which have emerged around the old zaibatsu banks, i.e., Mitsui, Mitsubishi and Sumitomo. In the following we concentrate on the financial keiretsu as an allocation of property rights defined by the financial contracts connecting individual group members. These financial linkages within the groups can be illustrated by Figures 2 and 3, depicting the lending and shareholding ties, respectively, within the Sumitomo financial keiretsu.

Figure 2: Intragroup Lending Patterns in the Sumitomo Group* (excluding trade credits)

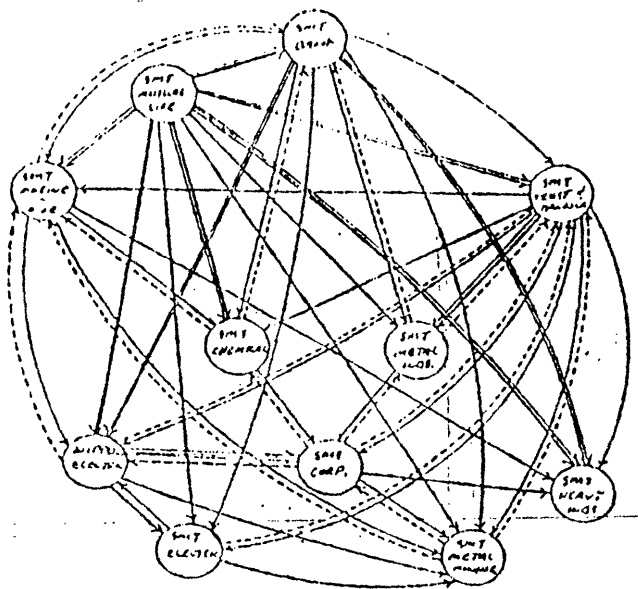


- ==== Main lender
- ===== Loans in excess of 10% of company's borrowed capital (but not main lender)
- Loans of 1-10% of company's borrowed capital

* SMT = Sumitomo

Source: Gerlach, Michael, 1987, "Business Alliances and the Strategy of the Japanese Firm," California Management Review (Fall)

Figure 3: Intragroup Shareholdings in the Sumitomo Group



- ==== 5 per cent or more and the largest owner
- ===== 5 per cent or more or less than 5 per cent and the largest owner
- one of the ten largest shareholders but less than 5 per cent
- small, reciprocal shareholdings

Source: Gerlach, Michael, 1987, "Business Alliances and the Strategy of the Japanese Firm," California Management Review (Fall).

The figures demonstrate the strategic role of the main bank, here Sumitomo Bank, as the chief lender to member firms and one of the most important shareholders.¹⁰ According to Table 1, the main bank on average covered between 12 and 28 per cent of group members' bank loans in 1985. The group trading house is instrumental in providing short and medium-term finance and in mediating intragroup trade. Like the main bank, the trading house assists problem firms within the group. The most conspicuous feature of these groups is the extensive cross-shareholdings among firms. The combined holdings of group companies are usually sufficient to guarantee a voting majority in every member firm.

However, each group member's ownership share in a particular firm is small, typically 2-5 per cent. Table 1 showed the extent of crossholdings in the six largest groups. If we take into account that shareholdings of individuals are typically dispersed, the importance of intragroup holdings of equity becomes even more striking. Table 2 depicts only the 20 largest shareholdings among the 100 largest manufacturing companies and the 23 largest financial institutions.

Table 2 Crossholdings of Shares Within the Financial Keiretsu

<u>Issuing Company</u>	<u>Owing Company</u>						Independent
	Mitsui	Mitsu- bishi	Sumi- tomo	Fuji	Dai- Ichi	Sanwa	
Mitsui (12)	<u>55.2</u>	5.4	7.3	4.9	2.1	--	25.2
Mitsubishi (13)	1.7	<u>74.2</u>	0.8	3.8	3.8	1.0	14.8
Sumitomo (10)	1.7	0.3	<u>68.8</u>	3.6	1.6	0.2	23.9
Fuji (14)	3.5	6.4	6.8	<u>49.2</u>	5.5	4.9	23.6
Dai-Ichi (10)	4.2	9.1	4.7	6.2	<u>42.3</u>	2.4	31.1
Sanwa (12)	3.2	5.6	2.6	12.7	11.3	<u>32.8</u>	31.8
Independent (12)	11.2	13.0	9.8	9.2	9.5	7.2	40.0

The figure indicates the shares held within groups (underlined) and between groups as well as between independent firms. The data comprises only the 20 largest owners in each company. The sample covers only the 100 largest non-financial corporations and the 23 largest financial corporations. (Within paranthesis you find the number of firms in each category).

Source: Futasugi (1976) referred to in Michael Gerlach (1986) "Institutionalized Markets: Corporate Control and Large-Firm Organization in Japan," Yale University (unpublished working paper).

Shareholdings in Japan are remarkably stable (Clark, 1979). Banks, trading houses, and group-affiliated insurance companies serve as so-called stable

shareholders. Such shareholders purchase large portions of new issues of member firms' shares with the implicit, and sometimes explicit, understanding that they will not be sold on the market without prior consultation of the issuing firm. As a result, the bulk of shares listed on Japanese exchanges are never traded.¹¹ The stable shareholdings are also important when, as is common in Japan, a firm may have to dispose of its shareholdings to offset business losses (Sheard (1986) documents a large number of such transactions). Furthermore, to maintain the ownership and control structure of the groupings, member firms purchase new issues of shares in proportion to previous holdings.

Companies which are part of financial keiretsu have also generally been more highly leveraged than independent companies (Nakatani, 1984). Furthermore, trade credits are a relatively more important source of credit than in, for example, the United States;¹² the extensive use of such credits gives rise to a peculiar structure of crosslending.

3 Previous Interpretations

A fairly rich literature has attempted to explain the existence and the specific structure of the financial keiretsu (for a thorough economic analysis, see Aoki (1988)). This section reviews some of these contributions. For expositional purposes, we distinguish between rationales arguing that the keiretsu pursues enhanced economic performance and those that view it primarily as examples of successful entrenchment by insider stakeholders. However, these explanations are not necessarily mutually exclusive. In fact, as also argued by Dore (1986) and others, entrenchment may serve to improve efficiency by allowing long-term planning and by preventing disruptive takeovers.

3.1 Economic Performance Rationales

Superior performance may be attributed either to enhanced market power or to efficiency advantages. In a traditional market power argument, the coalition enables member firms to keep higher prices by controlling output. While this argument may help explain other institutional arrangements in Japan, such as industry organizations, it hardly seems appropriate for the financial keiretsu. The keiretsu are carefully organized across industries and apparently do not establish monopoly power in individual markets.

Caves & Uekusa (1976) suggest that in an imperfect market the keiretsu could still utilize market power by trading at a two-tier price schedule with one set of prices aimed towards other group members and another set towards outsiders. Intragroup trade would occur at price ratios equal to internal marginal opportunity costs, while group members would utilize their market power in trade with outside companies.¹³ This explanation helps explain the preference among group companies for intragroup trade. However, purely contractual forms of mutual compensation may also encourage such trade even without involving mutual property rights. In addition, intragroup trade aimed at establishing market presence may have been a main driving force behind the formation of the pre-WW II zaibatsu and their reemergence after the war, but it is likely to be only one aspect of the complex relationships among firms within the financial keiretsu.

The financial keiretsu could also be viewed as arrangements intended to enhance the members' bargaining strength vis-a-vis other companies and the central government. This appears plausible for the period following WW II when there was significant government control over, among other things, the allocation of credit and foreign exchange. However, the development of

the financial keiretsu occurred at a later stage, when these constraints were being relaxed. While subsidies may still be significant in some segments of industry, this corporatist bargaining argument is insufficient as the main justification for the groups in their present form.

A number of contributions have rationalized the arrangement as profit maximizing through transaction costs savings. Goto (1982) suggests that the groups economize on contracting costs by facilitating the transfer of information. According to this explanation, strategic information is exchanged in the Presidents' Clubs and other fora for group interaction to facilitate the coordination of decision-making within the keiretsu. However, to be credible, such an exchange of information and strategic coordination must be supported by some enforcement mechanism preventing deviations by individual members.

In a similar vein, Hoshi et al (1990a and b), among others, view the groups as primarily financial arrangements mitigating information and incentive problems when investors are diffused. Their empirical evidence suggests that firms within the financial keiretsu have been less liquidity-constrained than independent companies. This is explained by better monitoring opportunities within the keiretsu as a result of the long-term relationships between group banks and member companies.¹⁴ The concentration of financial claims to a few banks improves incentives for monitoring. While an informational interpretation offers a plausible rationale for the concentrated creditor structure and the close relationship between banks and group companies, it does not explain the presence of elaborate crossholdings of equity. However, the exchange of information is apparently an important function of the groups; we argue that it is the existence of elaborate crossholdings of debt and equity that makes this exchange credible.

In general, these explanations lack an explicit model of the governance structure of the arrangement, nor do they address the complex allocation of property rights implied by the pattern of financing within the group.

3.2 Entrenchment Rationales

Entrenchment arguments assume that the financial keiretsu allow management or employees to reduce risk¹⁵ or obtain private benefits from control. Aoki (1984 and 1988) argues that the financial keiretsu should be viewed as risk sharing arrangements which have emerged in response to the absence of markets for managers and skilled workers and of a well-functioning social welfare system.¹⁶ Since a substantial part of the individual's wealth is tied to the corporation where he or she is employed, bankruptcy may lead to personal disasters for employees. This exposure to risk has provided managers as well as workers with strong incentives to find risk-sharing arrangements.

While the risk reduction argument could have contributed to the general acceptance of the financial keiretsu in Japanese society, it does not explain their complicated structure or why they originally emerged on the ashes of the zaibatsu. The pre-war groups were presumably formed for other reasons than to diversify away management or employee risk. Furthermore, as Aoki (1988) recognizes, it is not clear that the bankruptcy risk of firms of the size we find in the groups could be significant enough to motivate these elaborate arrangements. Risk exposure could also be reduced more efficiently, for example, by diversifying corporate investments into a broader set of securities and to risks outside the industrial sector;¹⁷ an optimal risk-sharing arrangement would involve as many firms as possible,

without any special role for reciprocal holdings concentrated among a well defined set of firms; nor would it justify the neat separation among the groups, and their apparent strong sense of identification. We believe that reciprocal holdings of shares serves primarily as an allocation of control rights rather than of income rights.

Along this view, Aoki (1988) and Sheard (1986) submit that the financial groupings should also be viewed as entrenchment mechanisms defending incumbent management against hostile takeovers. Crossholdings of shares may allow managers to increase the firm's capital base while retaining control over the firm. The entrenchment hypothesis certainly helps explain the low level of takeover activity in the Japanese financial markets, in particular for firms belonging to the keiretsu groups. However, even though fear of foreign purchases of undervalued Japanese companies was voiced at the time the groups were formed, takeovers were not common in the interim period before the groups reemerged after the war; in any case, the strict regulation on capital flows would have by itself provided sufficient protection. In addition, a purely defensive mechanism should be susceptible to disintegration as subcoalitions realize that they can gain by selling off their holdings in a particular firm to another management team which values them more highly.

None of these previous explanations aims at explain the crossholdings of shares in the financial keiretsu. These explanations also lack an explicit model of what makes individual firms comply with the agreement to cooperate, and how the arrangement is maintained over time. Furthermore, entrenchment theories also do not explain why reciprocal shareholdings are associated with other business transactions between the interlocked parties. In the following section, we provide an explicit formal model of a

underlying mechanism which may allow the keiretsu firms to credibly commit to perform in transactions among themselves.

4 The Collective Enforcement Mechanism

Most complex economic transactions require some specific investment from the transacting parties, i.e., some investment is worth more within a particular relationship than if sold on the market. When investments are specific, there are quasi-rents to be allocated. Unconstrained ex post bargaining over these rents gives rise to agency costs within the firm, conflicts among firms and may in general distort ex ante investment. If complete or comprehensive contracts specifying the payoffs and actions for every conceivable state of nature could be written, there would be no such ex post conflicts. However, specific investments are often hard to specify in contracts. When contracts are incomplete, contracting parties may mitigate conflicts by ex ante mechanisms constraining ex post bargaining (Williamson, 1985). One alternative to unconstrained bargaining is to delegate the right to make decisions not specified in the contract to one of the parties, the residual control rights (Grossman & Hart, 1986). The incomplete contract theory views allocation of control rights, along with income rights, among a firm's suppliers of capital as specified in the firm's financial contracts (Aghion & Bolton, 1988). Equity entitles its holder to a proportional share in the firm's residual income and a vote at the general shareholders meeting. Debt specifies a fixed payment and, if this payment is not met, a transfer of control to creditors as well as a share in the remaining value of the firm.

We suggest that the Japanese financial keiretsu may be interpreted as a private collective enforcement mechanism mitigating conflicts between

transacting firms, and between shareholders and management. Our explanation focuses on the internal financial structure of the financial keiretsu as an optimal allocation of control rights: the elaborate crossholdings of equity and debt, the dominant role of the main bank in group financing and the high debt-equity ratios. First, we generate a rationale for the crossholdings of equity (Section 4.1). Secondly, we suggest an arrangement which also includes crossholdings of debt and a concentrated creditor structure (Section 4.2). Finally, a rationale for the strong reliance on external financing through banks is developed.

We consider this allocation of control to provide a solution to two moral hazard problems giving rise to underinvestment. Section 4.1 examines the incentives offered to managers to exert effort when its firm is profitable; the manager's interest is shown to be aligned by the arrangement to that of its shareholders. Underinvestment arises because contracts are incomplete and transacting parties care differently about specific investments. Crossholdings of equity is shown to improve reciprocal commitment among a group of transacting firms. In Section 4.2, the mutual monitoring feature of equity crossholdings is insufficient to induce managers to exert effort when the firm is approaching default and should be liquidated. A conflict then arises between management and shareholders, when the manager receiving early information about firm profitability. This is shown to justify crossholdings of debt. The debt instrument here has two functions: (i) to provide a signal about the bad state of nature (cf. Harris & Raviv, 1990); (ii) to transfer control over assets in these states to creditors (cf. Aghion & Bolton, 1988).

The context we describe is a simple transaction with mutual specific investment plagued by a Prisoners' Dilemma which discourages cooperation in the one-stage game. Once the interaction is known to last indefinitely,

there is scope for collaboration through a reputation mechanism. However, reputation will fail when individuals discount highly future payoff; then the proposed crossholding arrangement is shown to improve commitment.¹⁸

4.1 Collective Enforcement Through Crossholdings of Equity

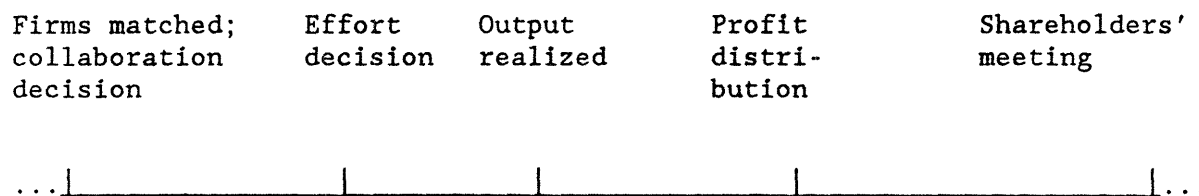
We consider an economy where public courts solely enforce control rights and rights to share in verifiable revenues. A firm is characterized by specific assets, with its capital structure defining the allocation of revenues and control. We distinguish between managerial and corporate control. Managerial control is defined as the entitlement to make production decisions regarding the use of the firm's assets. Corporate control is exercised by a shareholder or coalition of shareholders that own a majority of the shares outstanding and can assign managerial control over assets to a manager of choice. The firm's manager may or may not be a major shareholder; if he does not hold shares, his compensation scheme, or salary, is assumed to be directly proportional to the firm's profits.

The exercise of managerial control provides a manager with private benefits.¹⁹ We can think of these benefits as various forms of on-the-job-consumption, such as large expense accounts, golf club memberships and general social prestige, associated with being in charge of the corporation. For simplicity, these benefits of control are assumed to be the main component of the manager's compensation scheme. Managing the firm and engaging in transactions with other firms require specific effort investments by the manager. The decision to exert effort is discrete (work, shirk); work costs c , while shirking has no cost. Thus, a manager's utility is a function of his wage and his private benefits are net of effort costs. All agents discount future payoffs.

Over time there are random opportunities for firms to transact with each other. This opportunity may take the form of direct trading, or pooling of research efforts, the value of which is enhanced by joint relation-specific investment. The gains from trade may also arise from the exchange of reliable information; or from coordination of actions vis-a-vis third parties. Because contracts are incomplete, matched firms must bargain for a division of collaboration benefits. For simplicity, we assume that parties split these benefits evenly and focus on the effort investment and the private benefits.

The basic stage game, i.e., the one-period game repeated in each period is as illustrated in Figure 5. At first, transaction opportunities are unveiled. Agents then choose whether to expend effort. After the transaction has taken place, profits net of private benefits are distributed. Finally, a shareholders' meeting is held for each firm. Upon complaint the coalition inspects the outcome and the effort investment. A voting majority then decides to confirm or dismiss incumbent management.

Figure 5 Timing of Events in the Stage Game



A firm's return when it decides not to transact is θ . The profitability of outside transactions is enhanced by effort investment by the managers of the two firms: effort by both parties produces α , effort by one agent produces β , and no effort on either side produces 0, where $\alpha > 2\theta > \beta$. Figure 6 describes the payoffs to each firm.

Figure 6 Payoffs in the Stage Game

		Second agent	
		Effort	No effort
First agent	Effort	$\alpha/2 - c, \alpha/2 - c$	$\beta/2 - c, \beta/2$
	No effort	$\beta/2, \beta/2 - c$	$0, 0$

Since collaboration is valuable, both managers would like to commit themselves to exert effort. However, in the absence of credible precommitment, the only pure-strategy Nash equilibrium in a one-shot game may be Pareto-inefficient:²⁰ both agents shirk, and their payoff is zero. Since the payoff from own production θ dominates the Nash equilibrium, rational agents will refuse to enter in collaborative arrangements.

It is well known that when the stage game is repeated an infinite number of times, cooperation can be sustained through the threat of loss of reputation; the collective threat of refusing future transactions may discourage opportunism. However, the threat of losing future collaboration gains could be insufficient, when the agents' discount factor for future payoffs falls short of a critical level (Fudenberg and Maskin, 1986). When reputation is not sufficient, a stronger mechanism than loss of reputation is necessary to support collaboration. In the rest of this section we describe how a coalition of firms may credibly commit through a feasible redistribution of ownership rights among themselves.

Consider the following arrangement. Managers in a group of widely held firms agree to purchase each others' shares or issue new shares to each other until the combined holdings of the group exceed the full control level (say, one half). A first effect of exchanging shares is profit-sharing, so that all members internalize to some extent the profitability of all other firms in the coalition. However, reciprocal holdings not only redistribute net claims to residual income, but, more importantly, also reallocate control rights; mutual stakes carry voting power on each firm's shareholders meeting. By exchanging shares, each manager has made himself vulnerable to a takeover by the rest of the coalition; the potential loss of control rents implies a credible commitment in transactions with other coalition members.

The complete arrangement includes certain implicit behavioral rules in addition to the share exchange. Members should enter into collaborative ventures offering gains from trade with other members; both parties must then collaborate (expend effort). The arrangement also stipulates that if any firm management deviates from the prescribed behavior, the rest of the coalition must vote at the shareholders' meeting to oust the firm's manager from his position. The final provision stipulates that if the coalition fails to punish a deviating manager through expulsion, or alternatively, if the coalition removes a manager from control without just cause, members are no longer bound by an obligation to collaborate with each other (for a more formal analysis, see the Appendix).

Under this coalition rule, the manager will not find it in his interest to act in an opportunistic fashion in transactions with other member firms, if the one period net gain from shirking, plus the present value of the future income stream when not in charge, is less than the value of profits and control benefits enjoyed while in control. Note that

in this model profit sharing is not the main instrument to reduce the incentive to act in an opportunistic way. Whereas the deviating firm, as a partial crossholder, loses from the lower returns of the other firm, this loss is shared by all coalition members; indeed, profit sharing may worsen opportunism. Instead, the enforcement mechanism relies on the existence of managerial private benefits which would be lost if control were transferred to another agent. (In fact, when these benefits are large, the exchange of control rights separate from income rights is sufficient to sustain cooperation). The control rent sufficient to sustain the arrangement decreases in the number of member firms; a minimum size of the coalition may thus be necessary.

4.2 Hierarchical Enforcement Through Debt

In the previous section we showed that the interests of firm management and its shareholders (i.e., the rest of the coalition) became aligned through the threat of dismissal exercised by the mutual enforcement mechanism. In circumstances where this threat is not effective, there will be underinvestment in bilateral relations. In particular, when the firm is unprofitable and should be liquidated, presumably the future benefits associated with managing the firm vanish. Therefore, the threat of expulsion loses its effectiveness, and managers will prefer to shirk. As a result, if the other members of the coalition could observe the state of nature in the ailing firm, they would choose not to transact with it, further worsening the firm prospects.

The collective enforcement mechanism therefore needs to be complemented by another, state-contingent governance structure which discourages the manager from shirking in states of poor profitability. In principle, an

explicit reward scheme for managers may provide such incentives; in practice, financial compensation schemes for management have serious limitations. In particular, such schemes have limited liability constraints; legal and wealth constraints prevent managers from being severely fined. This reduces their effectiveness in bad states. Below we show how debt financing and a certain distribution of debt claims may be used to mitigate these problems associated with low performance states.²¹

Consider two transacting firms, A and B. At the time of contracting, A's manager has private information about the profitability of the firm (e.g., about costs or demand conditions for his firm's products). For simplicity, we think of two states of nature, good and bad; a bad state of nature implies that the firm should be closed down or thoroughly reorganized. We assume, realistically, that management learns the state of the firm before everyone else. Since management enjoys private benefits from control, it has imperfect incentives to announce the state; firm closure or thorough reorganization will erase management's control rents, possibly because old management skills are worthless in the new structure. Now the threat of expulsion is no longer effective. Based on his information advantage about the state of nature, the manager of company A decides on his level of effort investment. As long as the state of nature is good, the manager exerts effort, but in bad states he will underinvest (in the sense of taking a less efficient, less costly action).

To avoid poor incentives in unprofitable states, crossholdings within the coalition extend to debt, both in the form of bank loans with the group bank and trade credits among member firms. Unlike equity, debt stipulates fixed payments which permits coalition members to obtain valuable information; a failure to meet payment obligations is an early signal of the bad state of nature (or possibly a lack of earlier effort by the manager)(cf.

Harris & Raviv, 1990). Following default, the coalition assumes control and decides to close down or reorganize the firm. Presumably, even reorganizations require demotion or firing of current management, either because management has not exerted sufficient effort or because of a reduced competence in the reorganized firm. Extensive trade credits among member firms allow frequent updating and mutual monitoring.

An objection to this view may be that such a dispersed creditor structure associated with the use of diffused crosslending may threaten the commitment properties of debt. To prolong its control over assets and to extract more surplus, the management of the debtor firm may collude with one or more creditors at the expense of the rest of the creditor, e.g., the firm could choose to pay off some creditors but not others (Bulow & Shoven, 1978).²² Thus, the existence of more than one creditor may strengthen the ex post bargaining power of the debtor. The enforcement mechanism associated with crossholdings of equity may mitigate this problem by preventing individual trade creditors from settling separately with the firm in distress; a manager who attempted this could be expelled from the crossholding arrangement. However, such settlements may not be observable to the rest of the coalition, and collusion may be hard to prove. Since partial settlements which postpone default are beneficial to both parties involved, they will never be brought before the coalition unless they are observed by a third party, e.g., another creditor.

In principle, to solve this conflict, debt may be distributed or syndicated so that one creditor represents all or a large section of the creditors and acts as an overall monitor. This pattern of debtholdings also makes the allocation of voting rights in default much more concentrated and allows for a more hierarchical enforcement mode when firms are in financial distress. The crossholding arrangement underlying the relations between the

bank and the other member firms can also facilitate reorganization of the firm in default by ensuring that all member firms contribute to the recapitalization by forsaking part of their claims on the firm in default.

A final observation on the role of debt is in order. So far we have analyzed the financial liabilities of keiretsu firms instruments mostly in terms of control. However, crossholdings of debt and equity do not provide new capital for investments. Suppose a member firm needs external funds to finance its expansion; public issues of debt and equity may upset the described allocation of control.²³ To mitigate these problems, one coalition member, the main bank, could serve as an intermediary between external investors and group firms (cf. Diamond, 1984). The extensive use of debt financing from the group bank, insurance company or trading company, means that external funds can be raised without dispersing voting rights outside the coalition; it also allows not to alter the relative importance of member firms in the governance structure of the firm, at least until default occurs.

This view of debt as mitigating problems of asymmetric information echoes conclusions from several authors (see, for example, Harris & Raviv, 1990). In contrast, the notion of interfirm monitoring is, to our knowledge, novel. In our view, the use of trade credits multiplies opportunities for coalition members to verify the state of profitability of their trading partners; this information permits collective monitoring and supports the collective enforcement mechanism. However, a large intermediary may have better incentives than dispersed shareholders or bondholders to enforce discipline on a debtor firms (cf. Hoshi et al., 1990a). Here we add that the concentration of voting rights in one lender may mitigate the multicreditor problem. The dominant role of this intermediary in the keiretsu is supported by crossholdings of debt, ensuring that the bulk of creditors

belong to the coalition; and by crossholdings of equity, guaranteeing the cooperation of creditors in the event of default. Thus, the group combines two modes of enforcement: mutual enforcement by shareholders in good states, and hierarchical enforcement led by the financial intermediary in default states.

5 Empirical Evidence

We have formally modelled a private collective enforcement mechanism resembling the financial keiretsu. The conclusion is that crossholdings could be viewed as a hostage exchange, where contracting parties exchange control rights in order to commit to cooperative behavior (Williamson, 1983).²⁴ The model rests on a few crucial assumptions. This section discusses these assumptions and the predictions generated.

A crucial feature of the collective enforcement is that it remains stable over time; sustained interaction is necessary for the mechanism to police its own survival. In fact, in order to support long-term interaction, the arrangement should have no definite terminal date. This is consistent with the remarkable stability of the keiretsu groups; crossholding firms tend to retain constant stakes by subscribing to all stock issues in proportion to their historical holdings, and equity positions sold off by distressed firms are purchased proportionately by other members (Sheard, 1986).

Commitment to a coalition is facilitated when the group is well-defined, and insiders and outsiders are easily distinguished. Indeed, the boundaries of each keiretsu are very clearly drawn, and there is a strong sense of identification. The core of the group is defined by membership in the Presidents' Clubs. Interestingly, detailed statistics on ownership and

lending patterns within the groups are published yearly ensuring that gradual changes in the allocation of voting rights will not go unnoticed. In addition, recurrent campaigns promote the name of each keiretsu, encouraging group cohesion (Gerlach, 1988).

The proposed enforcement mechanism relies on the existence of significant managerial rents; these private benefits make the threat of expulsion effective. Evidence suggests that the private benefits associated with top management positions in Japanese corporations are indeed substantial (Clark, 1979). More generally, when managers stay in the same corporation for their entire careers, their skills become distinctly firm-specific. Indeed, the very features of Japan's economy invoked to motivate the financial keiretsu as risk-sharing arrangements, i.e., the absence of the managerial labor markets and a well-functioning social security system, magnify the costs of expulsion (Aoki, 1984).

Our model suggests that supporting bilateral trade may be an important function performed by the financial keiretsu. To motivate such an elaborate structure of property rights, intragroup trade must be sufficiently large. The data on such trade is poor, but overwhelming evidence suggests that group members do prefer to transact with other firms of the same keiretsu (see, for example, Clark (1979); Caves & Uekusa (1976); Sheard (1988); Gerlach (1988); and Flath (1990)). The historical reemergence of the groups from the pre-WW II zaibatsu, which had extensive intrafirm trading, also lends support to the claim that enforcement of bilateral trade is an important function of the groups.

Our rationale suggests that there is a minimum as well as a maximum size of the group; the group should be large enough to allow for repeated interaction between several firms, but small enough to permit mutual monitoring. In addition, to avoid conflicts of interest or antitrust

action, firms should be in different industries. The size of member firms should also preferably be of similar magnitude, since the proposed model suggests an "inter-pares" relationship rather than an hierarchical structure or pure vertical integration. These predictions of the model fit well with the structure of the groups and, in particular, with the fact that the groupings are represented in most industries ("one-setism"), but only rarely is more than one firm from each keiretsu in a particular industry (Clark, 1979).²⁵ Furthermore, as predicted in the model, the group's combined holdings in each member firm are typically large enough to ensure group control (see Table 2). No firm enjoys sufficient self-control to always overcome the votes of the coalition, and no firm has a controlling interest in another member firm. Thus, this coalition seems to capture some of the benefits of vertical integration without giving rise to some of its costs, such as loss of incentives and loss of information.

The discussion in Section 4.2 suggested that the enforcement mechanism is particularly vulnerable when individual firms are in bad states of nature, since the prospect of liquidation or thorough reorganization weakens the enforcement power of expulsion; the manager would lose his private benefits in any case. Through dependence on the main bank and extensive use of trade credits, the coalition can achieve frequent monitoring and will switch into a hierarchical enforcement mode when member firms are in financial distress. When firms in financial distress have to be reorganized, the reciprocal holdings of equity ensure collaboration under the direction of the main lender. The following well-known example from the reorganization of a firm in the Sumitomo group may illustrate how the enforcement mechanism works in financial distress (Pascal & Rohlen, 1983).

In the mid-1970s the Japanese company Toyo Kogyo, the producer of Mazda cars, experienced serious difficulties. The company is a member of the Sumitomo financial keiretsu. At the time, Sumitomo bank, the main bank of Toyo Kogyo, held 16 per cent of the company's accumulated debt and 5 per cent of its outstanding shares. In addition, Toyo Kogyo held 3 per cent of the equity capital in Sumitomo bank. Through bank managers working in the company, the bank had access to detailed information. As the problems became increasingly severe, the bank acted swiftly to remove management and find successors. Sumitomo Bank was actively involved throughout the rescue operation, for example, by designing adjustment plans and ensuring the cooperation of other claimants, to a large extent trade creditors affiliated with the Sumitomo group.

Sheard (1986) provides numerous similar accounts of how member companies have assisted in the restructuring of other group members, and in the process absorbed considerable losses. The reorganization of member firms in financial distress may be the most important aspect of the financial keiretsu; evidence suggests that bankruptcy is virtually non-existent within the groups whereas it is common among independent companies (Hoshino, 1984). The empirical results provided by Hoshi et al. (1990a) also indicate that costs of financial distress are lower in firms belonging to the financial keiretsu than in independent firms.

The arrangement we describe is in agreement with the observation made by Hoshi et al. (1991) that members of the financial groupings have been less liquidity-constrained than firms outside these arrangements. Their explanation offered by Hoshi et al. relies on bank monitoring. We have suggested a mechanism which makes commitments to truthful information exchange and future repayments credible. In our view, centralized monitor-

ing without the collaboration of trading partners or the ability to enforce contractual agreements is less effective.

Finally, the model suggests the existence of a body, a superboard where all firms in the group are represented, with the potential of coordinating enforcement. The dispersion of ownership shares in the coalition are such that the general shareholders' meeting of the individual member firms will have a similar composition as the superboard. This implies that opportunistic actions can occur only at the managerial level but not at the level of corporate control, as long as the coalition controls the majority in each firm. On the other hand, there is no need for frequent meetings of the shareholders' meeting to enforce control changes as long as the firms comply with mutual arrangements. The keiretsu firms maintain many intermediate and high level meetings among firm, among which the Presidents' Clubs, to coordinate action or exert mutual monitoring.²⁶²⁷

In general, our focus on the enforcement aspect of the financial keiretsu may tend to exaggerate the extent of coordination within these groups. While the financial keiretsu are an important aspect of the Japanese economic system, their influence on the daily operation of individual members is limited. Group intervention and subsequent dismissals of managers are relatively rare when the firm is not in default. However, intervention is common in distressed firms (see, for example, Sheard (1986)). Furthermore, an evaluation of the importance of a particular enforcement scheme should not be based on how often punishment is carried out; in equilibrium an efficient mechanism would never need to punish. This is clearly unrealistic; in a model with greater uncertainty, opportunistic actions and punishment may occur in some circumstances. In any case, we would argue that the significance of powerful enforcement schemes may be considerable, even when they are seldom utilized (cf. nuclear deterrence);

the crossholding arrangement should be regarded as a base upon which relationships between coalition members can be developed.

The proposed arrangement is always at least as strong as that of a mechanism based on loss of reputation, i.e., loss of future benefits from future transactions. Our punishment scheme contains one more element, the loss of private benefits through expulsion. A parallel can be drawn to the exit and voice mechanisms analysed by Hirschman (1970); "exit" corresponds to the discontinuation of trade and "voice" to the active interference through expulsion. Of course, this characterization does not capture the full richness of the "voice"-mechanism as developed by Hirschman.

6 Implications and Concluding Remarks

Our interpretation of the structure of the financial keiretsu as a private enforcement mechanism is compatible with several previous rationales advanced in the literature, in particular with explanations that focus on transaction efficiency within the group. The suggested mechanism may also enforce agreements to defend individual members against takeovers by outsiders, as well as to provide risk-sharing; the financial keiretsu can police their own survival.²⁸ We view our contribution as providing an explicit mechanism to explain how relationships among coalition members are sustained over time.

The rationale offered here most closely resembles a view held in the non-economic literature where reciprocal holdings are interpreted as implicit long-term agreements and expressions of mutual trust, so-called relational contracting (Dore, 1983). The exchange of equity holdings is then only part of a broader business relationship between member firms involving, for example, the extension of loans or the provision of insur-

ance services; "shareholdings are the mere expression of their relationship, not the relationship itself" (Clark, 1979). However, as economists we are not satisfied with the assumption of collective will and inherent reliability. Rather, we view collaboration as an (ex ante) desirable outcome of relationships among self-interested parties, supported by a mechanism for credible commitment. Our interpretation provides a theoretical mechanism for the support of such long-term relations, where the causal relation goes from crossholdings to trust, and not vice versa. Paradoxically, the existence of an effective enforcement mechanism may have allowed the relationships between member firms to develop in many dimensions, making the control aspect virtually invisible.

The corporate groupings could be viewed as an example of the role of groups in Japanese society. Some researchers argue that group membership plays the same role in Japan as individual self-realization and private property rights do in the Western world (Hirschmeier & Yui, 1979). Our model could be read as a formalization of the implicit punishment structure supporting group socialization, and in particular the importance of peer pressure, here managers of other group members, in determining behavior.²⁹ However, rather than contrasting a self-centered against a group-centered view of the individual, we suggest a line of reasoning that is compatible with both: consensus can be achieved by self-interested individuals under implicit threats of expulsion.

The rationale put forward here may also provide a reasonable interpretation of the significance of shareholdings in Japan. Many observers have found it hard to reconcile the seemingly negligible role of the individual shareholder and the importance of managers in Japanese business, with the potential power of shareholders if they act in concert. Statements such as "Japanese companies belong to managers and not to shareholders"

(Clark, 1979) could be reinterpreted as implying that Japanese managers de facto are shareholders, through direct and indirect holdings by the firms they manage. Yet, the intricate arrangements of the financial keiretsu have allowed a separation of corporate and managerial control; the group only intervenes when there is deviation by individual members. The financial keiretsu have in fact become a crucial element in an extreme form of managerialism, where managers have virtual insurance against hostile takeovers and can choose their heirs from within their own organizations.

The interpretation of the financial keiretsu as a private enforcement mechanism has major implications for Japanese society. We have suggested that such a mechanism could reduce the problem of underinvestment in specific assets that is associated with contractual incompleteness; the feasible set of contracts is enlarged through the creation of a commitment mechanism. However, the mechanism could also be utilized to support entrenchment through a collective takeover defence. Entrenchment may or may not be associated with inefficiency depending on the ability of the keiretsu to mitigate agency costs through internal monitoring.

Even if the financial keiretsu arrangement is beneficial for group members, it may potentially be costly for outsiders and, on balance, for society as a whole. The extensive use of informal, private mechanisms hampers the evolution of case law, and thus of the formal legal system. Furthermore, the groups promote insider trading which is likely to have a negative impact on the functioning of capital markets; insider shareholders have considerable influence over corporate decisions in Japan, whereas outside shareholders are virtually powerless. However, the keiretsu arrangement could also be viewed as an interesting answer to the question of "who monitors the monitors", i.e., which institution or individual is ultimately responsible for monitoring the use of assets. Our rationale

suggests that mutual monitoring may be more successful, and less disruptive, than a form of monitoring relying on higher authority, which may induce a loss of incentives among subordinates.

Whether the financial keiretsu are beneficial to society as a whole is an open issue, but the groups have undoubtedly demonstrated significant survival properties in the Japanese context. Though organized differently, bank-centered corporate groupings can be found on the European continent. This raises the question of why similar arrangements have not emerged in the United States. There may be several explanations. First, even if US legislation does not explicitly prohibit crossholdings of shares, political interest groups and anti-trust authorities would most certainly have reacted to the emergence of financial groupings with extensive reciprocal ownership between members.³⁰ Moreover, the Japanese commercial banks played an active role in recreating the zaibatsu by, for example, purchasing shares on the market and reselling them to corporate and institutional investors. In the United States, banking regulation prevents commercial banks from strategic holdings of corporate stock, and insolvency law deters bank involvement in individual firms.

The relative importance of the functions performed by the financial keiretsu changes over time in response to the general economic situation and to the specific needs of individual corporations. When firms are very profitable and do not need external financing, the likelihood of financial distress diminishes, and so the need for corporate reorganizations. Similarly, rapidly growing firms expanding into new geographical markets are likely to diversify their trading relationships, thus weakening the role of the financial keiretsu in supporting bilateral trade. Indeed, there are signs of weakening of the keiretsu as Japanese firms become increasingly globalized.

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APPENDIX: A FORMAL MODEL OF THE CROSSHOLDING ARRANGEMENT

This appendix develops a formal model of the crossholding arrangement discussed in Section 4.1. The model relies on infinite interaction between agents. We know from the Folk Theorem that in such a context just about any equilibrium can be sustained provided that agents are sufficiently patient; thus there is a fundamental indeterminacy. The multiplicity of equilibria is true also for our model. However, in this appendix we generate necessary conditions for a particular collaborative equilibrium on which contracting parties agree ex ante. Furthermore, we demonstrate that this equilibrium dominates a pure reputation equilibrium.

Consider a set of $N + 1$ firms, indexed by $i = 1, \dots, N + 1$, and n agents, indexed by $j = 1, \dots, n$, where $n > N + 1$; so there are more potential managers than firms. Output is enhanced in all firms by effort by their managers. The manager either exerts effort (work) or shirks. Working costs c , while leisure comes free. From the exercise of managerial control the manager enjoys a noncontractible benefit equal to a fraction $\sigma > 0$ of output. For simplicity, contractible compensation is assumed negligible in comparison to the control benefit. In addition, no manager personally owns shares in any firm; only firms and perhaps small, passive investors do.

Agents' utility functions are linear in return and effort. Define μ_{ij} to be the proportion of shares of firm i held by firm j . The payoff to a manager in charge, when π indicates the profit from the firm's assets, equals

$$U(\pi, c) = \sigma \pi - c \quad \text{when effort is expended}$$

$$U(\pi, 0) = \sigma \pi \quad \text{when no effort is expended}$$

while for a 'passive' shareholder indexed by i , who enjoys no benefit from control but exerts no effort, the return on a stake μ_{ij} in the j th firm is $U(\pi, 0) = \mu_{ij} (1 - \sigma)\pi$. We assume that $\sigma\theta - c > 0$, so managers prefer to be in control when the firm is engaged in own production (where $\pi = \theta$) even if they incur effort costs. All agents discount future payoffs at the rate δ per period.

Consider the manager's incentives to provide effort in a one period transaction with another firm. There is ex post symmetric information, so that the effort choice is observable by the other shareholders. The timing of events and payoffs are as illustrated in the text (see Figure 1 and 2). Since each manager receives a benefit equal to a fraction σ of the surplus, but has to invest specific resources to a cost c to achieve efficient production, his incentives are poor if $\sigma(\alpha/2) - c < \sigma(\beta/2)$. Thus, under even milder restrictions than those listed in footnote 19, we have a classic Prisoner's Dilemma: both agents shirk regardless of what the other does, and they both earn a payoff of zero. Because this outcome is anticipated, both agents prefer to engage in own production, which yields a net positive return $\sigma\theta - c$. As a result, potential gains from transactions will be lost.

Consider now the crossholding arrangement. In the initial stage, each firm i exchanges own shares for minority stakes μ_{ij} , $j \neq i$, in the other N companies, to the point where self-control (the amount of voting rights in the firm controlled by its manager) is zero, i.e. $\mu_{ii} = 0$ for all i .³¹ For simplicity, let $\mu_{ij} = 1/N$ for all j different from i ; each firm gets the same minority share in the i th firm. This allocation of voting rights makes each manager vulnerable to a takeover by the other N agents. Specifically, this threat is complemented by certain behavioral rules. Following any deviation by an individual manager from collaborative

behavior, the rest of the coalition will oust him from his position in charge of the firm.³² Another implicit provision stipulates that if the coalition fails to dismiss a deviating manager, or alternatively removes a manager from control without just cause, the arrangement collapses. Following such a collapse, members are not bound anymore by an obligation to collaborate with each other. In what follows, we establish the conditions under which the threat of expulsion by the rest of the coalition can enforce collaboration in transactions among coalition members such that the punishment is credible ex post.

The manager will not find in his interest to act opportunistically if the one period net gain from shirking in transactions with other firms is less than the capitalized value of future control benefits. By collaborating, in the future the manager will earn:

$$\delta[\sigma(\theta + \eta(\alpha/2 - \theta)) - c] / (1 - \delta)$$

from his stake in the firm he manages where η denotes the probability of being matched in a particular period. If instead he deviates, she saves the cost of effort c , minus his share of lower profits. Thus it does not pay to deviate and be dismissed as long as

$$\delta\sigma(\theta + \eta(\alpha/2 - \theta)) - \delta c > (1 - \delta) c + (1 - \delta)\sigma(\beta - \alpha)/2$$

$$\Rightarrow \sigma > \sigma^* = \frac{c}{\delta(\theta + \eta(\alpha/2 - \theta)) - (1 - \delta)(\beta - \alpha)/2}$$

Thus the payoff to shirking is lower, the larger is the managerial control benefit σ . There are two reasons: directly because with a large rent on firm assets, the manager internalizes more the loss of joint venture profits; but more importantly, because a dismissal implies the loss

of higher future benefits. For punishment to be effective, it must not rely on a noncredible threat. In other words, following a deviation, it must be in the interest of a majority of shareholders to agree to dismiss the manager. Next we examine their incentive to do so.

The choice for each shareholder at the meeting of the i th firm is a vote of confidence or dismissal for its manager. Since the crossholding equilibrium relies on a collective vote, we need to rule out the possibility of deviations from majority sub-coalitions. We do so by verifying under what conditions a majority subcoalition does less well in a deviation than in the collaborative equilibrium. Note that this is more restrictive than the previous condition, since we do not require the deviating manager to be better off from deviating.

First, we establish whether a deviant manager can block her dismissal by bribing a majority of shareholders. We allow a deviating manager can negotiate with other shareholders, and side transfers might take place. When n^* cross-shareholders are necessary to enforce the transfer of control, a number of members $n \geq n^*$ must have the incentive to do so. By stipulation of the arrangement, failure to punish a deviation will lead to a dissolution of the coalition, leading to loss of benefits from trade. Consequently, for punishment to be the optimal choice of the majority, it must be that for the subcoalition the loss of future collaboration gains outweighs the gain from deviation (including possible side payments by the deviant manager).

The maximum bribe that a manager will be willing to pay to avoid removal is given by the gain from deviation, plus the private control benefit he stand to lose from dismissal, minus his share of loss of collaboration profits due to the collapse of the arrangement:

$$MB = \sigma(\beta - \alpha)/2 + c + \delta[\sigma\theta - c]/(1 - \delta) - \delta[\sigma\eta(\alpha/2 - \theta)]/(1 - \delta)$$

A blocking subcoalition must be sufficiently large to ensure that their pooled votes can form a majority at the shareholders' meeting; it must contain at least n^* members, where

$$n^*[1/N] \geq \frac{1}{2} \implies n^* = (N+1)/2$$

If this subcoalition blocks punishment, its members lose their share of the loss of future trading gains. Therefore, punishment will not be blocked as long as:

$$\sigma(\beta - \alpha)/2 + c + \frac{\delta[\sigma\theta - c]}{1 - \delta} - \frac{\delta\sigma\eta(\alpha/2 - \theta)}{1 - \delta} \leq \frac{\delta n^*\sigma\eta(\alpha/2 - \theta)}{1 - \delta}$$

which can be rewritten either as a constraint on the size of σ :

$$\sigma > \sigma^{**} = \frac{2c}{\delta(N+2)\eta(\alpha/2 - \theta) - \delta\theta - (1 - \delta)(\beta - \alpha)/2}$$

where σ^{**} is the threshold private benefit necessary to ensure that punishment is credible. The maximum value for the control rent is decreasing in N . The intuition is that the larger the control rent, the larger is the compensation to the majority subcoalition necessary to avoid expulsion.

A general result is that a minimum size of the private benefit of control is necessary to support collaboration. Furthermore, an increased coalition size N in general contributes to support the crossholding equilibrium, since it increases the number of agents necessary for a majority coalition and thus the total loss of future profits to a deviating subcoalition disrupting the arrangement.

We contrast now the effectiveness of the crossholding arrangement with an alternative punishment device, loss of reputation (for the general result, see Perotti, 1991). Consider a continuum of possible economies indexed by their discount factor δ , where $\delta \in [0,1]$. We show below that the minimum value of δ required to sustain a reputation equilibrium (denoted δ_{RE}) is higher than the corresponding minimum value necessary to sustain a collaboration equilibrium (denoted δ_{CO}). We have the following proposition.

Proposition: The crossholding mechanism dominates the public reputation mechanism, in the sense that it sustains efficient transacting in some economies where the threat of reputation loss fails.

Proof: The condition for the threat of reputation loss to be effective is that

$$\sigma(\beta - \alpha)/2 + c + \delta\theta/(1 - \delta) - \delta[\sigma\theta + \sigma\eta(\alpha/2 - \theta)]/(1 - \delta)$$

$$\implies \delta_{RE} > \frac{2c + \sigma(\beta - \alpha)}{2c + \sigma(\beta - \alpha) + 2\sigma\eta(\alpha/2 - \theta)}$$

From the earlier analysis we can derive the minimum discount rate such that crossholding arrangements can support collaboration

$$\implies \delta_{CO} > \frac{2c + \sigma(\beta - \alpha)}{\sigma(\beta - \alpha) + 2\sigma(\theta + \eta(\alpha/2 - \theta))}$$

Comparing the two expressions, we see that δ_{CO} is lower than δ_{RE} when $2\sigma[\theta + \eta(\alpha/2 - \theta)] - c > \sigma\eta(\alpha/2 - \theta)$; this is ensured by our assumption that the net benefit from control over an independent firm net of effort

cost, i.e., the control rent, is positive ($\sigma\theta > c$). If that were not true, noone would want to be manager.

Q.E.D.

In conclusion, the crossholding mechanism dominates the reputation mechanism, since it can support collaboration in a broader set of circumstances. Our interpretation is that noncontractual enforcement arrangement structured for indefinite interaction dominates a purely contractual mechanism based on voluntary renewal of trading links, because the commitment property of the former is stronger.

1. Obviously, a court will not enforce agreements which run against some body of law or which stipulate anticompetitive collusive behavior. See Reuter (1984) for a discussion of the Mafia as a private enforcement mechanism when agreements cannot be enforced by law.

2. Legal informality is in no way confined to Japan; any economic system combines informal private and public conflict resolution with formal enforcement based on contractual agreements between private parties, and enforced by public courts. In fact, private enforcement is the predominant form of conflict resolution.

3. The reasons for this unwillingness to litigate have been the subject of considerable debate. Observers seem to agree that there is an inherent bias against litigation in Japanese ethics, and suing parties suffer reputational losses. However, Japan's level of litigation, while lower, is not as conspicuous when compared to countries in Western Europe. Haley (1978), in his discussion of "the reluctant litigant", identifies a number of inefficiencies in the court system that systematically discourage litigation. Ramseyer (1986), on the other hand, attributes the phenomenon partially to the predictability of the Japanese courts, i.e., the absence of litigation is a sign of a well-functioning system. In addition, the government provides a number of informal mechanisms for dispute resolution, such as institutionalized mediation.

4. In 1949, more than 69 per cent of corporate shares listed on the Tokyo stock exchange were held by individuals. By 1984 this share had fallen to 27 per cent.

5. Nakatani (1984) states that, out of 859 companies on the first section of the Tokyo stock exchange in 1981, as many as 719 (84 per cent) can be considered as members of such a group. This number differs somewhat across sources depending on the criteria used for group classification. According to Nakatani, the six largest financial groupings - Mitsui, Mitsubishi, Sumitomo, Fuji, Dai-Ichi Kangyo and Sanwa - counted no less than 546 (76 per cent) of these firms. Among the 140 companies judged to be more or less independent, only 54 lacked known group connections. Among the independent firms were the large steel producer Shin Nippon Steel, Hitachi and a number of smaller firms with predominantly local connections. The companies belonging to financial keiretsu are on average larger than the independent counterparts and were overrepresented in heavy industry.

6. Cross-holdings of shares here refers to reciprocal ownership. The Japanese term, "kabushiki mochiai", denotes reciprocal holdings, but it has a wider meaning of mutual help, shared interdependence and stability (Gerlach, 1987).

7. Board members are predominantly internally recruited. On average, 90 per cent of the board members of a particular firm are employees (Ballon, 1978).

8. Membership in these clubs is often used as a criterion for the classification of group affiliation. This membership is not clearly defined; there are no dues or authorized lists of members.

9. Reliable statistics on internal group trade are not available. According to Japan's Fair Trade Commission, 20 per cent of all sales transactions (above 1 mn yen) and 12 per cent of purchases (above 1 mn yen) of manufacturing firms were to and from fellow keiretsu members, respectively (Flath, 1990). However, while indicative of a preference for intragroup transactions, these figures underestimate the significance of intragroup trade since they do not include trade with affiliates and subsidiaries of keiretsu members.

10. The main bank for firms listed on the first section of the Tokyo Stock Exchange with bank borrowings in 1980 was the number-one or number-two shareholder in 39 per cent of firms, and among the top five shareholders in 72 per cent of firms (Sheard, 1986).

11. A brief look at the trading statistics from the Tokyo stock exchange illustrates this phenomenon. In 1983, about 20 per cent of the corporate stocks were owned by banks, but these institutions accounted for less than 2 per cent of the total transactions volume. The corresponding figures for non-financial corporations were 25 and 7 per cent, respectively (Nomura Securities, 1985).

12. Trade credits contributed 18 per cent of gross financing (unweighted) of nonfinancial enterprises 1970-1985. The corresponding figures for the United States and West Germany were 8.4 and 2.2 per cent, respectively (Mayer, 1990).

13. Although this explanation suggests economic distortions, this is not necessarily true. For instance, when entry into new areas entails large initial sunk costs, this arrangement will provide member firms with a minimum customer base encouraging them to invest. If, in addition, each keiretsu has a similar role, the implication will be more rapid entry of several competitors, with ambiguous, but quite possibly favorable effects on competition.

14. Hodder (1987) bases his observations on case studies and more impressionistic data but reaches similar conclusions.

15. In principle, investors can diversify their holdings at least as well as corporations; therefore, risk reduction by management through corporate diversification is often believed to be self-serving.

16. Aoki (1988) suggests that the risk-sharing role of the Japanese groupings may have been less important after 1975.

17. Horiuchi et al. (1988) provide an empirical test of the risk-sharing hypothesis. Even though their study focuses on the relationship between the main bank and member firms and not the wider intragroup relations, their data put this rationale into question. In situations where firms change main bank affiliation, the bank-customer relationship is not significantly related to the risk that banks and companies face. Moreover, if groups were truly designed to share risk, member firms would be able to compensate for changes in operating profits by adjusting financial expenses. However, the correlation between financial expenses and operating profits of specific companies are not significantly related to the degree of dependence on the main bank.

18. In principle, there are multiple equilibria in such a game. We assume an initial stage where all agents agree on a set of behavioral rules, which support the collaboration equilibrium.

19. These non-verifiable benefits from control derive from the broad discretion exercised by managers who daily take allocative decisions. In Grossman and Hart (1986), such benefits accrue to the owner of the vertically integrated firm. In our economy, there may not be a unique owner, but there is only one manager; because of this separation of ownership and control, it is natural to postulate that the private benefit of control over the asset accrues to the managers (cf. Hart, 1988). The private benefits could also be thought of as an efficiency wage which is well in excess of compensation in alternative employment.

20. More precisely, the equilibrium is inefficient when the following conditions for a classic Prisoner's Dilemma are satisfied:

$$H1a) \quad \alpha - c > 2 \theta > \beta - c$$

(Collaboration is Pareto-superior to independent use of assets when both agents exert effort, and Pareto-dominated if neither does)

$$H1b) \quad \alpha/2 - c < \beta/2$$

(If the other agent works, it is optimal to shirk)

$$H1c) \quad \beta/2 - c < 0$$

(It does not pay to be the only one to work).

21. We focus on the underinvestment problem in bilateral transactions between two coalition members. The argument could be applied also to the mitigation of agency costs in own production when default is the outcome of a failure by management to exert proper effort or take the most efficient but more costly action.

22. This is the "common pool problem" where an individual creditor has incentives to settle with the debtor at the expense of the creditors as a collective (Jackson, 1988).

23. Moreover, such issues may have poor commitment properties; group firms may be viewed as favoring members of their own groups at the expense of outside investors.

24. The traditional static hostage model suffers from opportunism problems once the transaction is completed: how do we know that the hostages really will be turned over, and once they have been turned over what guarantees that the other party will stick to the agreement? In our analysis, this is resolved by relying on an infinite horizon of interaction.

25. If we assume that a firm wants to maximize the opportunity of being matched with other group members in the future and avoid transactions outside the group, the "one-setism" feature may, in fact, be generated endogenously in our model. Assume that a firm is less likely to transact with a competitor than with a firm from a different industry than its own. the group consists of a number of firms in different industries. If a new member in a industry

previously not represented in the group joins, the likelihood for the individual group member of inside transactions increases. However, if the new member comes from an industry already represented in the group, the likelihood of being matched will go down for the group member in that industry; there will now be two firms instead of one supplying other group members with the same products.

26. Aoki (1988) suggests that the Presidents' Clubs, among other things, settle conflicts between individual group members. This is in line with our rationale suggesting that the financial keiretsu mitigate conflicts.

27. The boards of individual keiretsu firms may not reflect the distribution of control suggested by the crossholding arrangement; as previously described they are dominated by managers from the firm. To the extent that these boards are responsible for hiring and firing top management, our rationale would imply that actual control is different from that implied by the nominal representation on the board of directors. We would argue that the threat of a concerted effort from a majority shareholder would be sufficient to enforce the coalitions's code of behavior.

28. It should be noted, however, that if takeover defence were the primary motive for the existence of the extensive crossholdings, the groups should be expected to be less stable than observed. If a rival offers the coalition all or a majority of their holdings in a particular firm, it is not clear why the coalition would not accept it. An offer to buy the entire portfolio of an individual coalition member has limited effects on the arrangement and thus should not be resisted by the rest of the coalition.

29. In recent work, Kandel & Lazear (1989) model the influence of peer pressure on the level of effort exerted by members of an organization. Kandel & Lazear also demonstrate how a discontinuous punishment scheme, such as the exclusion of members, under certain conditions may be as effective as an elaborate non-linear incentive scheme.

30. Roe (1990) provides a thorough analysis of the role of interest groups in the emergence of financial regulation and corporate capital structure in the United States (see also Jensen (1989)).

31. This assumption is reasonable, since the manager does not own any shares. In any event, it is not crucial, as long as the degree of self-control is sufficiently low.

32. Since managers do not own shares, substituting a manager who has deviated does not reduce the number of firms in the coalition.