

FINANCIAL DISTRESS AND THE EFFICIENCY OF THE JAPANESE MAIN BANK SYSTEM*

MASARU KONISHI**

Abstract

This paper develops a banking model to examine the conventional view that the main bank makes restructuring decisions efficiently since it holds significant blocks of both equities and loans to its client firm in financial distress. The paper shows that the efficiency of restructuring decisions depends upon the structure of the main bank's financial claims to the firm as well as the capital structure and the debt structure of the firm. It is also shown that seniority, renegotiability, and the maturity structure of the main bank's debt claim to the firm affect the efficiency.

Keywords: Main bank system; Financial distress; seniority; reegotiability; maturity

JEL classification: G21; G33

I. *Introduction*

One of the distinguishing features of the Japanese main bank system is the role the main bank plays when its client firm is in financial distress. When the firm is in financial difficulty, the main bank often takes over its management and chooses whether to rescue or liquidate the firm. (See Aoki et. al (1994) and Sheard (1994b)) Conventional wisdom argues that the main bank, delegated by the rest of the firm's stakeholders, makes restructuring (or bankruptcy) decisions efficiently since it holds both equities and loans to the firm in significant blocks. Few theories, however, have explored the economic efficiency of the main bank system from this perspective.

The purpose of this paper is to analyze the efficiency of the main bank's rescue operation when its client firm is in financial distress. The paper attempts to make a point that holding significant blocks of loans and equities to the firm is not sufficient for the main bank to achieve the efficient corporate restructuring. In the model, the main bank that holds both equities and loans chooses whether to rescue or liquidate the firm. In the benchmark analysis with the proportional liability provision, the structure of the main bank's financial claims as well as the

* I am grateful to seminar participants at Hitotsubashi University, Sophia University, The Finance Journal, Finance Forum and the 1997 Japan Society of Monetary Economics Meeting for helpful comments. I especially thank Eiji Ogawa, Takashi Misumi, Toshihiro Horiuchi and Shin-ichi Hirota for discussions and comments. Any remaining errors are mine.

** Correspondence: 2-1, Naka, Kunitachi, Tokyo, 186-8601, Japan, tel/fax 042-580-8469, or email cc00580@srv.cc.hit-u.ac.jp.

capital structure of the firm are shown to be relevant to the efficiency.

The benchmark model is extended in several ways to discuss issues related to the efficiency of corporate restructuring. First, the paper studies impacts of debt subordination by the main bank on the efficiency. It is known that the main bank often guarantees substantial portions of debt claims held by other creditors regardless of their seniority. It is shown that the efficiency of corporate restructuring depends on the structure of the main bank's financial claims and the amount of debt claims held by creditors other than the main bank. The paper also demonstrates that the main bank is more likely to supply an incremental loan to the troubled firm when it subordinates its debt claims to other creditors. The result is consistent with the conventional argument that the main bank is actively involved in restructuring a troubled firm because its debt claims are often subordinate to other creditors. Further, the paper studies an environment whether to subordinate its debt claim is endogenously determined in the course of negotiation between the main bank and another lender, the non-main bank. When the main bank strategically chooses *when* to subordinate its debt claim to the non-main bank's claim, it is shown that the debt subordination does not necessarily induce the main bank to be actively involved in the rescue operation, which is contrary to the conventional view.

Second, the paper explores impacts of a maturity structure of debt claims held by the main bank on the efficiency of corporate restructuring. I am particularly interested in the difference between incentives of long-term credit banks and those of city banks at the time they intervene in the management of troubled firms. It is shown that long-term credit banks, which have a greater share of long-term debt claims than city banks do, are less likely to rescue distressed firms. The paper also analyzes impacts of a maturity structure of troubled firms' debts on the efficiency of corporate restructuring. The current analysis indicates that the main bank is more likely to rescue its client when the proportion of long-term debt is sufficiently high. Further, the paper explores the effect of renegotiability of debt on the efficiency of corporate restructuring. It is shown that when the fraction of privately-placed debt is sufficiently large relative to that of publicly-traded debt, the main bank is more likely to rescue troubled firms since it can renegotiate the debt contracts with the private-debt holders (such as other banks and insurance companies) and obtain an extension of payment due from them.

There are a few papers related to the current analysis. Berlin et al. (1996) explore an environment where a bank has an incentive to collude with its client firm to expropriate the firm's non-equity stakeholders. They show that when the bank's equity claim is either sufficiently large or small, the firm is efficiently restructured. The current analysis is distinguished from theirs as I study an environment where both underinvestment and overinvestment problems can occur, whereas Berlin et al. (1996) examines only an overinvestment problem. Sheard (1994a) shows that the main bank has incentives to efficiently restructure troubled firms on behalf of other creditors. He argues that, to achieve the efficiency, the main bank bears a disproportionately large share of losses when its client enters financial distress. Aoki (1994) explores an environment where the main bank takes over the management of its client firm contingent on the financial state of the firm. He shows that it is efficient for the main bank not to intervene the management of its client when the financial state of the firm is good, but take over control of the firm and make bankruptcy decisions when it is in financial difficulty. Both Sheard (1994a) and Aoki (1994), however, does not analyze impacts of a financial structure of the main bank's claims to the distressed firm on the efficiency of restructuring decisions, which is the main subject of this paper.

This paper is also related to the literature on corporate bankruptcy decisions such as Bulow and Shoven (1978) and Gertner and Scharfstein (1991). The current analysis, differs from them in that they study corporate restructuring managed by equityholders or the management acting on behalf of equityholders, whereas this paper highlights the efficiency of restructuring managed by the main bank that holds both equities and loans.

The paper is organized as follows. Section II presents the model and examines the efficiency of corporate restructuring managed by the main bank under the proportional liability provision. Section III studies impacts of debt subordination by the main bank on the efficiency of corporate restructuring. Section 4 explores impacts of the maturity structure of distressed firm's debts and that of main bank's debt claims on the efficiency of corporate restructuring. The effects of negotiability of debt on the efficiency of restructuring is also studied in this section. Section 5 discusses tentative extensions of the current analysis and concludes the paper.

II. *The Benchmark Model*

I shall analyze managerial incentives of the main bank and its effects on the efficiency of corporate restructuring in the following two-period model.¹

Suppose that, in period 1, the face value of its first period debt, D_1 , exceeds the liquid assets of a firm, Y , and hence the firm is in financial distress.² Then, managerial control is transferred from the firm to its main bank, which, in turn, decides whether to rescue or liquidate the firm. If the main bank chooses to liquidate the firm, the firm's assets are given to debtholders in proportion to their loan shares. It is assumed that bankruptcy is equivalent to liquidation; i.e. reorganization by law is not considered in the current analysis. If it chooses to rescue the firm, the main bank makes an additional loan to the firm, which, in turn, makes investment. The investment opportunity requires I , and returns 0 with probability 1/2 and x with probability 1/2 for simplicity. Let us assume that the return from the project in the good state, x , is large relative to the face value of second period debts, D_2 ; i.e. $x > D_2$. Hence, in period 2, all the debt claims are repaid in full only if the investment turns out to be successful. It is also assumed that the investment outlay, I , exceeds the firm's liquid assets, Y , so that $I - Y$ needs to be financed in order to rescue the firm. The main bank makes an additional loan of $I - Y$.

It is assumed that the main bank has both equities and loans to the firm. The fact that banks are allowed to hold equity of their client firms is a distinguishing feature of the Japanese banking system compared with that of the U.S.³ In particular, let k be the main bank's equity share and s_i be the main bank's loan share in period i , where $i = 1, 2$.

¹ This analysis builds upon the model developed by Chen, Weston and Altman (1994) in which they examine the efficiency of corporate restructuring managed by equityholders.

² I assume that the firm has no fixed assets. An alternative interpretation of the current set up is that the fixed assets depreciate fully by the time the firm goes bankrupt, or that the fixed assets are firm-specific and, hence, the market value of the fixed assets is zero.

³ Banks in Japan are currently allowed to hold up to 5% of a firm's equity by virtue of Anti-Monopoly Law, whereas, in the U.S., banks are not allowed to hold equities on their own account. As for venture businesses, however, the 5% rule is scheduled to be repealed in fiscal 1998. (See *Nihon Keizai Shinbun*, January 31, 1998.)

Given k and s_1 , when the insolvent firm is rescued, the expected payoff to the risk neutral main bank, $RTB1$, is given by

$$RTB1 = k \left\{ \frac{1}{2} \max[(0 - D_2), 0] + \frac{1}{2} \max[(x - D_2), 0] \right\} + s_2 \left\{ \frac{1}{2} \min[0, D_2] + \frac{1}{2} \min[x, D_2] \right\} - (I - Y) \quad (1)$$

where $D_2 = D_1 + (I - Y)$.⁴ In equation (1), the expression in the first bracket multiplied by the main bank's equity share and the second bracket multiplied by the main bank's loan share are expected returns to the main bank as an equityholder and a debtholder respectively, whereas $I - Y$ is the amount of additional loan to the firm. Note that the main bank's loan share in period 2, s_2 , is given by

$$s_2 = \frac{1}{D_2} \{s_1 D_1 + (I - Y)\} \quad (2)$$

Substituting (2) into (1) gives

$$RTB1 = \frac{1}{2} k(x - D_2) + \frac{1}{2} \{s_1 D_1 + (I - Y)\} - (I - Y) \quad (3)$$

On the other hand, the return to the main bank when the firm is liquidated in period 1 is given by $s_1 Y$. Let $DIF1$ be the difference between the return to the main bank when the firm is rescued and that when it is liquidated. Therefore, the main bank chooses to rescue the firm if

$$DIF1 = RTB1 - s_1 Y > 0 \quad (4)$$

holds. Substituting (3) into (4) gives

$$k > \frac{1}{x - D_2} \{(2Y - D_1)s_1 + (I - Y)\} \quad (5)$$

Thus, if and only if k and s_1 satisfy (5), the main bank makes an additional loan and attempts to rescue the firm.

In the remainder of this paper, the efficiency of corporate restructuring is defined as follows:

Definition 1 *The corporate restructuring managed by the main bank is efficient if and only if it restructures the insolvent firm when the net present value of the restructuring project is non-negative. (i.e. $\frac{1}{2}x - I > 0$)*

Now, assume that $(2Y - D_1)s_1 + (I - Y) > 0$.⁵ Then, the right hand side of (5) is decreasing in x . Thus, the main bank with an equity share and a loan share satisfying the

⁴ That the bank is risk-neutral is a simplifying assumption. Assuming non-neutrality, however, should not change the following analysis in principle. See Hughes and Mester (1994) for bank managers' attitude toward risk. Their empirical results indicate that smaller banks are not risk-neutral.

⁵ If the inequality in the assumption is opposite, the main bank always chooses to rescue the troubled firm for any pair of s_1 and k ; namely, the efficient restructuring cannot be achieved. The following analysis highlights only interesting cases where the efficient restructuring can be achieved.

following condition efficiently rescues or liquidates the firm for any value of x :

$$k = \frac{1}{2I - D_2} \{(2Y - D_1)s_1 + (I - Y)\} \quad (6)$$

From (7), the following proposition is obtained:

Proposition 1 Let k^ and s_1^* be a pair of equity share and loan share that achieves the efficient corporate restructuring. Then, k^* is increasing in s_1^* if $2Y > D_1$, and decreasing if $2Y < D_1$.*

The first half of the proposition indicates that the equity share that assures of the efficient corporate restructuring is increasing in the loan share if the face value of debts in period 1 (alternatively, the debt ratio of the troubled firm) is sufficiently small. The result is quite intuitive. Recall that debtholders are conservative (i.e. risk averse) due to the concavity of their return streams from investments, whereas equityholders are aggressive (i.e. risk-taking) due to the convexity of their return streams.⁶ For the main bank to achieve the efficient corporate restructuring, its equity share and loan share must be balanced in such a way that the conservative pressure and the aggressive pressure are cancelled.

The second half of the proposition says that the equity share that assures of an efficient restructuring is decreasing in the loan share if the firm's debt in period 1 is sufficiently large. Though the result looks rather puzzling, the intuition is clear. When the main bank holds a large portion of debt claims, it has an incentive to take a risk in restructuring the firm since it cannot expect much gain from liquidation.

The current result is contrary to the conventional argument that a financially distressed firm is efficiently restructured by its main bank since it has equities and loans in significant blocks. The result suggests that the efficiency of corporate restructuring is not affected by the size of equity share or loan share, but affected by the debt-equity structure of the main bank's claim along with the capital structure of the troubled firm (i.e. the amount of debt issued by the firm).

Note that the current analysis is not intended to argue that the size of the bank's claims is irrelevant. For instance, if the size of a bank's claim is infinitesimally small, the bank would not be in the position to dictate the firm's bankruptcy decision in the initial place. Hence, there is an interconnections between the size of financial claims (and the structure of the main bank's claim as a result) and the efficiency of bankruptcy decisions. The focus of the current paper, however, is not who gets the control when a firm is in financial difficulty and how the structure of bank's claim is determined in the course of obtaining the control, but how the efficiency of bankruptcy decisions is affected by various factors when the control right as well as the structure of bank's claim is exogenously given. In other words, the objective of this paper is limited to ex post efficiency of bankruptcy decisions.

⁶ The conservative attitude of the debtholders, which is known as the existence of *debt overhang*, is pointed out by Myers (1977), while the aggressive attitude of equityholders is a point made by Jensen and Meckling (1976).

III. Debt Subordination by the Main Bank

1. Effects of Debt Subordination

The previous section dealt with the efficiency of corporate restructuring managed by the main bank when the proportional liability provision takes place. In practice, however, the main bank often subordinates its debt claims to the rest of creditors when its client is liquidated.

Suppose that the main bank subordinates its debt claims to the rest of debtholders when its client firm is liquidated. Then, if the main bank chooses to rescue the firm in period 1, its expected payoff remains the same as $RTB1$ in (3) since the realization of the investment in the bad state is 0. The payoff to the main bank when the firm is liquidated is given by

$$\max[Y - (1 - s_1)D_1, 0] \quad (7)$$

(7) indicates that the main bank obtains the residual value of the firm if the debt claims of the rest of creditors are sufficiently small. If the debt claims of the rest of creditors exceed the liquidation value of the firm, however, the main bank receives nothing.

First, suppose that $Y - (1 - s_1)D_1 < 0$. Let $DIF2$ be the difference between the payoff to the main bank when the firm is rescued and when it is liquidated in expected terms. Then, the main bank chooses to rescue the firm if

$$DIF2 = RTB1 - 0 > 0 \quad (8)$$

holds. ($RTB1$ is given by (1).) Substituting (3) into (8) gives

$$k > \frac{1}{x - D_2} \{-D_1 s_1 + (I - Y)\} \quad (9)$$

Hence, if and only if k and s_1 satisfy (9), the main bank makes an additional loan to rescue the insolvent firm.

Assume $-D_1 s_1 + (I - Y) > 0$. (For the justification of this assumption, see footnote 5.) Then, since the right hand side of (9) is decreasing in x , a pair of k and s_1 satisfying the following condition always ensures the efficient corporate restructuring:

$$k = \frac{1}{2I - D_2} \{-D_1 s_1 + (I - Y)\} \quad (10)$$

Thus, if (10) holds, the main bank makes an additional loan to the firm *if and only if* the net present value of rescue operation is positive.

Similarly, when $Y - (1 - s_1)D_1 > 0$ holds, the main bank chooses to rescue the firm if

$$DIF2 = RTB1 - \{Y - (1 - s_1)D_1\} > 0 \quad (11)$$

holds. Substituting (3) into (11) gives

$$k > \frac{1}{x - D_2} \{s_1 D_1 + (I - Y) + 2(Y - D_1)\} \quad (12)$$

Therefore, if and only if k and s_1 satisfy (12), the main bank rescues the insolvent firm.

Since the right hand side of (12) is decreasing in x , a pair of k and s_1 satisfying the following condition always ensures the efficient corporate restructuring by the main bank:

$$k = \frac{1}{2I - D_2} \{s_1 D_1 + (I - Y) + 2(Y - D_1)\} \quad (13)$$

The following propositions are in order:

*Proposition 2 Let k^{**} and s_1^{**} be a pair of equity share and loan share that achieves the efficient corporate restructuring. Then, k^{**} is increasing (decreasing, respectively) in s_1^{**} if $Y - (1 - s_1)D_1 > 0$ ($Y - (1 - s_1)D_1 < 0$, respectively) holds.*

As discussed in Section 2, the incentive of the main bank is affected by its debt claims in two ways. First, the main bank as a debtholder becomes risk averse due to the concavity of its return stream. Second, if the main bank subordinates its debt claims to the rest of debtholders and gives up a large portion of its debt claims when the firm is liquidated, it may take a risk in restructuring the firm. The proposition says that (a) when $Y - (1 - s_1)D_1 > 0$, the first effect dominates the second and, hence, a higher loan share must be paired with a higher equity share for the main bank to achieve the efficient corporate restructuring, and (b) when $Y - (1 - s_1)D_1 < 0$, the second effect dominates the first and, thus, a higher loan share must be paired with a lower equity share to achieve efficiency.

Proposition 3 If the main bank subordinates its debt claims to the rest of debtholders, the main bank is more likely to rescue its client firm in financial distress.

To prove the proposition, it is sufficient to show that $DIF1 < DIF2$ holds for any pair of k and s_1 , or, alternatively,

$$\max[Y - (1 - s_1)D_1, 0] < s_1 Y$$

Subtracting $\max[Y - (1 - s_1)D_1, 0]$ from $s_1 Y$ gives

$$s_1 Y - \max[Y - (1 - s_1)D_1, 0] = \min[(1 - s_1)(D_1 - Y), s_1 Y] > 0$$

Hence, the proposition is verified.

Recall that it is often said that the main bank has an incentive to supply incremental loans to rescue its client firm in financial difficulty all the more because its debt claims are often subordinate to the rest of creditors. The result obtained in the current analysis is supportive of the conventional argument. The result indicates that the main bank is more prone to fall into an overinvestment problem when their debt claims are subordinated than when the proportional liability provision is in effect.

Note that it is often argued that the corporate restructuring managed by the main bank is efficient since it has claims to the residual asset of the troubled firms when its debt claims are subordinate to those of other creditors. The current result, however, does not agree with that view. Proposition 2 indicates that the main bank does not necessarily rescue the distressed firm in the efficient way even if it subordinates its debt claims to other creditors.

2. A Strategic Use of Debt Subordination

In the previous subsection, it is assumed that the main bank subordinates its debt claims whenever the troubled firm is liquidated (i.e. both in period 1 and in period 2). An interesting question may be: Why does the main bank subordinate its debt claims? According to Sheard (1994a), "the convention that the main bank bears a disproportionately large share of bank losses is viewed as being part of contractual arrangement among banks designed to give the main bank adequate incentives to carry out monitoring on behalf of lending banks as a whole." (Sheard (1994a), p. 1) The contract is agreed upon by banks as the monitoring is reciprocal, which, in turn, economizes upon monitoring costs. If this is the case, the results obtained above (Proposition 2 and 3) remain relevant.

An alternative answer may be that the main bank subordinates its debt claims for strategic purposes. In particular, the main bank may subordinate its debt claim to affect the return stream of other creditors in order to pursue a restructuring/bankruptcy decisions of its own interest. If so, the previous results may be changed. To see this, suppose, alternatively, that there exist two banks; the main bank and the non-main bank. Both the main bank and the non-main bank holds equities and loans to the distressed firm. Let k_j be the equity share of bank j , and s_i^j be the bank j 's loan share in period i , where $j=M, N$ and $i=1, 2$. The superscript M refers to the main bank, and N refers to the non-main bank. It is assumed that $0 < k^M + k^N < 1$ and $s_j^M + s_j^N = 1$.

The main bank makes restructuring decisions with the agreement of the non-main bank. To reach an agreement, the main bank offers a contract $C = \{a_1, a_2\}$ to the non-main bank, where a_1 and a_2 are main bank's actions in period 1 and in period 2, respectively. The actions are chosen from the action set $A = \{\text{don't subordinate, subordinate}\}$; namely, the main bank's offer specifies when to subordinate its debt claim. The assumption that the non-main bank has veto power may be rather extreme, yet it is legitimate at least for two reasons. First, the consent of the non-main bank may be required by the main bank if some of the non-main bank's debt claim must be rescheduled for the main bank to rescue the distressed firm. Second, if the main bank is concerned about its future reputation, it may be plausible to assume that the non-main bank has veto power. Indeed, the main bank's reputation depends on whether it makes bankruptcy decision on behalf of non-main bank's interest, not on how often the main bank rescue its client firm.

As in the previous section, the return from the restructuring project is uncertain. The realization of the return in period 2, however, is H in the good state and L in the bad state, where $0 < L < 2I < H$. The inequalities suggests that the net present value of the restructuring project is positive (negative, respectively) in the good state (in the bad state, respectively). The assumption is introduced to make the debt subordination costly for the main bank in period 2. Also, for simplicity, assume $s_2^N D_2 < L$; i.e. the non-main bank's debt claim is always repaid in full in period 2.

Then, the following proposition can be shown:

Proposition 4 *If the proportion of the main bank's equity share to its loan share is sufficiently large, the main bank offers $C = \{\text{don't subordinate, subordinate}\}$ to the non-main bank. If the proportion of the main bank's equity share to its loan share is sufficiently small, however, the main bank offers $C = \{\text{subordinate, don't subordinate}\}$ to the non-main bank.*

The proof of the proposition is tedious, and, hence, omitted. I shall only present the sketch of the proof. See Konishi (1998) for the entire proof. The first half of the proposition is carried out by two steps. First, I show that the non-main bank always accepts the contract. Then, given this result, I show that the main bank offers the contract when k^M is sufficiently large relative to s_1^M . The second half of the proposition is proved as follows. First, I show that the non-main bank accepts the contract when k^N is sufficiently small relative to s_1^N . Then, I show that the main bank in fact offers the contract when k^M is sufficiently small relative to s_1^M .

The intuition is as follows. When the proportion of the main bank's equity share to its loan share is sufficiently large, the main bank prefers to rescue the distressed firm. If the non-main bank is opposed to rescue the firm, the main bank subordinates its debt claim to the non-main bank's claim in period 2 provided that the opportunity cost of foregoing the restructuring project exceeds the cost of subordinating its debt claim. The contract offered by the main bank reduces the expected cost of carrying out the rescue operation to the non-main bank, and, hence, the non-main bank agrees to rescue the distressed firm. When the proportion of the non-main bank's equity share to its loan share is also sufficiently large, the non-main bank also prefers to rescue the firm. In such a case, it is not necessary for the main bank to subordinate its debt claim to reach an agreement with the non-main bank.

When the proportion of the main bank's equity share to its loan share is sufficiently small, the main bank prefers to liquidate the distressed firm. If the non-main bank refuses to liquidate the firm, the main bank subordinates its debt claim to the non-main bank's claim in period 1 provided that the opportunity cost of undertaking the restructuring project exceeds the cost of subordinating its debt claim in period 1. The contract offered by the main bank reduces the cost of liquidation to the non-main bank, and, hence, the non-main bank agrees to liquidate the distressed firm. When the proportion of the non-main bank's equity share to its loan share is sufficiently small, the non-main bank prefers to liquidate the firm, and, hence, the main bank does not have to subordinate its debt claim.

The proposition indicates that there are two observationally equivalent cases where the main bank subordinates its debt claim to the non-main bank's claim for different purposes. In one case, the main bank subordinates its debt claim in order to pursue the rescue operation. The same result has been obtained in the previous subsection, and it is consistent with the conventional argument. In the other case, the main bank subordinates its debt claim in order to liquidate the troubled firm. The current result suggests that if the timing of debt subordination is determined endogenously in the course of negotiation between the main bank and the non-main bank, the main bank may subordinate its debt claim when it is reluctant to be involved in the rescue operation.

IV. *Debt Structure*

This section analyzes the impacts of a maturity structure of firm's debt and a maturity structure of main bank's debt claims on the efficiency of corporate restructuring. In particular, assume that there are two kinds of debts, a short-term debt and a long-term debt. The short-term debt matures in period 1 and the long-term debt matures in period 2. Therefore, if the main bank chooses to restructure the firm, it must provide funds that are sufficient for the firm not only to carry out the restructuring project, but also to meet the short-term debt

obligation.

Assume that the main bank has both short-term and long-term debt claims. A fraction α of the main bank's debt claims is the short-term, and the remaining fraction $1-\alpha$ is the long-term.

Let β be the proportion of short-term debt, where $0 < \alpha s_1 < \beta < 1$. Further, assume that the main bank renegotiates with the short-term debtholders and it obtains extension from a fraction γ of the debtholders. γ can be interpreted as a proportion of privately-placed debt which is held by banks other than the main bank, while $1-\gamma$ is a proportion of publicly-traded debt.⁷ Thus, if the main bank chooses to restructure the firm, it must supply

$$(I - Y) + (1 - \gamma)(\beta - \alpha s_1)D_1$$

to the firm as an incremental loan. The first term is the amount of funds necessary to carry out the restructuring project, whereas the second term is the amount of funds necessary for the firm to repay its short-term debt obligation net of short-term debt claims held by the main bank. In the following, an economy where the proportional liability provision is prevalent is analyzed. The predictions would be the same in principle in an economy where the main bank subordinates its debt claims.

In the current environment, the expected payoff to the main bank when the firm is restructured, $RTB3$, is given by

$$\begin{aligned} RTB3 = & k \left\{ \frac{1}{2} \max[(0 - D_2), 0] + \frac{1}{2} \max[(x - D_2), 0] \right\} \\ & + s'_2 \left\{ \frac{1}{2} \min[0, D_2] + \frac{1}{2} \min[x, D_2] \right\} \\ & - \{(I - Y) + (1 - \gamma)(\beta - \alpha s_1)D_1\} \end{aligned} \quad (14)$$

where s'_2 is the loan share of the main bank in period 2, and it is given by

$$s'_2 = \frac{(I - Y) + D_1 + (1 - \gamma)(1 - \alpha s_1)D_1}{D_2} \quad (15)$$

Substituting (17) into (16) gives

$$\begin{aligned} RTB3 = & \frac{1}{2} k(x - D_2) + \frac{1}{2} \{(I - Y) + D_1 + (\beta - \gamma)(1 - \alpha s_1)D_1\} \\ & - \{(I - Y) + (1 - \gamma)(\beta - \alpha s_1)D_1\} \end{aligned} \quad (16)$$

Let $DIF3$ be the difference between the return to the main bank when the firm is restructured and the return when it is liquidated. If the firm is liquidated in period 1, the long-term debt maturing in period 2 is accelerated to period 1, which is consistent with the article 17 of the Bankruptcy Law; i.e. the main bank obtain $s_1 Y$ when the firm is liquidated. Therefore, the main bank chooses to restructure the firm if and only if

$$DIF3 = RTB3 - s_1 Y > 0 \quad (17)$$

⁷ Privately-placed debt are said to be much easier to renegotiate and restructure than publicly-traded debt. See Bulow and Shoven (1978), Gertner and Scharfstein (1991) and Gilson, John and Lang (1990), Hoshi, Kashyap and Scharfstein (1990) and Preece and Mullineaux (1996) on the renegotiability of debt contracts.

Substituting (18) into (19) gives

$$k > \frac{1}{x - D_2} [(2Y - (1 - \gamma)\alpha D_1)s_1 + \{(1 - \gamma)\beta - 1\}D_1 + (I - Y)] \quad (18)$$

Since the right hand side of (20) is decreasing in x , the corporate restructuring managed by the main bank is efficient for any x if and only if the following condition is satisfied:

$$k = \frac{1}{2I - D_2} [(2Y - (1 - \gamma)\alpha D_1)s_1 + \{(1 - \gamma)\beta - 1\}D_1 + (I - Y)] \quad (19)$$

The following propositions are obtained from comparative static exercises of (?).

*Proposition 5 Let β^{***} and k^{***} be a proportion of short-term debt and a equity share that ensure the efficient corporate restructuring. Then, k^{***} is increasing in β^{***} .*

It says that a high (low, respectively) equity share of the main bank must be paired with a large (small, respectively) proportion of short-term debt to achieve the efficiency. The intuition is as follows. The greater the proportion of short-term debt is, the greater amount of loan the main bank must supply to the firm for the repayment of short-term debt, which, in turn, makes the main bank more conservative. Thus, to achieve efficiency, the main bank must have a high equity share to cancel the conservative pressure induced by the high proportion of short-term debt.

*Proposition 6 Let α^{***} be a proportion of short-term debt claims of the main bank that ensures the efficient corporate restructuring. Then, k^{***} is decreasing in α^{***} .*

It says that the equity share that ensures the efficiency of corporate restructuring is decreasing in the proportion of the main bank's short-term debt claim. The intuition is as follows. Other things being equal, a large α implies that the proportion of short-term debt claims held by creditors other than the main bank is small, and, hence, a small amount of incremental loan is required to meet the short-term debt obligation. In such case, additional funds necessary to carry out the rescue operation turns out to be small, which, in turn, makes the main bank more risk-taking. Therefore, the main bank must have a small equity share to counteract the bias towards risk.

Though the main bank is usually identified with the city bank which has the largest loan share, there are firms whose main bank is a long-term credit bank. In the current analysis, the main bank with a large α may be interpreted as a city bank, while the main bank with a small α may be interpreted as a long-term credit bank since long-term credit banks usually have greater proportion of long-term debt claims than city banks do. Proposition 6 indicates that the long-term credit bank is more conservative than the city bank, and, hence, the long-term credit bank must hold a greater equity share than the city bank does in order to achieve the efficiency.⁸

Note that city banks will be allowed to issue corporate bonds from October, 1999, and some banks are scheduled to issue straight bonds to raise funds. (Nihon Keizai Shinbun July

⁸ See Packer (1994) for details on the role of long-term credit banks as the main bank. He also presents some cases where the Industrial Bank of Japan, one of the three long-term credit banks in Japan, rescued financially distressed firms.

9, 1999) The current result predicts that other things being equal, banks with large outstanding corporate bonds will be reluctant to rescue financially distressed firms.

*Proposition 7 Let γ^{***} be a proportion of privately-placed short term debt claims held by banks other than the main bank that ensures the efficient corporate restructuring. Then, k^{***} is decreasing in γ^{***} .*

The intuition behind Proposition 7 is as follows. When the proportion of private-debt claims held by other creditors is large, a relatively small amount of incremental loan is required for the main bank to meet the short-term debt obligation, which, in turn, provides the main bank with an incentive to take a risk in the restructuring project. In order to counteract the bias towards risk, the main bank must hold less equity to achieve the efficient restructuring.

The proposition indicates that the main bank is likely to rescue the financially distressed firm when the proportion of private debt is sufficiently large. The privately-placed debt can be interpreted as debts issued to banks and other financial institutions such as insurance companies. The proposition says that, when a large fraction of short-term debt can be renegotiated and their maturity is extended, the main bank is more likely to rescue the troubled firm. On the other hand, when a large fraction of short-term debt is publicly-traded debt such as commercial papers, the main bank is less likely to rescue the troubled firm.⁹

Note that the proportion of the main bank's short-term debt claim, the proportion of short-term debt issued by the firm and the proportion of privately-placed debt claim are exogenously given in the current analysis, though there may be systematic relationships between those variables and the firm's risk. Those variables are treated as exogenous since this simplification help to explore the efficiency of bankruptcy decisions by the main bank. To endogenize those variable may be an interesting experiment. Yet, the current results concerning ex post efficiency of bankruptcy decisions would not be affected by the modification since all those variables would be determined before a firm falls in financial difficulty.¹⁰

V. Concluding Remarks

A model has been established to examine the efficiency of corporate restructuring managed by the main bank. The main point of the current analysis has been that the proportion of the main bank's equity share to its loan share affects the efficiency of corporate restructuring, along with other factors such as the capital structure of the firm, and seniority, maturity structure and renegotiability of debt claims, etc. The main results obtained in the current analysis are as follows:

(1) Holding equities and loans to the distressed firm in significant blocks does not necessarily ensures the efficient corporate restructuring. It is the structure of the main bank's financial claims to the firm as well as the firm's capital structure that affect the efficiency.

(2) The main bank is more likely to rescue its client when it subordinates its debt claims to other creditors than when the proportional liability provision is effective.

⁹ A similar result is obtained by Gertner and Scharfstein (1991).

¹⁰ See Flannery (1986) and Diamond (1991) for relationships between the maturity structure of the firm's debt and its risk. Also, see Diamond (1993) for relationships between the efficiency of the bank's bankruptcy decisions and the maturity structure of the bank's debt claims.

(3) If the timing of debt subordination is endogenously determined as a result of main bank's strategic consideration, the debt subordination does not necessarily induce the main bank to rescue the distressed firm.

(4) City banks, which have a greater share of short-term debt claims than long-term credit banks do, are more likely to rescue troubled firms than long-term credit banks.

(5) The main bank is more likely to rescue financially distressed firms when the proportion of long-term debt issued by the firm is large.

(6) The main bank is more likely to rescue financially distressed firms when the proportion of privately-placed short-term debt is large relative to that of publicly-traded short-term debt since the private debt contracts are easier to renegotiate.

There are several ways to extend the current analysis. First, it has not been studied why a particular bank becomes the main bank of the troubled firm in the first place. An interesting question would be: Does a bank which would efficiently restructure the financially distressed firm have incentives to become the main bank? Though the previous literature on the main bank system documents bank's incentives to become a main bank of a firm, it does not explain why a particular bank is willing to become the main bank of a firm while others are not.¹¹

Second, in the current analysis, it is assumed that bankruptcy is equivalent to liquidation; namely, reorganization by law is not analyzed. It would be interesting to study how the efficiency of restructuring by the main bank is affected by different legal bankruptcy procedures and why a particular bankruptcy procedure is chosen.¹²

Third, the model used in this paper can be extended to study effects of alternative financing sources by the distressed firm on the efficiency of corporate restructuring by the main bank. Though it has been assumed that the distressed firm goes bankrupt if it cannot get an additional loan from the main bank, the firm in fact has alternative financing sources to raise funds necessary to carry out the restructuring project. The main bank's incentive to rescue the firms should be different depending on by whom and how funds are supplied since the main bank's return stream is affected by those factors. More fully specified models needs to be developed to discuss these issues.

HITOTSUBASHI UNIVERSITY

REFERENCES

Aoki, M., (1994). The Contingent Governance of Teams: Analysis of Institutional Complementarity, *Int. Econ. Rev.*, 35, pp. 657-676.

¹¹ Sheard (1994b) argues that banks are willing to become a main bank since they would obtain "a disproportionately large share of various banking-related business, such as placement of corporate bank deposits, operation of settlement accounts, involvement in bond issues as trustee administrator (domestically) and co-underwriter (internationally), handling of foreign exchange transactions, and access to banking business of related firms". (See Sheard (1994b), p.209.)

¹² White (1889) and Gertner and Sharfstein (1991) study effects of Chapter 11 reorganization law on the investment decision by an insolvent firm. James (1996) empirically examines when banks take equity positions in financially distressed firms. He finds that banks are likely to take equity when a distressed firm has growth opportunity. Gertner and Scharfstein (1991) theoretically shows that a distressed firm always prefer issuing debt to equity.

- Aoki, M., Patrick, H., and Sheard, P., (1994). The Japanese Main Bank System: An Introductory Overview, in "The Japanese Main Bank System" (M. Aoki and H. Patrick Eds.), Oxford Univ. Press.
- Berlin, M., Kose, J., and Saunders, A., (1996). Bank Equity Stakes in Borrowing Firms and Financial Distress, *Rev. of Finan. Stud.*, 9, pp. 889-919.
- Bulow, J., and Shoven, J., (1978). The Bankruptcy Decision, *Bell J. Econ.*, 9, pp. 437-456.
- Chen, Y., Weston, J., and Altman, E., (1994). Financial Distress and Restructuring Models, *New York Univ. Salomon Center Working Paper Series*, S-94-34.
- Diamond, D. (1991). Debt Maturity Structure and liquidity Risk, *Quart. J. Econ.*, 106, pp. 710-737.
- Diamond, D. (1993). Seniority and Maturity of Debt Contract," *J. Finan. Econ.*, 33, pp. 341-368.
- Flannery, M. (1986). Asymmetric Information and Risky Debt Maturity Choice, *J. Finance*, 39, pp.19-37.
- Gertner, R., and Scharfstein, D., (1991). A Theory of Workouts and the Effects of Reorganization Law," *J. Finance*, 46, pp. 1189-1222.
- Gilson, S., John, K., and Lang, K., (1990). Troubled Debt Restructuring: An Empirical Study of Private Reorganization of Firms in Default, *J. Finan. Econ.*, 27, pp. 315-354.
- Hoshi, T., Kashyap, A., and Scharfstein, D., (1990). The Role of Banks in Reducing the Costs of Financial Distress, *J. Finan. Econ.*, 27, pp. 67-88.
- James, C., (1996). Bank equity Positions in Distressed Firms, in "Universal Banking", (A. Saunders and I. Walter Eds.,) Irwin.
- Jensen, M., and W. Meckling, (1976). Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure, *J. Finan. Econ.*, 5, pp. 305-360.
- Konishi, M., (1998). Financial Distress and the Efficiency of the Japanese Main Bank System, mimeo.
- Hughes, J., and Mester, L., (1994). Bank Managers' Objective, *Philadelphia Fed Working Papers series*, 94-8.
- Myers, S., (1977). Determinants of Corporate Borrowing, *J. Finan. Econ.*, 5, pp. 145-175.
- Packer, F., (1994). The Role of Long-Term Credit Banks within the Main Bank System, in "The Japanese Main Bank System" (M. Aoki and H. Patrick Eds.), Oxford Univ. Press.
- Sheard, P., (1994a). Reciprocal Delegated Monitoring in the Japanese Main Bank System," *J. Japanese Int. Econ.*, 8, pp. 1-21.
- Sheard, P., (1994b). Main Banks and the Governance of Financial Distress, in "The Japanese Main Bank System" (M. Aoki and H. Patrick Eds.), Oxford Univ. Press.
- Preece, D., and Mullineaux, D., (1996). Monitoring, Loan Renegotiability, and Firm Value: The Role of Lending Syndicates, *J. Banking Finance*, 20, pp. 577-593.
- White, M., (1989). The Corporate Bankruptcy Decision, *J. Econ. Perspectives*, 3, pp. 129-151.