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Lender's Risk Incentive and Debt Concession

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Abstract

This paper demonstrates that a lender's risk incentive may render it difficult to conduct efficient debt renegotiation. When a lending bank has a risk incentive, the bank is not likely to make a debt concession, even though such a concession could resolve inefficiencies caused by a borrower's risk incentive. If the lender refrains from renegotiation the debt, then the borrowing firm chooses a value-decreasing risky project. As a result, the cash flow that the lending bank collects becomes risky, and the wealth of the bank's shareholders increases. The lender's risk incentive thus accelerates the borrower's risk incentive.

JEL classification: G21, G31

Keywords: Bank Risk Incentive, Debt Concession,

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1. Introduction

Debt renegotiation is often desirable for a borrowing firm in financial distress because it resolves inefficiencies caused by suboptimal decisions made by the firm or its stakeholders. However, several studies have pointed out that ex-post debt renegotiation is difficult. For example, Giammarino (1989) and Heinkel and Zechner (1993) show that informational asymmetry between the borrowing firm and outside creditors is a hindrance to efficient debt restructuring. Gertner and Scharfstein (1991), James (1995), and Detragiache and Garella (1996) point out that debt renegotiation often can not be agreed upon due to conflicts among multiple creditors when the borrowing firm has a number of different creditors.

This paper provides an alternative explanation for the difficulty of debt renegotiation, i.e., the lender's risk incentive. Let us consider a typical risk incentive problem of a levered firm in financial distress, which borrows from only one bank. It is a well known problem of risk incentive that shareholders of the levered firm are likely to prefer a risky investment to a safe one, even though a risky project is less valuable than a safe one.[1] The risk incentive of the borrowing firm decreases the value of a bank loan as well. By forgiving debt, the risk incentive problem of the borrowing firm can be resolved, and then the borrowing firm undertakes a safer, value-increasing project. As a result, both the total value of the firm itself and the expected amount of money that the lending bank can collect increase.

From the viewpoint of the lending bank, while debt concession enhances the value of the loan to the firm, it may decrease the wealth of its shareholders. Along the same

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[1] For a discussion of a risk incentive problem, see Jensen and Meckling (1976), Gavish and Kalay (1983), Green (1984), and Green and Talmor (1986).

lines in the case of the borrowing firm, shareholders of the lending bank may prefer a risky collection of the loan to a stable collection, even though the risky collection is less valuable than the stable one. In particular, when the financial condition of the lending bank is unhealthy, shareholders of the bank have a risk incentive, as do the shareholders of the borrowing firm.[2] If the bank management pursues the shareholders' wealth at the cost of the creditors (e.g., the depositors), then debt concession does not occur. Thus, the model presented in this paper shows that the risk incentive at a lending bank renders efficient debt renegotiation impossible, even if neither informational asymmetry nor conflicts among creditors exist.

On the other hand, if the management of the lending bank takes actions that are not in the interest of the shareholders' wealth, then debt concession might decrease the equity value of the unhealthy lending bank. For example, the management may prefer a stable loan collection to a risky collection in order to avoid bankruptcy in which the management will lose its position. In such a case, the bank management has an incentive to forgive debt, after which the indebted firm undertakes a safer project and the bank can achieve stable collection of the loan. It is also possible that management of a main lending bank chooses to rescue the indebted firm in financial distress in order to maintain its good reputation. In such a situation, it seems reasonable to suppose that the

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[2] Saunders, Strock, and Travlos (1990) and Demsetz and Strahan (1997) empirically found a positive relationship between managerial shareholdings and bank risk-taking (market risk measure) in the U.S. Anderson and Fraser (2000) also reported that managerial shareholdings were positively related to both total risk and firm-specific risk in the late 1980s, when the U.S. banking industry was under unhealthy financial conditions. John, John, and Senbet (1991) and Goldberg and Harikumar (1991) theoretically argued the relationship between bank risk-taking incentives and the design of deposit insurance.

management of a lending bank will agree to debt concession with little concern for the shareholders' interests.

Recently, some Japanese non-financial firms and their main banks made large debt concession agreements. In response to the announcements of debt concession, the stock prices of the main banks decreased.[3] Since management is separated from ownership in major Japanese banks, one might conclude that the management of major Japanese banks does not always act to increase the wealth of shareholders. In addition, it is well-known that the financial condition of the Japanese banking industry has been unhealthy since the late 1990s. As argued above, the current model helps to explain why the stock price of a main lending bank declined in response to debt concession.

The rest of the paper is organized as follows. In Section 2, a simple model is provided in which bank debt concession resolves a typical risk incentive problem of a borrowing firm. Section 3 shows the mechanism by which risk incentive of a lending bank hinders debt concession. In Section 4, a numerical example of the model is given. In Section 5, the negative effect of debt concession on the stock price of a lending bank is discussed. Section 6 concludes the paper.

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[3] To the author's knowledge, there is no empirical study that shows a negative announcement effect on main lending banks in response to debt concession. Dahiya, Saunders and Srinivasan (2003) reported that a significant negative stock price reaction of a leading bank occurred when a large corporate borrower announced default.

2. A Model of a Borrower's Risk Incentive

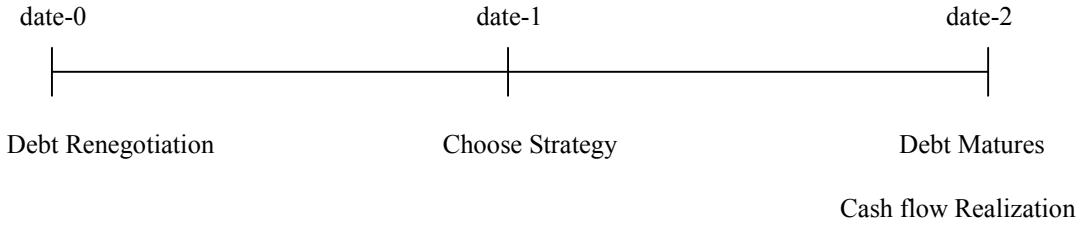

Figure 1: Sequence of Events

There are three dates in the model. At the initial date, date-0, a firm has bank debt with a face value of D. It is assumed that the firm borrows from only one bank. In the model, neither the holdout problem, as pointed out by Gertner and Scharfstein (1991), James (1995), and Detragiache and Garella (1996), nor the asymmetric information problem, as pointed out by Giammarino (1989) and Heinkel and Zechner (1993), exists. At date-1, the firm chooses between two mutually exclusive strategies: strategy S and strategy R. Strategy S generates a certain cash flow of Y at the terminal date, date-2. On the other hand, strategy R generates a stochastic cash flow, i.e., a high cash flow of X with probability p and a low cash flow of zero with probability 1-p at date-2. For the sake of simplicity, it is assumed that all agents are risk-neutral and the risk-free interest rate is zero.

The following parameters are assumed in this model.

$$0 < pX < Y < D < X . \tag{1}$$

Assumption (1) implies three things. First, $pX<Y$ means that strategy S generates a higher expected cash flow than does strategy R; that is, strategy S is more valuable than strategy R. Second, $Y<D$ means that the expected value of the firm is lower than the face value of the outstanding debt. In this sense, the firm is in financial distress. If the

firm chooses strategy S, then all of the cash flow generated at date-2 is paid to the bank. Third, $D<X$ means that shareholders of the borrowing firm can obtain a positive cash flow, $X-D$, if the firm succeeds with strategy R.

Under the current setting, the firm has a risk-taking incentive. Let $V_F(D, j)$ denote the value of the equity of the firm, which is affected by both the face value of the bank debt, D, and the strategy $j \in \{R, S\}$ chosen at date-1. Since $V_F(D, R)=p(X-D)>0$ and $V_F(D, S)=\max\{Y-D, 0\}=0$ hold under assumption (1), the firm chooses strategy R in order to maximize its shareholders' wealth. The decision of the firm is inefficient in the sense that strategy R is less valuable than strategy S.

Furthermore, the risk-taking incentive of the borrowing firm decreases the value of the loan of the lending bank. Let $V_L(D, j)$ denote the value of the loan with a face value of D, under the condition that strategy $j \in \{R, S\}$ is undertaken. It is easy to show that, according to assumption (1), $V_L(D, R)=pD$ and $V_L(D, S)=Y$. Since $pD<pX<Y$, $V_L(D, R)<V_L(D, S)$ holds true. Thus, the risk-taking incentive of the borrowing firm may not be desirable for the lending bank.

In order to resolve the borrower's risk incentive problem and to increase the value of the loan, the bank has an incentive to make a debt concession. Suppose that both the firm and the bank agree upon debt concession, and, subsequently, the debt face value decreases to D^* from D. In order to make a debt concession, the new face value of the debt, D^*, has to satisfy two requirements.

First, it is required that the act of debt concession induces the firm to undertake strategy S. In other words, the firm chooses strategy S under the new face value of D^*. Let $V_F(D^*, j)$ denote the value of the firm equity just after debt concession is agreed upon, which depends upon strategy $j \in \{R, S\}$ chosen at date-1. Since $V_F(D^*, S)=\max\{Y-D^*, 0\}$ and $V_F(D^*, R)=p(X-D^*)$, this requirement is given by

$$V_F(D^*, S) \geq V_F(D^*, R) \Leftrightarrow (Y - pX)/(1-p) \geq D^*. \quad (2)$$

Note that condition (2) implicitly requires that $D^* < Y$. If condition (2) is not satisfied, then the firm will undertake strategy R in order to pursue the shareholders' interests.

Second, it is required that debt concession never decreases the value of the bank loan. In this section, it is assumed that the bank does not make a debt concession, if such a concession would decrease the value of the loan. Given that the firm chooses strategy S, the value of the loan with a new face value, which is represented as $V_L(D^*, S)$, is $\min\{Y, D^*\} = D^*$. Then, the second requirement is given by

$$V_L(D^*, S) \geq V_L(D, R) \Leftrightarrow D^* \geq pD \quad . \tag{3}$$

Thus, based on (2) and (3), it follows that the risk incentive of the borrowing firm can be resolved through debt concession, provided the new face value of the bank debt, D^*, satisfies the following equation:

$$pD \leq D^* \leq \frac{Y - pX}{1 - p}. \tag{4}$$

Equation (4) requires that

$$pD \leq \frac{Y - pX}{1 - p}. \tag{5}$$

I thereby arrive at the following proposition.

Proposition 1. Suppose that both (1) and (5) are satisfied. Under the original debt contract with a face value of D, the borrowing firm has a risk incentive such that the risky strategy R is undertaken at date-1. This risk incentive problem can be eliminated through debt concession, after which the face value of the bank debt decreases to D^* from D. Under the new face value, D^*, which satisfies equation (4), the firm undertakes the more valuable and safer strategy S. Both the value of the borrower's equity and the value of the lender's loan increase in response to such debt concession.

Proposition 1 shows that ex-post debt renegotiation, which is referred to here as efficient debt concession, can resolve the borrower's suboptimal investment. It should be stressed that Proposition 1 is derived from the assumption that the lending bank acts to maximize the value of the loan, or equivalently, acts to maximize the total value of the bank itself. The next section examines whether or not efficient debt concession will be agreed upon when the bank manager acts in the interest of the current shareholders' wealth, rather than acting to maximize the value of the loan.

3. Lender's Risk Incentive and Debt Concession

For the sake of analytical simplicity, suppose that the lending bank has two kinds of assets at date-0; one of these assets is risk-free (e.g., Treasury bills or portfolios of risk-free loans) and the other type of asset is a risky loan to the borrowing firm, as discussed in the previous section. The value of the risk-free asset is represented by A. As mentioned above, the original face value of the risky loan is represented by D. The bank has deposits with promised payments of B, which matures at date-2. In this setting, the equity value of the bank, represented by $V_E(D)$, is affected only by the face value of the risky loan.

First, consider the case in which $A \geq B$ holds. In this case, all deposits can be met, regardless of the amount of the collection on the risky loan. Therefore, the equity value of the bank increases monotonically with an increase in the value of the risky loan. Since debt reduction increases the value of the loan, as shown in Proposition 1, the lending bank makes a debt concession. The borrower's risk incentive can be resolved, and the more valuable strategy S is undertaken.

Next, consider the case in which the bank has a risky liability at date 0, i.e., $A<B$ holds. In other words, under the current status of the assets, the bank cannot meet its

liability with certainty. In this case, the equity value of the lending bank does not always increase with an increase in the value of the loan. To better understand this point, suppose that the bank does forgive debt, as shown in Proposition 1, such that the value of the loan increases. Since the indebted firm chooses strategy S under the new face value of D^*, the bank will collect D^* with certainty. Then, the total cash flow of the bank is $A+D^*$, and its equity value, denoted by $V_E(D^*)$, is given by

$$V_E(D^*) = \max\{A + D^* - B, 0\}. \tag{6}$$

On the other hand, if the bank does not forgive the debt, then the borrowing firm chooses strategy R. Since the total cash flow of the bank is A with probability 1-p, and $A+D$ with probability p, the value of bank equity is given by

$$V_E(D) = p\max\{A + D - B, 0\}. \tag{7}$$

It should be noted that $V_E(D^*)$ is not always larger than $V_E(D)$. The bank manager, who is assumed to act in the interest of the current shareholders' wealth, will decide to reduce the principal of the loan only when $V_E(D^*) \geq V_E(D)$ is satisfied.[4] Otherwise (i.e., when $V_E(D^*) < V_E(D)$ holds), the bank manager does not forgive the debt, even though debt concession increases the value of the loan.

It follows from (6) and (7) that the value of the bank equity is always equal to zero when $D \leq B-A$ holds. Therefore, in the following analysis, I will examine the case in which $0 < B-A < D$ holds. The next proposition shows that under some circumstances, the lender's risk incentive renders efficient debt concession impossible.

Proposition 2. Suppose that $0 < B-A < D$ and

$$\frac{Y - pX}{1 - p} < pD + (1 - p)(B - A). \tag{8}$$

[4] It is assumed that debt concession is agreed upon when $V_E(D^*) = V_E(D)$ holds.

Then, the equity value of the lending bank decreases after efficient debt concession is agreed upon.

Proof of Proposition 2 **:** Under condition (8),

$$D^* < pD + (1-p)(B-A)$$

is satisfied for any D^* satisfying (4). When $D^* \leq B\text{-}A$, it follows from (6) that $V_E(D^*)=0$. Since $V_E(D)>0$ under the condition of $B\text{-}A<D$, $V_E(D^*)<V_E(D)$ holds in this case. On the other hand, when $D^*>B\text{-}A$,

$$V_E(D) - V_E(D^*) = p(D + A - B) - (D^* + A - B) > 0$$

holds under (8). Then, $V_E(D^*)<V_E(D)$ holds in this case, too.

Condition (8) is satisfied when either D or $B\text{-}A$ is large. It follows from (7) that the equity value of the bank under the original loan, $V_E(D)$, increases with an increase in the residual profit of the bank, $D\text{-}(B\text{-}A)$. Since $D\text{-}(B\text{-}A)$ is increasing with D, shareholders of the bank prefer the original debt contract to debt renegotiation, when the original principal of the loan, D, is large. On the other hand, it follows from (6) that the equity value of the bank under the new principal of the loan, $V_E(D^*)$, decreases with $B\text{-}A$. Then, when $B\text{-}A$ is large, the original debt contract will be more advantageous for the shareholders of the bank than efficient debt concession. Thus, under condition (8), the equity value of the bank decreases if the bank forgives the debt. As long as the bank manager acts to maximize the current shareholders' wealth, she will not agree to debt renegotiation.

As shown in the previous section, if there is no debt concession, then the borrowing firm is induced to undertake the risky strategy R, resulting in a riskier collection of the loan. When a bank prefers a risky cash flow to a stable one, then the bank can be said to have a risk incentive. Proposition 2 implies that when the lending bank has a risk

incentive, efficient debt concession may not be agreed upon, such that the borrowing firm undertakes a risky strategy. The lender's risk incentive induces the borrower to choose value-decreasing risky projects.

4. Numerical Example

The following numerical example illustrates Proposition 2. Suppose that p=0.5, Y=80, D=90, X=100, and B-A=50. It is a simple matter to check that $0<B-A<D$, and conditions (1), (5), and (8) are all satisfied.

First, identify the risk incentive of the borrowing firm. Under the original principal of the loan, D=90, the equity value of the firm is zero if the firm undertakes strategy S. On the other hand, the equity value is 0.5(100-90)=5 if the firm undertakes strategy R. Clearly, the firm undertakes strategy R to enhance the shareholders' wealth. The value of the original bank loan is 0.5×90=45, on the condition that strategy R is undertaken.

In order to avoid the borrower's risk incentive, the bank will make a debt concession. The new principal, D^*, has to satisfy (4). It is assumed that the bank makes the minimum debt concession, that is, $D^*=(Y-pX)/(1-p)=60$. Under this new face value of the bank debt, the equity value of the firm is 20, regardless of the strategy undertaken at date-1. Then, the firm has no incentive to choose a risky strategy. After the bank forgives the debt, the value of the loan is 60, which is larger than 45. In this case, debt concession increases the value of the bank loan.

As shown in Proposition 2, however, the bank does not forgive the debt, due to its own risk incentive. Note that the firm undertakes strategy R under the original bank loan of D=90, while it chooses strategy S under the reduced loan of D^*=60. Then, the equity value of the bank under D=90 is given by $V_E(D=90)=0.5(90-50)=20$, and that under D^*=60 is given by $V_E(D^*=60)=60-50=10$. Since $V_E(D=90)>V_E(D^*=60)$ holds, debt concession decreases the equity value of the lending bank. If the manager of the bank

acts in the interest of the shareholders' wealth, then the bank does not forgive the debt.

It should be pointed out that both the lending bank and the indebted firm go into default with a positive probability of 0.5 if debt concession is not agreed upon. No default occurs if they agree upon debt concession. If both managers of the bank and the firm want to avoid default, then they will agree upon efficient debt concession. However, this choice will in turn decrease the equity value of the lending bank.

Conversely, when condition (8) does not hold, efficient debt concession increases the equity value of the lending bank. Suppose that B-A=20 and other parameters remain unchanged, such that condition (8) is not satisfied. Since $V_E(D=90)=0.5(90-20)=35$ and $V_E(D^*=60)=60-20=40$, $V_E(D=90)<V_E(D^*=60)$ holds in this case.

5. Stock Price Decline of the Lending Bank in Response to Debt Concession

Thus far, it has been assumed that the lending bank acts in its shareholders' best interests. In such a situation, debt concession cannot be agreed upon if it decreases the equity value of the bank. In the real world, however, the stock price of the lending bank often falls just following an announcement of debt concession.

Table 1 represents three cases of agreements to forgive large bank debts; these cases involved Japanese non-financial firms and their main banks in 2002. Daiei is one of the largest chain stores in Japan, the operating performance of which underwent a decline in the 1990s. Both Daikyo and Towa Real Estate are real estate companies listed on the Tokyo Stock Exchange 1st Section; the operating performance of both of these companies also declined during the 1990s.

On February 26, 2002, the morning edition of the *Nihon Keizai Shimbum*, which is the most popular economic newspaper in Japan, reported that Daiei and its three main banks, UFJ, Sumitomo Mitsui, and Mizuho, agreed upon a debt concession of 170 billion Yen (approximately $1.5 billion). As shown in Table 1, the stock price of these

main banks dropped in response to the announcement. Comparing with the Bank Industry Index provided by the Tokyo Stock Exchange, the abnormal return of UFJ was −3.6%, that of Sumitomo Mitsui was -1.28%, and that of Mizuho was -2.62%. Comparing with TOPIX, which is the most commonly used stock price index of the Japanese stock markets, the abnormal return of UFJ was -4.88%, that of Sumitomo Mitsui was -2.55%, and that of Mizuho was -3.89%.

Similar to the case of Daiei, a main bank, UFJ, experienced a relatively larger stock price decline compared to both the Bank Industry Index and TOPIX, when the bank forgave the Daikyo and Towa Real Estate loans.

The question is why the lending bank agreed to the concession of the loan, which in turn decreased its stock price. Proposition 2 and the numerical example suggest that debt concession decreases the stock price of the lending bank under two crucial assumptions.

One of these assumptions is that the financial condition of the lending bank is unhealthy in the sense that it has a large risky liability (B-A) and a large bad loan (D). When the financial condition of the lending bank is unhealthy, the stock price of the bank may decline due to debt concession because condition (8) is likely to be satisfied for such an unhealthy bank. It is well known that the financial conditions of Japanese banks steadily worsened during the 1990s.[5]

The other crucial assumption is that management of the lending bank is not concerned with the shareholders' wealth. There are at lease two cases in which the management of the lending bank agrees upon debt concession that is not desirable for the shareholders' wealth.

Conceptually, if the managerial shareholding is very small, then the manager of the

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[5] For example, see Cargill (2000), Ueda (2000), and Hoshi and Kashyap (2001, Chapter 8). Several Japanese banks failed in the late 1990s.

bank would regard the value of its firm-specific human capital as more important than the shareholders' wealth. Such management may prefer a stable loan collection to a risky collection in order to avoid bankruptcy, in which the management would lose its position.[6] As discussed in Section 4, in the current setting, the bank manager can decrease the probability of default by providing debt concession.

Traditionally, managerial shareholdings have been very small in major Japanese banks. Isagawa and Yamashita (2003) examined a more comprehensive sample of large debt concessions agreed upon between Japanese firms and their main banks. They found that the managerial shareholding for Japanese main banks was about 0.015% on average. This value was negligibly small. The average managerial shareholding for indebted firms was about 30 times as large as that for the main lending banks at the time of debt forgiveness. In the case of the three indebted firms introduced above, managerial shareholding was 0.03% for Daiei, 0.14% for Daikyo, and 0.4% for Towa Real Estate. From the viewpoint of managerial shareholding, indebted firms might have a stronger risk-taking incentive than their main lending banks in the process of debt renegotiation.

Another possibility is that a bank having close ties to the borrowing firm may make it a top priority to rescue the firm in financial difficulty. Main banks in Japan are a good example. The main bank of a firm holds considerable shares of the firm, and sometimes places its employees (often executives) in the board of directors of the firm. It is quite possible that the main bank chooses to rescue such a group firm in financial distress, although the rescue is not desirable for the stock price of the bank.[7] Hoshi and Kashap

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[6] Gilson (1989) and Gilson and Vetsuypens (1993) empirically found that default was costly for corporate managers. Several theoretical studies regarding corporate finance, such as those of Grossman and Hart (1982) and Zwiebel (1996), have assumed that corporate managers incur deadweight costs in cases involving bankruptcy.

[7] Hoshi, Kashyap, and Scharfstein (1990) and Morck and Nakamura (1999) found that

(2001, pp. 198-199) point out that the main bank may rescue its group firms in financial distress in order to maintain its reputation of being a good main bank. In particular, when debt concession improves the firm's productivity as in the current setting, then the main bank has an economic rationale to agree upon debt concession.[8] Taking these facts into account, it seems reasonable to suppose that the management of Japanese main banks would agree to debt concession with little concern for the shareholders' interests.

6. Conclusion

This paper suggests the possibility that a lender's risk incentive hinders the efficient renegotiation of debt. When both a lending bank and a borrowing firm have a risk incentive, the bank prefers a risky loan collection to a stable collection. Although debt concession reduces the risk incentive of the borrowing firm, the bank does not forgive the loan because it aims to enhance its shareholders' wealth. As a result, the borrowing firm chooses a value-decreasing risky project, such that the bank can collect a risky loan. The lender's risk incentive induces the borrower to also have a risk incentive.

This paper also demonstrates the possibility that the stock price of the lending bank will fall in response to debt concession. For example, when the financial condition of the lending bank is sufficiently poor that the management of the bank fears default, the bank makes a debt concession. In such situations, efficient debt concession increases the

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Japanese main banks rescue their group firms in financial distress.

[8] In 2001, the Japanese Bankers Association provided a guideline for out-of-court workouts, which says that the lending bank provides debt forgiveness in order to help in the restructuring of the borrowing firms and to increase the collection of loans made to the firms.

value of the borrowing firm, the value of the loan, and the total value of the lending bank, but decreases the equity value of the lending bank.

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Date	Concession Amount (Billion Yen)	Borrower	Main Banks	Bank Stock Return (%)	Industry Index (%)	Industry Adjusted Return (%)	TOPIX (%)	Market Adjusted Return (%)
2/26/2002	170	Daiei	UFJ Sumitomo Mitsui Mizuho	▲ 5.21 ▲ 2.88 ▲ 4.22	▲ 1.60	▲ 3.61 ▲ 1.28 ▲ 2.62	▲ 0.33	▲ 4.88 ▲ 2.55 ▲ 3.89
5/14/2002	410	Daikyo	UFJ	▲ 3.48	▲ 0.96	▲ 2.52	▲ 0.27	▲ 3.21
11/8/2002	200	Towa Real Estate	UFJ	▲ 8.72	▲ 2.28	▲ 6.44	▲ 2.05	▲ 6.67

Table 1: Recent Debt Concession and Bank Stock Price Reaction in Japan.