Systemic Financial Distress and Auction-Based Bankruptcy Reorganization

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Abstract

Most bankruptcy procedures attempt to reorganize a financially-distressed firm’s debts to a serviceable level through negotiations overseen by courts. Markets are an alternative to such negotiations. This paper develops such a market-based approach that is appropriate if claimants are severely cash-constrained and there is merit in having existing owners-managers remain in control.

The scheme arranges creditors in a queue to be serviced in sequence from the firm’s operating cash flows. Creditors bid for their position in this queue, and those accepting a greater proportionate reduction in the face value of their claims are placed ahead of the others. A pre-existing hierarchy of claims is honored by having claimants bid for their positions within the relevant segment of the queue. No one in the queue (including owners who are last) is paid anything until the (reduced) debts of the first in line are fully discharged using the firm’s operating cash surpluses. The queue then moves up and the next claimant in line is serviced.

The paper shows that, in equilibrium, the aggregate debts of the firm are reduced to a serviceable level and provides the owner-manager with a positive expected residual return. The owner-manager therefore has an incentive to operate the firm efficiently. We discuss the efficiency properties of this scheme and its appropriateness to situations of systemic financial distress, including the East Asian crisis.
1. Introduction

A basic goal of a bankruptcy process is the efficient deployment of the firm’s assets, which could mean reorganizing the liabilities of a financially-distressed firm that is deemed to be viable or liquidating it in an orderly manner if it is not. Another basic goal is to protect the rights of creditors, which is necessary for capital markets to function effectively. These goals may be in conflict, though, as when creditors try to “grab” assets or garner proceeds disproportionately or out of turn, which can improve their payment but, much like a run on a bank, may also force the liquidation of an economically viable firm. Bankruptcy procedures differ across countries in many regards, but they all generally balance preventing creditors from engaging in this type of behavior and preventing managers and owners from extending the life of a nonviable firm.

A country’s bankruptcy procedure should be designed to deal with the normal mortality of firms. Such a procedure may be an inadequate or even misguided response to a systemic financial crisis, though. This is because the scale of distress in a systemic crisis may simultaneously constrain feasible responses and force attention to economy-wide considerations. A systemic crisis can also point to a different underlying explanation for a firm’s distress, so that a different response is needed. This paper proposes and analyzes a scheme for the resolution of corporate financial distress in a systemic crisis. The scheme is especially suited to a crisis like the 1997 Asian Crisis, although its application may be appropriate more widely.

This introduction continues with a description of the 1997 Asian Crisis and its aftermath, both to identify the specific issues with which a bankruptcy procedure must contend and to argue the need for a scheme different from those that have been used in practice or proposed in the literature. Our scheme is described and analyzed in Section 2. Briefly, it directly deals with the widespread corporate debt overhang problem by having a firm’s creditors bid in an auction for forgiveness of debt. To overcome the standard problem of creditors free-riding on the forgiveness of other creditors, we propose by creating a new debt structure in which creditors that forgive more become more senior and receive earlier repayment of their (lower) claims. Section 3 extends the analysis to allow for an initial seniority structure of the debt, creditors with heterogeneous beliefs about the value of the firm, and the government as a creditor. Concluding remarks and issues for implementation appear in section 4.

1.1 East Asia’s Systemic & Lingering Problems

Several issues about the 1997 Asian Crisis have significant implications for any appropriate response. First is the extent to which corporations in the affected countries cannot service their existing debt levels. Firms, even non-exporters, tended to denominate their borrowings in foreign currency.1 As a result, firms that already had high debt levels before 1997, became even more highly indebted when local currencies depreciated during the crisis.2,3 This problem was exacerbated when loans that were rolled over during the crisis faced interest rates that had risen sharply.4 In 1999, interest payments exceeded operational cash flows for more than one-quarter of firms listed on the stock exchange in Korea, Malaysia, and Thailand, and for almost two-thirds of Indonesian firms (see Claessens, Djankov, and Klingebiel, 1999). The debt to equity ratio varies across sectors and the severity of the problem was greater for unlisted firms that relied more on borrowings than equity. Table 1 portrays the situation immediately pre- and post-crisis.5

The second issue is that government is now the major creditor, albeit an indirect one. When the banking systems failed as a result of firms’ non-performing loans, governments responded by guaranteeing deposits. As the bad loans greatly exceeded the equity in the banks, governments needed to re-capitalized the banks. Their fiscal situation made this difficult, though. For example, Indonesia’s banking deposits were at about 45% of GDP. Guaranteeing those deposits doubled the government’s debt to almost 100% of its GDP. With tax revenues in the range of 20% of GDP, servicing these debts
even at non-crisis levels of interest rates would be difficult. So governments sought to defer the explicit recognition of losses and the need to fully re-capitalise the banks (by issuing non-tradable bonds with low interest rates in the banks).

The third issue is that, while the general response of the countries was to intervene quickly in the banking system, to pass new bankruptcy laws or amend existing ones, and to improve the ability of courts to function, these actions have had limited impact. Few bankruptcy claims have been filed (e.g., only 183 bankruptcy petitions were filed in Indonesia from August 1998 to August 2000) and little progress has been made on renegotiations. Government creditors cannot negotiate the debts without being accused, fairly or unfairly, of corruption and favoritism. This could be a reason that the situation drags on.

The fourth issue is that, while governments have been slow to act, firms have been adjusting to the new economic circumstances, including altering their product mix as changes in exchange rates have affected relative prices. While total factor productivity was declining in the years before the crisis, making East Asia’s growth less miraculous than was earlier believed, firms’ managers are generally competent and, for the most part, have posted positive operating cash flows (Xu, 2000). This points to the benefits of not blaming managers for the crisis and dismissing them; instead, they should continue because of their valuable firm-specific capital and because there are insufficient management teams to step in when the distress is economy-wide. Managers have tended to perform well, but they have also sought to preserve their cash flows, in part by suspending servicing their debts. Despite its adverse effect on the ability of firms to gain new funding, there are several reasons for this suspension: 1) legal systems are slow and have not acted in predictable ways against debtors, so debtors are inclined not to service their debts and not to cooperate if proceedings begin; 2) restructuring often entails a dilution in ownership through a swapping of debt for equity, but that is unattractive when managers and owners are as closely linked as in East Asia corporations (see Claessens, Djankov and Lang, 2000); and 3) firms simply have fewer worries about needing new funding if they can suspend servicing their current debts.

East Asian economies and the financial situation of their corporations experienced some recovery from 1998-2000. The corporate debt overhang problem is still serious, though, and even in those countries where the debt-equity ratio has declined and cash flows are positive, average profits are too slim to service the debt. Governments are restructuring the banks and while banks’ non-performing loans are falling, this is mostly because the claims are being transferred to other entities (e.g., asset management companies), not because the claims on the heavily indebted firms are being reduced. As a result, corporate indebtedness remains high. In Thailand, for example, aggregate corporate debt still hovers around 150% of GDP, down from 170% during the peak of the crisis (the result of economic growth, not debt reduction). The debt to equity ratio has come down from 4 to 3 in Thailand (lower than during the worst of the crisis, but higher than pre-crisis levels); but has actually risen in the Philippines and Malaysia. This is shown in Figures 1 and 2.

The continued debt overhang problem is worrisome. While firms continue to operate and adapt their operations, the status quo erodes the owner-managers’ incentives to operate the firm efficiently since any increase in firm value would accrue entirely to the creditors (even if the debts are not currently being serviced). Put differently, the owners’ call options are now far “out of the money” because the exercise price far exceeds the asset value of the firm. This creates an incentive to divert the firm’s assets away from the creditors’ grasp, and with a close connection between the firms’ managers and their controlling owners (who may not own the majority of the firm’s equity), and a poorly functioning court system, this is a very real risk.

1.2 The Need for a Different Scheme

What is needed is a way for the debts to be reduced to sustainable levels without disrupting
existing management, which is restructuring operations in response to the changed markets, and for this to be accomplished with minimal dilution of ownership. Any approach must recognize the limited ability of courts to handle bankruptcy proceedings on an economy-wide scale and needs to acknowledge the special circumstances of the government as a major creditor.

The 1978 U.S. Bankruptcy Code allows firms to be either liquidated under Chapter 7 or reorganized under Chapter 11. Neither seems appropriate for the Asian crisis situation. Criticisms of Chapter 7 are that (1) viable firms may be needlessly dismantled, and (2) sales proceeds would be meager when the most likely buyers of industry-specific assets are buffeted by the same adverse economic developments as the bankrupt firm (Shleifer and Vishny, 1992, and Pulvino, 1998). Chapter 11 is a court-supervised negotiation among current managers, equityholders, and creditors, with the outcome being an agreement on a different payment stream than what was originally contracted. The new agreement can include a postponement of interest payments, a reduction in the principal, or a swapping of debt for equity. While such re-contracting with creditors does not require courts to be involved, filing for bankruptcy limits the ability of dissenting minority creditors to block a reorganization and allows the debtor to halt payments on some or all of its debts (see LoPucki and Whitford, 1993). The U.S. experience with Chapter 11, that proceedings take about two years on average and typically involve a significant role of the courts, virtually eliminates it from consideration in a systemic setting with limited court resources. Stiglitz (2000) offers a "super" version of Chapter 11, but it is largely motivated by a need to continue operations and maintain employment. It is clear that firms are doing so, though, and the problem is debt overhang. Market-based alternatives, because they make limited demands on the court and can be structured to minimize the politicization of the restructuring, may be an attractive alternative to court proceedings.

Such market-based alternatives to bankruptcy through courts have been proposed before, although not specifically for the East Asian crisis. Bebchuk (1988, 1999), using Black and Scholes’ original insight that equity is a call option on the firm’s assets with an exercise price equal to the debt that is owed, proposed working up the hierarchy of claims. Starting with the most junior claimant (namely, equity), each claimant class is given a choice of either paying off all the more senior claimants in full or having its own claims extinguished. Whichever class pays off all the more senior claimants then becomes the firm’s new owner. Bebchuk’s proposal respects the absolute priority of the claims and results in an all-equity firm.8

Bebchuk’s proposal allows only existing claimants (shareholders and creditors) to bid. Outsiders may run the firm better, thereby raising its value; so Aghion, Hart and Moore (1992, hereafter AHM) proposed allowing outsiders to both bid and to specify different ways the existing claims would be paid. For example, creditors may propose restructuring the existing debt, while an outside bidder (e.g. a firm in a similar business) may offer to merge and replace debt with equity in the merged entity. Since different classes of claimants would value the bids differently (e.g. senior claimants would tend to prefer offers with a low variance to the returns), AHM propose “homogenizing” the claimants (possibly through Bebchuk’s scheme) before the vote on the various offers.

While AHM’s proposal is more suitable when outsiders could run the firm better, it requires bidders to pay in cash to homogenize bids prior to the vote. This procedure could work in isolated bankruptcies but not in systemic or sector-wide bankruptcies, because potential bidders are often from the same industry and likely face the same predicament. Hotchkiss and Mooradian’s (1999) auction between outside buyer and a coalition of incumbent management and creditors also involves cash payments (as well as inefficiencies when insiders “overbid” given their toehold, which can deter some entry of outsiders).

So the existing proposals in the literature, ingenious though they are, are unsuited to the East Asian circumstances. Credit markets work poorly especially now: domestic banks are largely bankrupt (governments are restructuring them) and access to foreign credit has been disrupted. With potential domestic bidders cash constrained, large-scale sales to foreigners could generate a backlash of public
sentiment, especially in countries with recent and unpleasant colonial experiences. Even if these problems were surmountable, outsiders (whether domestic or foreign) face an acute information asymmetry problem: firms have been remarkably coy about divulging their finances to their own creditors, let alone to unrelated parties even if they were potential bidders. Any proposal relying on outside bidders (as in the AHM proposal) or having junior claimants raise additional cash (as in the Bebchuk proposal) is unlikely to be suitable. A workable proposal must also recognize that existing owners are best placed to operate the firm, and the trick is to overcome the free-riding incentive that diverse creditors face and to get them to reduce their aggregate claims.

2. The ACCORD Scheme: ”Auctions Speak Louder than Words”

This paper develops a non-cash auction based scheme called ACCORD (for Auction based Creditor Ordering by Reducing Debts) in which creditors bid the reduction in the claims they are willing to accept. The ACCORD discourages the standard holdout problem of a creditor free riding on the forgiveness of other creditors by arranging creditors in a queue, with those offering the greatest proportionate reduction placed ahead of the others in the queue, and then having creditors serviced sequentially from the operating cash flows of the firm. Unlike conventional debt re-contracting (e.g. under Chapter 11) where all creditors receive periodic payments (of interest and/or principal), under ACCORD only the creditor at the head of the queue is paid. When this creditor’s (reduced) debts are fully discharged, the queue moves up and the creditor who is next in line reaches the head of the queue and is paid, while the others have to wait their turn.

The ACCORD requires creditors to choose between accepting a smaller fraction of his (original) debt but being paid sooner (and therefore with a higher probability of being paid) against waiting longer for a greater payment. A creditor who offers no reduction (or does not bid at all) is placed at the back of the queue, but ahead of the owners (equity-holders) who obtain any residual after all the (reduced) debts are discharged. The firm continues to operate under the existing owner-manager’s control.

Under ACCORD, all creditors will remain creditors and the owners will not have their holdings ”diluted,” but the aggregate level of debt will be lowered. Those that forgive proportionately more have their (reduced) debts fully discharged before those who forgive less. Creditors who believe the firm to be worth little would be willing to forgive a larger proportion of their claim to be sure of obtaining at least something before the funds run out. Conversely, creditors who think that the firm’s difficulties are only temporary would forgive little, and wait (further behind in line) for their turn to receive payments. The original equity-holders (i.e. the most junior claimants) do not bid and continue to own and operate the firm, obtaining any residual that may be left. We now examine the ACCORD scheme in several settings, focusing on its competitive effect on the creditors and the resulting level of forgiveness.

2.1. Example 1 with Endogenous Owner-Manager’s Effort Decision

Our first example both illustrates ACCORD’s competitive effects on creditor forgiveness and endogenizes the owner-manager’s effort decision. We also compare ACCORD to the status quo (i.e. no forgiveness), and to two basic versions of more traditional bankruptcy reorganization schemes, one in which creditors offer forgiveness but there are no changes in the seniority structure and the other in which the creditors swap their debt for equity in the firm. In the example, the financial distress is sufficient that the status quo offers the owner-managers little reason to exert effort, resulting in a low expected value of the firm. So, even though the creditors are owed a large sum and they receive the
entire value of the firm, that value is low. The second alternative, which resembles Chapter 11, can generate forgiveness, but each creditor has an incentive to free ride on the forgiveness of the other (which courts try to prevent, but inexperienced or ineffective courts do not). The third alternative of swapping debt for equity eliminates the debt but reduces the original owner-manager’s incentive to exert the effort necessary for the firm value to be high. In the example, the ACCORD scheme generates at least as much and perhaps more debt reduction than the first alternative. Despite this greater forgiveness, the expected payment to creditors can be greater because owner-managers have more incentive to increase the value of the firm. The ACCORD also outperforms the debt-for-equity swap. Since the owner-manager in our example realizes the same value in under all four alternatives (i.e. the status quo, Chapter 11, debt-for-equity swap, and the ACCORD), the ACCORD scheme weakly Pareto dominates the other schemes.

We assume a firm with two creditors that are equally senior and holding equal claims. The value of the firm is \( H \) with probability \( p \) and \( L \) otherwise, with \( H > L > 0 \). The probability \( p \) is selected by the owner-manager at a personal cost of \( \Delta \cdot p \), where \( \Delta \) is her disutility per unit of probability. Creditors 1 and 2 offer new debt levels \( d_1 \) and \( d_2 \), respectively. After \( d_1 \) and \( d_2 \) are selected, the owner-manager solves the following problem:

\[
\max_{0 \leq p \leq 1} \left( \max\{0, L - d_1 - d_2\} \cdot \{1 - p\} + \max\{0, H - d_1 - d_2\} \cdot p - \Delta \cdot p \right)
\]

The first two terms are the expected return to the owner-manager, given a probability \( p \) and limited liability of the owner. The third term is the cost to the owner-manager of the probability choice. Assume that \( H - \Delta \geq L \), so that the efficient outcome has the owner-manager select \( p = 1 \). The optimal solution for the owner-manager is to select \( p = 1 \) if \( H - \Delta \geq d_1 + d_2 \); otherwise \( p = 0 \).

We now consider our three alternatives, starting with the status quo. If the creditors together are owed more than \( H - \Delta \) and if no forgiveness occurs, the owner-manager will select \( p = 0 \). The resulting payoffs are zero for the owner-manager and \( L/2 \) for each creditor.

Next consider the ACCORD scheme. The following proposition reports the subgame-perfect equilibrium.

**Proposition:** In the unique subgame-perfect equilibrium, the owner-manager chooses:

\[
p = \begin{cases} 
1 & \text{if } d_1 + d_2 \leq H - \Delta \\
0 & \text{otherwise}.
\end{cases}
\]

The are two cases to consider for the creditors.

Case 1: \( \frac{H - \Delta}{2} \leq L \leq H - \Delta \): Creditors offer \( d_1 = d_2 = \frac{H - \Delta}{2} \), with the result that the firm value is \( H \), creditors each receive a payoff of \( \frac{H - \Delta}{2} \), and the owner-manager’s payoff is zero.

Case 2: \( L < \frac{H - \Delta}{2} \): Creditors offer \((d_1, d_2)\), with \( d_1 \in [L, H - \Delta - L] \) and \( d_2 = H - \Delta - d_1 \) with the result that the firm value is \( H \), payoffs are \( d_1 \) and \( d_2 \) for creditors 1 and 2, respectively, the creditors collectively receive \( d_1 + d_2 = H - \Delta \), and the owner-manager’s payoff is zero.

**Proof:** First note that the indicated strategy for the owner-manager is clearly the best response to the levels proposed by the creditors. To consider the creditors, there are two cases.

Case 1: \( \frac{H - \Delta}{2} \leq L \leq H - \Delta \): Suppose that creditor 1 chooses \( d_1 = \frac{H - \Delta}{2} \). Creditor 2’s payoff is \( d_2 \) for \( d_2 \leq \frac{H - \Delta}{2} \) and \( L - \frac{H - \Delta}{2} \) otherwise. The former follows because the resulting firm value will be \( H \) and the creditors can be paid their full (reduced) claims. For the latter case of \( d_2 > \frac{H - \Delta}{2} \), the firm value will be \( L \) and, after creditor 1 as the more senior claimant receives \( \frac{H - \Delta}{2} \), only \( L - \frac{H - \Delta}{2} \) is left for creditor 2. Since, by assumption, \( L \leq H - \Delta \), then \( L - \frac{H - \Delta}{2} \leq \frac{H - \Delta}{2} \). Therefore, creditor 2’s best response is \( d_2 = \frac{H - \Delta}{2} \). Thus, the indicated strategies are a subgame perfect equilibrium.
To show that there are no other pure-strategy subgame perfect equilibria, recognize that the indicated strategy for the owner-manager must be part of any subgame perfect equilibrium. Consider first another candidate equilibrium with \( d_1 > \frac{H-\Delta}{2} \). Consider creditor 2’s possible responses and payoffs:

1) if \( d_2 > d_1 \) then the resulting firm value is \( L \) and 2’s payoff is \( \max(0, L - d_1) \)
2) if \( d_2 = d_1 \) then the resulting firm value is \( L \) and 2’s payoff is \( L/2 \)
3) if \( H - \Delta - d_1 < d_2 < d_1 \) then the resulting firm value is \( L \) and 2’s payoff is \( \min(L, d_2) \)
4) if \( d_2 \leq H - \Delta - d_1 \) then the resulting firm value is \( H \) and 2’s payoff is \( d_2 \).

It is easily shown that 2 will choose \( d_2 \) to just undercut \( d_1 \) for a payoff of \( \min(L, d_1) \). But, in this event, creditor 1 will rethink his choice, preferring to undercut \( d_2 \). Hence, there cannot be an equilibrium with \( d_1 > \frac{(H-\Delta)}{2} \).

Now consider an equilibrium candidate with \( d_1 < \frac{(H-\Delta)}{2} \). In this case, creditor 2’s possible responses and payoffs are:

1) if \( d_2 > H - \Delta - d_1 \) then the resulting firm value is \( L \) and 2’s payoff is \( L - d_1 \)
2) if \( d_2 \leq H - \Delta - d_1 \) then the resulting firm value is \( H \) and 2’s payoff is \( d_2 \).

Consider \( d_2 = H - \Delta - d_1 \) with its payoff of \( H - \Delta - d_1 \). This is clearly the best response for possibility 2. It is also superior to choices in possibility 1 by our assumption that \( L < H - \Delta \). But in response to \( d_2 = H - \Delta - d_1 \), creditor 1 will rethink his choice, preferring instead (based on our analysis above) to just undercut \( d_2 \). Hence, there cannot be an equilibrium with \( d_1 < \frac{(H-\Delta)}{2} \).

Thus, for case 1, the proposed strategies are the unique pure-strategy subgame-perfect equilibrium.

Case 2: \( L < \frac{(H-\Delta)}{2} \): We first show that the proposed strategies are an equilibrium, beginning by noting that the indicated strategy for the owner-manager is clearly a best response to any levels proposed by the creditors. Next suppose that creditor 1 chooses \( d_1 \in [L, H - \Delta - L] \). Selecting \( d_2 \leq H - \Delta - d_1 \) leads to a firm value of \( H \) and a payment of \( d_2 \) for creditor 2. This is maximized at \( d_2 = H - \Delta - d_1 \) and represents a payoff for 2 of at least \( L \). Selecting \( d_2 > H - \Delta - d_1 \) results in a firm value of \( L \), which clearly guarantees 2 a payoff of no more than \( L \). Thus, a best response for creditor 2 is \( d_2 = H - \Delta - d_1 \). A symmetric argument for creditor 1 proves that the proposed strategies are a subgame-perfect equilibrium.

To show that there are no other pure-strategy equilibria, consider a candidate equilibrium with \( d_1 > H - \Delta - L \). Creditor 2’s best response is to choose \( d_2 \) to just undercut \( d_1 \), which results in a firm value of \( L \), all of which goes to 2. As a result, it will not be in 1’s best interest to choose the proposed \( d_1 \). Suppose second that 1 chooses \( d_1 < L \). Then 2’s optimal offer is \( d_2 = H - \Delta - d_1 \), for a firm value of \( H \) and a payoff to 2 of \( H - \Delta - d_1 \). Creditor 1 can do better by selecting \( d_1 = L \), for a return of \( L \). Thus, there are no other pure-strategy subgame-perfect equilibria.

Thus, the efficient outcome is realized in equilibrium, with creditors sharing \( H - \Delta \), the maximum firm value minus the amount needed to motivate the owner-manager to choose \( p = 1 \). The owner-manager’s overall payoff is zero.

The next alternative is the first of two more traditional bankruptcy schemes in which the creditors negotiate among themselves to reduce the debt. Our simple model of this procedure has the two creditors report their new debt levels. The firm value is determined, after which the creditors receive their new claims, if there is sufficient value to do so; otherwise the creditors receive the full value of the firm divided in proportion to their new claims. Consider as an equilibrium candidate each creditor demanding \( \frac{(H-\Delta)}{2} \). In this case, the owner-manager will choose \( p = 1 \), creditors will each receive \( \frac{(H-\Delta)}{2} \), and the owner-manager receives zero. While it is clear that neither creditor wishes to unilaterally reduce its demand, there may be interest in raising one’s demand, though. To see this, suppose creditor 1 demands \( \frac{(H-\Delta)}{2} \). Then, with a demand \( d_2 > \frac{(H-\Delta)}{2} \), the owner-manager will choose \( p = 0 \), and creditor 2’s payoff is the following share of the firm value \( L \):
\[
\frac{L \cdot d_2}{d_2 + 0.5(H - \Delta)}
\]

This is maximized with \(d_2\) as large as possible. Let the original amount owed each creditor be \(D\). Then the optimal \(d_2\) is \(D\). Thus, our equilibrium candidate is indeed an equilibrium only if \((H - \Delta)/2\), the payoff from offering \((H - \Delta)/2\), exceeds the payoff from not forgiving at all. Specifically, it is necessary that:

\[
\frac{H - \Delta}{2} \geq \frac{L \cdot D}{D + 0.5(H - \Delta)}
\]

So, if the following inequality holds:

\[
L \leq \frac{(H - \Delta)(H - \Delta + 2D)}{4D}
\]

then the equilibrium candidate is an equilibrium and the payoffs for all participants are precisely those with the ACCORD scheme. If this inequality is violated, which is more likely as \(D\) increases, then it can easily be shown that the equilibrium is for no forgiveness by either participant, leading to the owner-manager’s choice of \(p = 0\) and a firm value of \(L\). Thus, each creditor will receive \(0.5L\), which is strictly less than \(H - \Delta\), the creditors share in the pure-strategy equilibria of the ACCORD scheme.

The last alternative is for creditors to swap debt for equity in the firm. A simple model of this approach allows the creditors to independently propose fractions of the equity that they require in exchange for the debt. Let \(\alpha_i\) be the fraction demanded by creditor \(i = 1, 2\) and assume, given that the creditors are owed equal amounts, that \(\alpha_i\) is restricted to be no more than 0.5. Then the owner-manager will select:

\[
p = \begin{cases} 
1 & \text{if } (1 - \alpha_1 - \alpha_2)H \geq \Delta \\
0 & \text{otherwise}
\end{cases}
\]

The symmetric pure-strategy equilibrium is for creditor \(i\) to select:

\[
\alpha_i = \begin{cases} 
\frac{H - \Delta}{2H} & \text{if } L \leq \frac{H - \Delta}{2} \\
0.5 & \text{otherwise}
\end{cases}
\]

Thus, the equilibrium outcome is efficient if \(L \leq \frac{H - \Delta}{2}\), with a payoff of \(\frac{H - \Delta}{2}\) to each creditor and a payoff of zero to the owner-manager. If \(L > \frac{H - \Delta}{2}\), the firm value will be \(L\), the creditors will each receive \(0.5L\), and the owner-manager receives zero.

Summing up, we have the following results:

1) The status quo leads to a firm value of \(L\), with 0.5\(L\) going to each creditor and zero to the owner-manager.

2) The pure-strategy equilibria of the ACCORD scheme lead to a firm value of \(H\) and zero payoff to the owner-manager. If \((H - \Delta)/2 \leq L \leq H - \Delta\), the creditors each receive \((H - \Delta)/2\). If \(L < (H - \Delta)/2\), there is a continuum of pure-strategy equilibria in which the creditors share \(H - \Delta\), but in all cases each creditor receives at least \(L\).

3) In the equilibrium of the more traditional bankruptcy scheme, the firm value is \(H\) and creditors each realize \((H - \Delta)/2\) only if \(L \leq \frac{(H - \Delta)(H - \Delta - 2D)}{4D}\). Otherwise the firm value is \(L\) and each creditor realizes \(0.5L\). In either case, there is zero payoff to the owner-manager.

Summing up, we have the following results:
4) In the equilibrium of the debt-for-equity swap, the firm value is $H$ and creditors each realize $(H - \Delta)/2$ only if $L \leq \frac{(H - \Delta)}{2}$. Otherwise the firm value is $L$ and each creditor realizes $0.5L$. In either case, there is zero payoff to the owner-manager.

Thus, ACCORD is the only one of the four schemes considered that generates the efficient outcome for all parameter values (i.e., firm value of $H$). Furthermore, ACCORD always weakly Pareto dominates the status quo. ACCORD also weakly Pareto dominates the two more traditional bankruptcy schemes for $L$ sufficiently large.

We see that the ACCORD scheme encourages more forgiveness but, at the same time, offers payoffs to the creditors that are never lower and may be higher. In this example, the owner-manager’s payoff was always zero.

### 2.2 Two Examples with Firm Value Uncertainty but No Owner-Manager Decision

We now move to a model that has no explicit role for the owner-managers, but which introduces underlying uncertainty about the value of the firm. In this model we show that the creditors may not realize the full value of the firm; instead, the ACCORD scheme offers in equilibrium a positive expected residual return to the owner-manager.

Consider a firm whose assets have an expected market value of $100. The firm has two creditors who are equally senior, share a common belief about the firm’s value, and are each owed an amount that exceeds $50, so that the firm is in financial distress.

We now consider two examples to illustrate equilibrium bidding under ACCORD. In both, the creditor who forgives more of the debt becomes the senior claimant and the original equity-holders remain residual claimants.

#### 2.2.1 Example 2: No Uncertainty

The creditors hold a common belief that the true value of the firm is $100 with certainty. Let the bid $b_i$ represent the new face value of the debt that creditor $i = 1, 2$ offers in the auction, so that a lower bid means more forgiveness. Regardless of the tie-breaking rule chosen, the unique pure-strategy Nash equilibrium is $b_1 = b_2 = 50$ (i.e., both offer a new face value of 50). In equilibrium, each creditor, whether junior or senior, receives a certain payoff of 50.

It is easily seen that $b_1 = b_2 = 50$ is a Nash equilibrium. To show that there are no other pure-strategy equilibria, consider an equilibrium candidate in which, say, creditor 1 bids $b_1 \neq 50$. First suppose that $b_1 < 50$. Then creditor 2 optimally responds with $b_2 = 100 - b_1$, to which $b_1$ is not a best response for bidder 1. Second, consider a bid $b_1 > 50$. Only if $b_2 = 100 - b_1$ can this $b_1$ be best for bidder 1, but such a $b_2$ cannot be an optimal response for bidder 2.

#### 2.2.2. Example 3: With Uncertainty

Suppose that the value of the firm could be low ($L$) or high ($H$), each outcome equally likely and $H > 100 > L > 0$. Since the firm’s expected value is 100, then $H = 200 - L$. We first show that $b_1 = b_2 = 50$ is not an equilibrium. To do so, suppose creditor 1 does choose $b_1 = 50$ and consider two cases for creditor 2.

First, suppose $L \geq 50$. Bidding $b_2 = 50$ will result in a tie, and creditor 2 will be randomly selected to be either senior or junior creditor. If senior, creditor 2 receives 50 with certainty. If junior, creditor 2 receives an expected return of $\frac{1}{2}(L - 50) + \frac{1}{2}(50) = \frac{1}{2}L < 50$. Thus, creditor 2’s average return from also forgiving 50 percent is strictly less than 50. Creditor 2 prefers bidding $b_2 = 100$ (i.e., no forgiveness), for an expected return as junior claimant of $\frac{1}{2}(L - 50) + \frac{1}{2}(H - 50) = 50$.

The second case has $L < 50$. Creditor 2’s expected return from bidding $b_2 = 50$ is $\frac{1}{2}(L) + \frac{1}{2}(50) < 50$ if chosen to be senior creditor and $\frac{1}{2}(0) + \frac{1}{2}(50) = 25$ if junior. Thus, creditor 2
expects a return strictly less than 50. Creditor 2 prefers to bid \(b_2 = 100\), which guarantees junior status and an expected return of \(\frac{1}{2}(0) + \frac{1}{2}(100) = 50\).

A pure strategy equilibrium does not exist for this example. If creditor 1 forgives a lot, then creditor 2 prefers to forgive nothing; but if creditor 1 forgives little, then creditor 2 will forgive slightly more to become the senior creditor. We now determine the mixed-strategy equilibrium.

Let a bid \(b\) represent the new (reduced) face value of the debt that is offered by the creditor (i.e., level of forgiveness = original face value - \(b\)). Define:

\[
\begin{align*}
G_1(b;c_1) &= 2 + \frac{c_1}{\sqrt{20b-L}}, \\
G_2(b;c_2) &= c_2 + \frac{b}{L}, \\
G_3(b;c_1,c_2) &= 2 + \frac{c_2}{\sqrt{20b-100}} - \frac{c_1}{4\sqrt{2b-100}} \cdot \sin^{-1}\left(\frac{500-3L-4b}{300-3L}\right), \\
G_4(b;c_2,c_3) &= \frac{400+2L-b}{3L} + c_2 + \frac{c_3}{\sqrt{200-2b}}, \\
\text{and } G_5(b;c_1,c_4) &= 1.5 + \frac{c_4}{\sqrt{200-2b}} - \frac{c_4}{2\sqrt{200-2b}} \cdot \sin^{-1}\left(\frac{600-5L-4b}{200-2b}\right).
\end{align*}
\]

Also, define \(L^*\) as the solution to:

\[
2\sqrt{\frac{2L-100}{400-5L}} + \sin^{-1}\left(\frac{500-7L}{300-3L}\right) = 2\sqrt{2} + \sin^{-1}(1/3).
\]

(I.e., \(L^* \approx 76.95\).)

The symmetric Bayesian-Nash equilibrium is for each creditor to independently draw \(b\) from an interval \([b, \bar{b}]\) according to a cumulative probability distribution, \(G(b)\). Since the other creditor will not bid less than \(\bar{b}\), there is no benefit to bidding more than \(H - \bar{b}\). In fact, we show that \(\bar{b} = H - b\).

Thus, \(b < H/2 < \bar{b}\). There are four cases of \(L\) to consider in specifying the equilibrium: 1) \(b < L\); 2) \(H/2 < L \leq \bar{b}\); 3) \(b \leq L \leq H/2\); and 4) \(L \leq \bar{b}\). These four cases are, respectively, the four cases for following expression of the symmetric Bayesian-Nash equilibrium:

Case 1: For \(L^* < L < 100\),

\[
G(b) = \begin{cases} 
G_1(b;c_1) & \text{for } b \in [b, H/2] \\
G_3(b;c_1,c_2) & \text{for } b \in [H/2, \bar{b}]
\end{cases}
\]

where \(\{c_1, c_2, b, \bar{b}\}\) solves \(G_1(b;c_1) = 0\), \(G_1(H/2;c_1) = G_3(H/2;c_1,c_2)\), \(G_3(\bar{b};c_1,c_2) = 1\), and \(b + \bar{b} = H\).

Case 2: \(200/3 < L \leq L^*\),

\[
G(b) = \begin{cases} 
G_1(b;c_1) & \text{for } b \in [b, H/2] \\
G_3(b;c_1,c_2) & \text{for } b \in [H/2, L] \\
G_5(b;c_1,c_3) & \text{for } b \in [L, \bar{b}]
\end{cases}
\]

where \(\{c_1, c_2, c_3, b, \bar{b}\}\) solves \(G_1(b;c_1) = 0\), \(G_1(H/2;c_1) = G_3(H/2;c_1,c_2)\), \(G_3(L;c_1,c_2) = G_5(L;c_1,c_3)\), \(G_5(b;c_1,c_3) = 1\), and \(b + \bar{b} = H\).

Case 3: \(100/(1 + 2^{1/3}) < L \leq 200/3\),
Third, for $111.50, however, the analysis needs to be slightly modified, but the results are qualitatively the same. Beyond about $H$, bidding ignores the event that the firm value is zero, since no value is realized in that event.

The proof is in Appendix 1. We now consider several features of the equilibrium. First, in all four cases, the creditors are indifferent among the bids on $[b, H]$. Bidding $b$ guarantees the creditor both senior status and, for cases 1–3, guarantees a payment of $b$, since it can be shown that $L > b$ for these three cases. In case 4, $L < b$, so expected payment is $\frac{1}{2}L + \frac{1}{2}b$. Figure 3 illustrates the range of bids, $[b, H]$, as $L$ varies from 0 to 100. Second, the maximum value of $b$ is 111.5. Thus, our analysis implicitly assumes that the original face value of the debt owed to each creditor exceeds $111.50 (because creditors cannot bid more than their original claims). If each creditor is owed less than $111.50, however, the analysis needs to be slightly modified, but the results are qualitatively the same.

Third, for $L$ close to zero (which means $H$ is near 200), bids are in a small range around 100, which is roughly the value of each creditor’s claim were it known that the outcome would be $H$ with certainty. Thus, in effect, the creditors essentially ignore the $L$ outcome, because its value is so low, and focus on the $H$ outcome. For $L = 100$, the firm is worth 100 with certainty (since $H = 100$, too), so, from Example 1, creditors bid 50.

Since the expected value of the firm is $\frac{1}{2}(L + H)$, absolute priority requires that each creditor receives $\frac{1}{4}(L + H)$. It can be shown that, for all cases 1–4, each creditor’s equilibrium expected return is less than $\frac{1}{4}(L + H)$, though. As a consequence, the owner-manager’s equity position has a positive expected value. Figure 4 illustrates the expected value of the equity as $L$ varies from 0 to 100 (and $H$ varies from 200 to 100). Notice that as $L$ increases from 0, the owner-manager’s expected return increases. Beyond about $L = 55$, though, this expected return decreases. To understand this reversal, consider the extreme case of $L = 0$ and $H = 200$, for which the variance of the value is highest. In this case, both creditors bid $b = 100$ (i.e., no forgiveness), for an expected return of 100 with probability $\frac{1}{2}$, which leaves zero expected return for the owner-manager. Bidding $b = 100$ is what the creditors would bid if the value of the firm was known to be 200 with certainty. As discussed above, the bidding ignores the event that the firm value is zero, since no value is realized in that event. This result that the owner-manager’s expected return decreases as uncertainty increases is partly an artifact of the example’s two-point distribution. This is seen in section 3 with an example of firm value that is uniformly distributed.

Despite the owner-manager’s expected residual return, the equilibrium forgiveness is not sufficient to guarantee that the new debt level will be sustainable. This is immediate since, as noted above, $b > \frac{1}{2}L$, so it is possible for the new level of debt to exceed even $H$. Also, Figure 3 shows that $b > \frac{1}{2}L$. Thus, equilibrium forgiveness is guaranteed to be insufficient in the event that the realization

$$G(b) = \begin{cases} G_1(b; c_1) & \text{for } b \in [b, L] \\ G_2(b; c_1, c_2) & \text{for } b \in [L, H/2] \\ G_4(b; c_2, c_3) & \text{for } b \in [H/2, H - L] \\ G_5(b; c_1, c_4) & \text{for } b \in [H - L, b] \end{cases}$$

where $\{c_1, c_2, c_3, c_4, b, H\}$ solves $G_1(b; c_1) = 0$, $G_1(L; c_1) = G_3(L; c_1, c_2)$, $G_3(H/2; c_1, c_2) = G_4(H/2; c_2, c_3)$, $G_4(H - L; c_2, c_3) = G_5(H - L; c_1, c_4)$, $G_5(b; c_1, c_4) = 1$, and $b + b = H$.

Case 4: $0 < L \leq 100/(1 + 2^{1/3})$,

$$G(b) = \begin{cases} G_2(b; c_2) & \text{for } b \in [b, H/2] \\ G_4(b; c_2, c_4) & \text{for } b \in [H/2, b] \end{cases}$$

where $\{c_2, c_4, b, H\}$ solves $G_2(b; c_2) = 0$, $G_2(H/2; c_2) = G_4(H/2; c_2, c_2)$, $G_4(b; c_2, c_4) = 1$, and $b + b = H$. Figure 3 illustrates the range of bids, $[b, H]$, as $L$ varies from 0 to 100.
of the firm value is $L$. (On the other hand, $b < \frac{1}{2}H$, so the new level of debt may be sustainable.) In practice, bankruptcy reorganization cannot guarantee that a firm will not subsequently experience financial distress (just as a firm that has not experienced financial distress in the past cannot guarantee that financial distress will not occur in the future). We discuss this issue at greater length in section 3.

3. Additional Considerations in ACCORD

The earlier section showed that the ACCORD scheme results in debt forgiveness and that the owner-manager could expect a positive residual return, which provides the vital incentive to operate the firm efficiently. This result arises from the uncertainty over the value of the firm. We now extend these results in several ways.

3.1 Pre-Existing Seniority of Claims

Example 3 is now altered to include junior creditors who have claims in addition to the two (senior) creditors. Since the payoffs to the two senior creditors do not depend on the junior creditors’ claims, the optimal bidding strategy of senior creditors (described in Section 2.2.2) would be unchanged. We now examine the junior creditor’s bidding strategy.

Let $S$ represent the sum of the senior creditors’ bids. As was noted, $L \leq 2b \leq S$ and $H$ may exceed $S$. Consequently, the junior creditors face a residual value of $0$ or $\max\{H - S, 0\}$, depending on whether the realized firm value is $L$ or $H$, respectively. Based on the equilibrium bidding from Section 2, junior creditors will bid $b = \frac{1}{2}\max\{H - S, 0\}$, which eliminates all positive expected residual returns for the owners.

It is Example 3’s two-point distribution assumption that entirely eliminates the owners’ expected residual returns. We now consider a continuous distribution example in which junior claimants expect to receive a positive expected return. In particular, with a pre-existing seniority structure, all senior creditor classes who are certain that they would be repaid, would bid no forgiveness. Only in the class where there is some probability of not being fully paid, would bids involve forgiveness as in Section 2. Their bidding will leave a positive expected return to the next most senior claimants, who will bid in a manner that offers a positive expected return to those junior to them, and so on down to the equityholders.

**Example 4:**

Suppose that it is commonly known by the creditors that the value of the firm, $V$, is uniformly distributed on $[0, 1]$. Our analysis considers the two most-senior creditors, who are owed identical amounts that exceed $1$ in total. Appendix 2 determines the symmetric equilibrium in which both creditors bid an amount $b$ that they are willing to accept according to the following cumulative distribution function:

$$G(b) = \begin{cases} \frac{-k_1}{2b^2} - 0.5 \ln(b) + k_2 & \text{if } b \in [b, 0.5] \\ 2 + k_2 - 0.5 \ln(1 - b) \\ k_1 \ln \left( \frac{1 + (1 - b)^2}{2(1 - b)} \right) + \sqrt{2} \sinh^{-1}(\sqrt{2}(1 - b)) \right) \frac{\sqrt{2} \sinh^{-1}(\sqrt{2}(1 - b))}{\sqrt{1 - 2(1 - b)^2}} \\ + \frac{0.5 \tanh^{-1}(\sqrt{1 - 2(1 - b)^2}) - k_3 \sqrt{2}}{\sqrt{1 - 2(1 - b)^2}} & \text{if } b \in (0.5, \bar{b}] \end{cases}$$

where $(b, \bar{b}, k_1, k_2, k_3)$ solve $b + \bar{b} = 1$, $G(b) = 0$, $G(\bar{b}) = 1$, $\lim_{b \to 0.5^+} G(b) = \lim_{b \to 0.5^+} G(b)$, and $G(0.5) = 0.5$. 

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\[ \int_{b}^{\bar{b}} G(b) \, db = 0. \] By numerical solution, \((b, \bar{b}, k_1, k_2, k_3) = (0.2532, 0.7468, 0.2211, 1.0379, -1.8327)\).

Thus, in equilibrium, the creditors bid a reduced level of debt, \(b\), according to the cdf \(G(b)\), which is graphed in Figure 5. The range of bids is \([b, \bar{b}] = [0.2532, 0.7468]\). Two properties of the equilibrium are immediate. First, since creditors are indifferent among all bids between \(b\) and \(\bar{b}\) and since senior claimant status is guaranteed by bidding \(\bar{b}\), each creditor’s expected return in equilibrium is:

\[ b(1-b) + \int_{v=0}^{\bar{b}} v \, dv = 0.2215. \]

For a creditor that bids \(b\), the two terms above represent, respectively, a payment of \(b\) when the realized value of the firm exceeds and a payment equal to the full value of the firm when that value is less than \(\bar{b}\). Thus, the creditors together expect a return of 0.44223, and leave 0.05777 or 11.55% of the expected firm value to the more junior claimants.

Since \(b = 0.2532\), a second property of the equilibrium is that the two creditors together are guaranteed to bid more than 0.5, the expected value of the firm. It can be shown that each creditor bids 0.3399 on average. With an upper range \(\bar{b} = 0.7468\), it is immediate that the creditors together may demand more than 1.0, the highest possible value of the firm. The likelihood of that event is only 1.38%, though. Thus, with probability 98.62%, junior claimants receive a positive level of expected residual return.

This pattern of progressively smaller but positive expected returns to the progressively more junior creditors violates absolute priority, but it helps the functioning of ACCORD. In any class, creditors need both uncertainty and some expected return as an incentive to compete for a better position in their segment of the queue; otherwise, they have no incentive to forgive, which would adversely affect the outcome of ACCORD. Alternatively, if the claims of the very junior creditors were extinguished, owners would be assured of an even greater positive expected return.

### 3.2 Creditors with Private Information

Section 2 assumed that the creditors share a common belief about the probability distribution of the value of the firm. In practice, creditors may have different information and may interpret the same information about the firm differently. In this subsection we consider an example with two creditors, each with private information. We show a Bayesian-Nash equilibrium in which a creditor who is more optimistic about the firm’s prospects tends to forgive less and more likely to become the junior creditor.

**Example 5:**

Suppose that the value of the firm is \(V = V_1 + V_2\). Both creditors share a common belief that the random variables \(V_1\) and \(V_2\) are independent, that \(V_1\) takes on the values 0 or 1, each with probability \(\frac{1}{2}\), and that \(V_2\) is 0 or 1, each with probability \(\frac{1}{2}\). Assume also that creditor \(j\) privately observes \(v_j\), the realization of \(V_j, j = 1, 2\). Therefore, creditor \(j\) who observes 0 realizes that the firm is worth 0 or 1, both equally likely, and creditor \(j\) who observes 1 knows that the firm is worth 1 or 2, both with probability \(\frac{1}{2}\).

In the Bayesian-Nash Equilibrium, creditor \(j\) who observes \(v_j = 0\) draws a bid according to the cumulative distribution function:

\[ G_0(b) = \begin{cases} 2 + \frac{k_1}{\sqrt{3b-1}} & \text{for } b \in [a, 1) \\ 1 & \text{if } b = 1 \end{cases} \]

Also, creditor \(j\) who observes \(v_j = 1\) draws a bid \(b\) according to the cumulative distribution.
A different response is needed for a systemic financial crisis, both because the scale of the crisis overwhelms courts and because individual managers are rarely to blame for the firms’ distressed state (Stiglitz, 1999). Few procedures have been offered for resolving systemic financial distress. This
paper discusses their shortcomings for a crises like the 1997 Asian Crisis, as well as the shortcomings of several market-based bankruptcy proposals not specifically intended for systemic crises. Any successful procedure must address the following four circumstances of the Asian Crisis.

First, firms are generally well run. This suggests both that most firms should not be liquidated and that there are advantages to having current management continue. The latter is because current management has valuable industry- and firm-specific knowledge and because the extent of the distress has stretched the supply of management teams.

Second, debt-equity ratios of firms tended to increase dramatically with the collapse of local currencies and the common practice of denoting debt in US dollars. Many firms find themselves unable to service the higher debt levels despite being economically viable enterprises. As a result, managers are discouraged from efficiently operating the firm because creditors gain all increases in firm value. Managers instead may be motivated to engage in risky behavior that offers sufficient upside, however unlikely, for them to realize some residual return or they may be motivated to “strip” assets from the firm. Achieving efficiency is most likely with debt forgiveness and without swapping debt for equity in firm. The latter claim is based on the high ownership stakes that managers tend to have, which create strong incentives for the efficient operation of the firm and which will be reduced with a dilution of ownership.

Third, no courts in any country have shown the ability to quickly and effectively handle the massive number of distressed firms in a systemic crisis.

Fourth, with their interventions in the banking system, the governments of the Asian Crisis countries have become major creditors. These governments and their courts already have a reputation for being susceptible to the influence of powerful and wealthy business interests. With the taxpayers bearing much of the losses (through the government guarantee of banking deposits), there is at least the possibility of the perception, if not the practice, of some well-connected debtors enjoying an unwarranted reduction in debts in negotiations with government agents (e.g. the asset management companies or bank restructuring agencies which hold the claims). Even if this did not occur, the fear of such an accusation could stymie any bureaucrat negotiating unpaid claims.

The ACCORD scheme does respond to the four circumstances mentioned above. First, current owners continue to operate the firm and do so with no dilution of their ownership. Second, as this paper demonstrates, forgiveness occurs in the equilibrium of ACCORD, which improves management’s incentive to operate the firm more efficiently. Third, ACCORD, as a market-based procedure, makes minimal demands on the courts. They do not value the firm, select any procedures, or facilitate any negotiations; their only roles are the traditional ones of the courts: 1) to establish the initial priorities of and amounts owed all creditors; and 2) to enforce the ACCORD outcome. Fourth, rather than bidding itself in the auction, it is possible for the government to accept the terms established by the non-government creditors, thereby eliminating the perceptions and/or practice of corruption and favoritism.

Not only does ACCORD respond to these four circumstances, but the analysis in this paper suggests that its outcome can be more efficient than two procedures commonly used in practice, at least as we model these procedures in this paper. The two are traditional Chapter 11 exercises in which the creditors negotiate (rather than bid) on forgiveness or negotiate on swapping debt for equity.

We now address two issues of the appropriateness and implementation of the ACCORD scheme. The first concerns evidence to date that the ACCORD scheme would be a practical approach to resolving financial distress. The bankruptcy auctions observed in practice have tended to be sales of the firm as a going concern or sales of its assets as part of a liquidation. Such sales are also not restricted to (and perhaps do not even involve) the creditors. While they are clearly different than the ACCORD’s intra-creditor auction for forgiveness, they may provide some limited insight. Thorburn’s (2000) study of auctions of small bankrupt firms in Sweden finds them to be efficient, quick, requiring low costs, and avoiding the deviations from absolute priority that cash sales allow. She also finds that
74 percent of firms continue as going concerns, which is similar to Chapter 11 outcomes. Stromberg (2000) also noted similarities between bankruptcy auctions and reorganization negotiations, including that both exhibit some ability to avoid fire-sale liquidations but both also can result in too many inefficient continuances due to conflicts between banks and other creditors. He does observe, though, that negotiation schemes typically provide some bargaining power to junior creditors and, as a result, they tend to fare better in negotiations than through auctions. Thailand has also had some success with its Financial Restructuring Agency’s auctions of the non-performing loans of failed finance companies in 1997. And, of course, non-distressed examples abound of the successful use of auctions, including U.S. Federal Communications Commission’s auction of the use of the radio spectrum for cellular telephony, which spawned an extensive academic literature (e.g., Cramton 1995, 1997).

The second issue concerns the details of implementing ACCORD, a subject that is discussed in greater depth in Hausch and Ramachandran (2000). Its implementation does not require any new law or having to circumvent existing or new, albeit rarely used, bankruptcy codes. The ACCORD could be conducted under the aegis of the courts with the auction replacing the negotiations. It could be imposed but it could also be offered as an alternative to existing procedures, with creditors and debtors voting on its use. Given the efficiency properties of ACCORD, it is possible that a sufficient majority of creditors would agree to the use of ACCORD and to be bound by the ACCORD rules for, say, 5 years. Owners would agree to forgo any cash dividends or payouts during these 5 years and, if the reduced debts are not fully discharged by the end of the 5 years, to automatic liquidation. The automatic liquidation clause protects creditors against the firm accumulating cash surpluses (which may have genuine business reasons) instead of servicing the debts of those in the creditor queue.

The deferred debts accrue interest at specified rates, and whenever these debts are fully discharged, the court would declare that the firm is no longer under its aegis and it is free to operate unfettered. If the (reduced) debts are not fully discharged by the end of the 5 years specified, the firm is liquidated automatically. (This too could be by auction with the owners and creditors free to bid.)

One likely dispute is if the firm accumulates cash without paying any of the deferred creditors. Having the judge adjudicate this would generate endless disputes because cash is often needed to operate the business. So instead of tying the courts and the parties into litigation, the automatic liquidation protects creditors who have a right to this cash. Furthermore, creditors may trade their claims at any time; so regardless of their position in the queue, creditors could cash in their claims (albeit at a price different from their reduced claim).

While firms may only distribute cash to the head of the creditor queue, they should be free to raise additional funds through asset sales, new equity or borrowings. Such new claims should not come ahead of existing claims, and should not be serviced before all the deferred claims outstanding are fully discharged. Any new equity should be in the same class as the old equity (at the very end of the queue); but a new loan should be behind all other loans (although ahead of the equity). While this is different from conventional bankruptcy filing (where new loans come before pre-filing loans), it is appropriate for ACCORD because the old creditors have already reduced their claims.

Putting new borrowings at the back of the creditor queue would not be detrimental to the continued operations of the firm or disadvantageous to the new creditor. Recall that the firm is not obligated to make any cash payment; so its ability to finance its continued operations is considerably greater. The firm may also discharge all of its outstanding debts at any time; so if the new lenders or investors find the restrictions onerous, the firm could use the proceeds from new borrowings or equity issues to discharge the outstanding debts to the deferred creditors and operate unfettered by the rules of the ACCORD.

Finally, ACCORD differs from other market-based schemes proposed in the literature in that it specifically does not allow for a change in control or a dilution of ownership. Rather than ask, as Bebchuk does in his pioneering proposal, which class of creditors gets to operate the firm, ACCORD assures the owners that they would continue to own and operate the firm, and instead has creditors bid
against each other by trading off how much they are willing to collect against how long they are willing to wait.

This difference is what makes the ACCORD ideally suited to a situation like the recent East Asian financial crisis, since creditors were, and still are, ill suited to operate the myriad firms that became mired in large debts. Although creditors are collectively better off by reducing the face value of their claims, minority creditors who are willing to settle for less are stymied when the major creditor (the government entity that controls the banks’ claims) is unwilling to do so. The auction under ACCORD breaks this logjam, and all the parties can benefit.

Endnotes

1 For Indonesia in 2000, at least 75 percent of the total debt of private enterprises of $110 billion is denominated in foreign currency (see IMF Staff Country Report No. 00/132, October 2000).

2 High leverage prior to the crisis is due to at least two factors: 1) debt can be more attractive to lenders given the weak legal protection for noncontrolling shareholders; and 2) controlling owner-managers preferred to maintain their control and minimize disclosure of information (see East Asia: Recovery and Beyond, World Bank, 2000).

3 The depreciation of local currencies relative to the US dollar between the end of 1996 and October 2001 was 76 percent for Indonesia, 35 percent for South Korea, 33 percent for Malaysia, 49 percent for the Philippines, and 43 percent for Thailand.

4 Indonesia, Malaysia, the Philippines, Thailand and South Korea all had periods between June 1997 and January 1998 when interest rates were at least 25 per cent (Barro, 2001).

5 For comparison’s sake, the average debt-to-equity ratio for the manufacturing sector in the United States in 1998 was 1.59.


7 ibid

8 The firm could introduce debt through a separate transaction that occurs simultaneously if all the claimants in that class agree to accept pro rata fractions of each class of liabilities in the desired new financial structure.

9 Hart, La Porta Drago, Lopez-de-Silanes, and Moore (1997) offer a variation on AHM that accommodates cash-constrained claimants, but does not typically eliminate the need for cash payments altogether.

10 There are mixed-strategy equilibria which have a positive probability of a firm value of $L$, an inefficient outcome. For example, there is an equilibrium in which the creditors independently randomize over choosing $L$ and $H - \Delta - L$. If both creditors select $H - \Delta - L$, claims exceed $H - \Delta$ and the owner-manager sets $p = 0$ for a firm value of $L$.

11 It could also be that the government’s claims and queue positions are assigned to match the proportionate reductions and queue positions of the other creditors. Thus, rather than the government’s claims appearing as a bulge in the middle of the queue, its claims could be uniformly spread over the queue.

References


Barro, Robert (2001), Economic Growth in East Asia Before and After the Financial Crisis,"
APPENDIX 1: Equilibrium of Example 3

The ACCORD equilibrium of Example 3 has four cases. Since the proofs for the four cases are similar, we treat only case 1.

Suppose creditor 2 bids \( b_2 \) according to \( G(\bullet) \) for \( L^* < L < 100 \). Bidding \( b < b_2 \), creditor 1 realizes a certain return of \( b \). Therefore, creditor 1 strictly prefers bidding \( b \) to any \( b < b_2 \). For \( b \in [b_2, H/2] \), creditor 1’s expected payoff is:
\[ P(b) = b(1 - G(b)) + 0.5 \int_{b_2 - b}^{b} (L - b_2) dG(b_2) + 0.5bG(b) \]

The first term deals with the event that creditor 1 bids less than creditor 2, becomes senior creditor, and is paid \( b \) whether the firm value is \( L \) or \( H \). The second and third terms treat the event that creditor bids more than creditor 2, and so becomes the junior creditor. In the second term, the value is \( L \), so there is only \( L - b_2 \) available to creditor 1. In the third term, the value is \( H \), which is sufficient to fully pay the junior creditor. Integrating by parts gives:

\[ P(b) = b + (L/2 - b)G(b) + 0.5 \int_{b_2 - b}^{b} G(b_2)db_2 \]

which reduces to:

\[ P(b) = L - b - 0.5c_1\sqrt{2b - L} = b \]

where the last equality follows since the condition \( G_1(b_2; c_1) = 0 \) means that \( c_1 = -2\sqrt{2b - L} \).

Now consider \( b \in [H/2, \bar{b}] \), in which case creditor 1’s expected return is:

\[ P(b) = b(1 - G(b)) + 0.5 \int_{b_2 - b}^{b} (L - b_2) dG(b_2) + 0.5 \left( \int_{b_2 - b}^{H - b} bdG(b_2) + \int_{b_2 - b}^{b} (H - b_2) dG(b_2) \right) \]

This expression differs from \( P(b) \) for \( b \in [\bar{b}, H/2] \) in the last term. Here, if creditor 1 is junior and the value is \( H \), then creditor 1 receives \( b \) only if \( b_2 \) is less than \( H - b \); otherwise, creditor 1 receives \( H - b_2 \). Plugging in \( G(b) \) gives:

\[ P(b) = 200 - H - b + 0.5c_1 \left( 2\sqrt{H - L} - \sqrt{2H - L - 2b} - \sqrt{2b - L} \right) \]

\[ -0.25\sqrt{2b - 100} \left( 4c_2 - c_1 \sin^{-1} \left( \frac{500 - 3L + 3b}{300 - 3L} \right) \right) + \int_{b_2 - H/2}^{b} \frac{4c_2 - c_1 \sin^{-1} \left( \frac{500 - 3L + 3b}{300 - 3L} \right)}{4\sqrt{2b - 100}} db_2 \]

We first show that \( P(H/2) = b \).

\[ P(H/2) = 200 - \sqrt{H - 100} \left( c_2 - \frac{c_1 \sin^{-1}(1/3)}{4} \right) - b - H \]

\[ + \frac{c_1}{2} \left( \sqrt{H - L} - \sqrt{2b - L} \right) \]

\[ = 200 - \frac{c_1 H - 100}{c_2} - b - H + \frac{c_1}{2} \left( \sqrt{H - L} - \sqrt{2b - L} \right) \]

since \( c_2 = c_1 \left( \frac{1}{c_2} + \frac{\sin^{-1}(1/3)}{4} \right) \)

\[ = 200 - b - H - \frac{c_1}{2} \sqrt{2b - L} \]

\[ = b \]

since \( c_1 = -2\sqrt{2b - L} \)

It can be shown that \( P'(b) = 0 \) for \( b \in [H/2, \bar{b}] \), so \( P(b) = b \) for \( b \in [H/2, \bar{b}] \).

Finally \( P(b) = \bar{b} \) for \( b > \bar{b} \), too, since \( \bar{b} = H - b \) means that bidding \( b > \bar{b} \) has the same return as bidding \( \bar{b} \).

This analysis has assumed that \( b < L \), which do hold for \( L > L^* \).

We have shown that, for case 1 and against creditor 2 using \( G(\bullet) \), creditor 1 cannot do better than to choose any bid on \([\bar{b}, \bar{b}]\). The three other cases are similar. Thus, \( G(\bullet) \) is a best response for creditor 1, which means that it is an equilibrium for both creditors to use \( G(\bullet) \).
APPENDIX 2: Equilibrium of Example 4

Recall that \( V \sim U[0, 1] \). We will determine a symmetric mixed-strategy bidding equilibrium for the creditors. Let \( G(b) \) denote the cumulative distribution function and let \( g(b) \) be the probability density function. The range of bids is \([\underline{b}, \overline{b}]\), with \( \underline{b} + \overline{b} = 1 \). This follows since a creditor cannot gain from bidding more than \( 1 - b \) if the lowest that the other creditor will bid is \( b \). To determine \( G(b) \), assume that creditor 2 bids \( b_2 \) using \( G(\bullet) \) and first consider creditor 1’s expected return with a bid \( b \in (\underline{b}, 0.5) \):

\[
(b(1 - b) + \int_{v=0}^{b} vdv)(1 - G(b)) + \int_{b_2 = \underline{b}}^{b} \left( \int_{v=b_2}^{b}(v - b_2)dv + \int_{v=b_2}^{1} b_2 dv \right) dG(b_2) \tag{2.1}
\]

The first term above treats the case of creditor 1 bidding less than creditor 2, which occurs with probability \( 1 - G(b) \). In this case, creditor 1 realizes \( b \) if the value of the firm exceeds \( b \) and the full value of the firm otherwise. The other terms cover the case when creditor 2 bids less than creditor 1. Term 2 deals with the firm value being sufficiently low that creditor 1 receives only \( v - b_2 \) while term 3 has the firm value high enough that creditor 1 receives \( b \). If creditor 1 is to be indifferent among all the bids then the derivative of (2.1) is zero:

\[
(1 - b)(1 - G(b)) - g(b)\left(b(1 - b) + \int_{v=0}^{b} vdv - \int_{v=b}^{2b}(v - b)dv - \int_{v=2b}^{1} b_2 dv \right) + \int_{b_2 = \underline{b}}^{b} (1 - b - b_2)dG(b_2) = 0 \tag{2.2}
\]

With \( H(b) = \int_{b_2 = \underline{b}}^{b} G(b_2)db_2 \), equation (2.2) reduces to:

\[
b^2H''(b) + bH'(b) - H(b) = 1 - b \tag{2.3}
\]

Differentiating the second-order differential equation (2.3) with respect to \( b \) gives a first-order differential equation:

\[
H'''(b) + 3b^{-1}H''(b) = -b^{-2} \tag{2.4}
\]

The solution of (2.4) is:

\[
g(b) = H''(b) = k_1b^{-3} - 0.5b^{-1}
\]

Therefore, as was to be shown, for \( b \in (\underline{b}, 0.5) \):

\[
G(b) = -0.5k_1b^{-2} - 0.5 \ln(b) + k_2 \tag{2.5}
\]

We next consider creditor 1’s expected return from a bid \( b \in (0.5, \overline{b}) \):

\[
(b(1 - b) + \int_{v=0}^{b} vdv)(1 - G(b)) + \int_{b_2 = \overline{b}}^{1-b} \left( \int_{v=b_2}^{b}(v - b_2)dv + \int_{v=b_2}^{1} b_2 dv \right) dG(b_2) + \int_{b_2 = 1-b}^{b} \left( \int_{v=b_2}^{1} bdvdG(b_2) \right) \tag{2.6}
\]

The first term deals with creditor 1 bidding less than creditor 2. If creditor 1 bids more than creditor 2, thereby becoming the junior creditor, then creditor 1 receives zero if \( v < b_2 \), receives \( v - b_2 \)
if \( v \) is between \( b_2 \) and \( \min\{b + b_2, 1\} \) (see terms 2 and 3), and receives \( b \) if \( v > b + b_2 \) (see term 4). If creditor 1 is indifferent among all bids in this interval, then the derivative of (2.6) is zero:

\[
(1 - b)(1 - G(b)) - g(b)\left(b(1 - b) + \int_{v=0}^{b} v dv - \int_{v=b}^{1} (v - b) dv\right) + \int_{v=b}^{1-b} (1 - b - b_2) dG(b_2) = 0 \quad (2.7)
\]

Using integration by parts, (2.7) reduces to:

\[
(1 - b)(1 - G(b)) + g(b)(0.5 - 2b + b^2) + \int_{b_2=b}^{1-b} G(b_2) db_2 = 0 \quad (2.8)
\]

Since the range of bids in the integral term of (2.8) is in the interval \((b, 0.5)\), then (2.5) can be used to reduce (2.8) to:

\[
-(1 - b)G(b) + g(b)(0.5 - 2b + b^2) + k_2(1 - b - b) + 0.5k_1 \left(\frac{1}{b - b_1} - \frac{1}{b} \right) \\
+ 0.5(1 - b) \ln(1 - b) + 1 - b - b \ln(b) + b = 0 \quad (2.9)
\]

Solving this first-order linear differential equation gives the indicated expression for \( G(b) \) in the range \( b \in (0.5, \bar{b}) \).

The five constants \((b, \bar{b}, k_1, k_2, k_3)\) solve the following equations: \( b + \bar{b} = 1 \), \( G(b) = 0 \), \( G(\bar{b}) = 1 \), \( \lim_{b \to 0.5^-} G(b) = \lim_{b \to 0.5^-} G(b) \), and \( \int_{b=0.5^-}^{1-b} G(b) db = 0 \). Thus, assuming creditor 2 uses \( G(b) \) on \([b, \bar{b}]\), creditor 1’s expected return is constant across \([b, \bar{b}]\). It is also easily shown that creditor 1 has no interest in venturing outside \([b, \bar{b}]\). Thus, both bidders using \( G(b) \) is a symmetric Nash equilibrium.
Table 1: Salient Corporate Statistics in the Aftermath of the Crisis

<table>
<thead>
<tr>
<th></th>
<th>Indonesia</th>
<th>Korea</th>
<th>Malaysia</th>
<th>Philippines</th>
<th>Thailand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1998 to 1996 Real GDP Ratio</strong></td>
<td>0.88</td>
<td>1.00</td>
<td>1.00</td>
<td>1.05</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>1998 GDP (billion US$)</strong></td>
<td>105</td>
<td>309</td>
<td>69.4</td>
<td>68</td>
<td>121</td>
</tr>
<tr>
<td><strong>Nominal Exchange Rate Ratio (mid 99/mid 97)</strong></td>
<td>2.75</td>
<td>1.31</td>
<td>1.5</td>
<td>1.43</td>
<td>1.44</td>
</tr>
<tr>
<td><strong>Capacity Utilization</strong></td>
<td>58%</td>
<td>71%</td>
<td>65%</td>
<td>68%</td>
<td>60%</td>
</tr>
<tr>
<td><strong>Total Corporate Debt (billion US$ equiv.)</strong></td>
<td>118.0</td>
<td>444.0</td>
<td>120.2</td>
<td>47.5</td>
<td>195.7</td>
</tr>
<tr>
<td>Of which external</td>
<td>67.1</td>
<td>64</td>
<td>40</td>
<td>23.3</td>
<td>32.5</td>
</tr>
<tr>
<td>...domestic debt (billion US$ equiv.)</td>
<td>50.9</td>
<td>380.0</td>
<td>80.2</td>
<td>24.2</td>
<td>163.2</td>
</tr>
<tr>
<td><strong>Banking Sector’s External Debt (b. US$)</strong></td>
<td>50.3</td>
<td>72.4</td>
<td>23.0</td>
<td>17.8</td>
<td>46.8</td>
</tr>
<tr>
<td><strong>Debt to Equity Ratio</strong></td>
<td>3.1</td>
<td>5.2</td>
<td>1.5</td>
<td>1.6</td>
<td>2.5</td>
</tr>
</tbody>
</table>

1World Bank survey of firms (mid 1998)

Figure 1: Thailand Corporate Debt
Source: IMF Country Report No. 01/147, August 2001

Figure 2: East Asia Debt-Equity Ratios, 1997 vs. 2000
Source: IMF Country Report No. 01/147, August 2001
Figure 3: Range of bids, $[\underline{b}, \bar{b}]$, in Example 2 as $L$ varies from 0 to 100. (Recall that $H = 200 - L$, so $H$ meanwhile varies from 200 to 100.)

Figure 4: For Example 2, the expected return to the owner-managers following the ACCORD scheme, as $L$ varies from 0 to 100. Since the expected value of the firm is 100 for all values of $L$, the expected return to creditors is $100 - \text{expected return to owner-managers.}$
Figure 5: Cumulative distribution function for Example 3’s symmetric equilibrium bidding strategy. A creditor will reduce its debt down to between 0.2532 and 0.7468.