Ex-ante efficiency of bankruptcy procedures

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Abstract

This paper suggests a framework to analyze the efficiency properties of bankruptcy procedures, distinguishing between ex-ante and ex-post efficiency. Ex-post efficiency consists in maximizing the ex-post value of the insolvent firm, whereas ex-ante efficiency consists in maximizing the proceeds to creditors from the reorganization of the firm and providing incentives for the creditors to monitor the firm. We show that the definition of creditors' ownership rights over the company and the protection of the creditors' seniority, are crucial to asses the ex-ante efficiency of a bankruptcy procedure. © 1997 Elsevier Science B.V.

1. Introduction

There is a great variety of bankruptcy laws in different countries. Both the theoretical and legal debate on bankruptcy, as well as the practitioners, seem not to be able to agree on which procedure is the best. Indeed the problem arises from the fact that a lot is at stake when a bankruptcy procedure is initiated and a good bankruptcy law should achieve many, not always compatible, goals.

A bankruptcy law has to decide what to do with the insolvent firm and how to compensate the creditors. One obvious goal is then to maximize social surplus, that is to make the best possible use of the firm. How creditors are compensated and in what amount may be seen ex-post as a simple redistribution and therefore irrelevant from a welfare point of view. However, this would not take into account

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another important goal of the bankruptcy law: its effect on the incentives of the involved parties before the firm goes into bankruptcy, even before any clue of financial distress is at the horizon. If the choice of what to do with the firm can be regarded as *ex-post efficiency*, the effect on the incentives can be regarded as *ex-ante efficiency*.

Two main effects on the incentives are of relevance. First, a bankruptcy procedure 'punishing' managers or entrepreneurs of the insolvent firm may be seen as providing them with the right incentives to manage the firm so as to avoid ending up in financial distress, for example by undertaking too many risks. Secondly, a bankruptcy procedure by protecting the creditors' interests when the firm is in financial distress may reduce the overall costs of borrowing for the firm.

The effects of different bankruptcy procedures on the managers' and entrepreneurs' incentives have been extensively studied in the literature (Aghion and Bolton, 1992, Berkovitch et al., 1993, Bolton and Scharfstein, 1996, among others). This paper focuses on the alternative aspect of ex-ante efficiency: the protection of the creditors' claims. In particular, we take the protection of the creditors' claims to consist in both the attempt to maximize the proceeds to the creditors from the reorganization (what we call *revenue efficiency*) *and* the respect of the relative seniority of their claims (known as *absolute priority rule*).

A crucial assumption of our analysis is that the value of the firm when reorganized, rather than liquidated, is not uniquely defined. In fact, many reorganization plans may be available and each plan may imply a different value of the firm, depending on who takes the decisions within the new firm and what projects he has in mind.

The first problem we highlight concerns the revenue efficiency of bankruptcy procedures. Existing bankruptcy procedures, in fact, do not define the ownership rights of the creditors on the insolvent firm. [1] This omission on the part of existing procedures may lead to a failure of revenue efficiency. For example, a cash auction procedure will maximize the firm ex-post value, provided that credit markets are perfect or that the potential buyer is not cash constrained. However, a cash auction does not perform as well on the ground of maximizing the proceeds from the sale of the firm as a going concern. Indeed, in Section 2 we show that the proceeds may be increased by auctioning off only a control stake of the firm and retaining the minority stake. Of course, for this decision to be taken the creditors' ownership rights on the insolvent firm need to be well defined.

We then move to the analysis of the trade-off between ex-post efficiency and the compliance with the absolute priority rule. In Section 3 we show that procedures such as Chapter 11 in the US may lead to violations of the absolute priority rule and that such violations may lead to ex-ante inefficiencies. Indeed, in

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[1] An exception is represented by the recent proposal for reform of bankruptcy law by Aghion et al. (1992) which expands on the proposal by Bebchuk (1988).

a framework in which creditors need to be provided with the incentives to monitor the debtor's behaviour and this monitoring activity is costly, violation of the absolute priority rule may induce each creditor to free-ride on other creditors by inefficiently reducing their monitoring activity. On the other hand, when considering bankruptcy procedures that do comply with the absolute priority rule, such as the Receivership in the UK, we show that if the most senior creditor, which has all the decision power according to this procedure, is guaranteed his claim in any event, his incentives to monitor disappear, leaving the remaining creditors with not enough proceeds to induce them to monitor efficiently the firm. The possibility of a violation of the absolute priority rule, however, could improve the creditors' incentives to monitor.

2. Revenue efficiency

A bankruptcy procedure is revenue efficient if it maximizes the sum of all creditors' proceeds. Failing revenue efficiency may lead to inefficiencies which take the form of additional costs imposed on the borrowed funds by the creditors. Therefore, there may exist investment projects that have a positive net present value under a revenue-efficient bankruptcy procedure but are not financed if the bankruptcy procedure in place is *not* revenue efficient.

Baird (1986) and Aghion et al. (1992) have argued that in a world without cash or credit constraints, auctions are an efficient bankruptcy procedure. However, while it is true that an auction achieves ex-post efficiency, it may not necessarily achieve revenue efficiency. In particular, when auctions are used in bankruptcy procedures, the entire firm is usually auctioned off. Moreover, in virtually all bankruptcy procedure the creditors' ownership rights on the insolvent firm are not explicitly defined before the auction is completed. As a result the creditors have no control on how the firm is auctioned off. [2]

Consider for example (for a more detailed analysis see Cornelli and Felli (1997b)) a situation in which there exist only two potential buyers for the insolvent firm, none of them a creditor. [3] Each potential buyer has a restructuring (or liquidating) plan in mind and the firm under his control will have value V_1 and V_2, respectively. Without loss of generality, let us assume that $V_1 < V_2$. [4]

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[2] It should be mentioned that these considerations and the result presented below apply to other bankruptcy procedures as well, for example bargaining procedures such as Chapter 11. Cfr. Cornelli and Felli (1997b).

[3] This assumption is needed to simplify the analysis of the equilibrium outcome of the auction. Indeed, in the event that a potential buyer is one of the creditors there would exist incentives for him to overbid as exemplified in Burkart (1995) and Bulow et al. (1996). The result presented below, in general, still holds.

[4] We assume that the entire valuation V_i, $i = 1, 2$, is transferable, that is, there are no private benefits from control. The effect is enhanced if we add private benefits.

The unique trembling hand perfect equilibrium of the cash auction is such that bidder 2 obtains the firm at the price V_1. [5] Allocative efficiency is achieved, since the value of the firm is maximized in the hands of bidder 2. However, the creditors could have obtained a higher revenue by structuring the auction differently.

Consider in fact the following procedure. Assume that only the minimum number of shares necessary to have control (for example, 50% of the shares of the firm plus one) is auctioned off. Then bidder 2 will buy 50% plus one shares and obtain the control, paying $\frac{1}{2}V_1$. The creditors will now be left with a minority stake of a firm whose total value is V_2. The total revenue accruing to the creditors will therefore be $(\frac{1}{2}V_1 + \frac{1}{2}V_2)$, which is certainly higher than V_1.

Two observations are in order. First, to be able to achieve this outcome it is not enough to allow the bidders to make more elaborate bids that specify the stake of the firm they are willing to buy as well as the price they are willing to pay for it. In our example, bidder 2 would have no incentive to bid for anything less than the entire firm since by purchasing the entire firm at the price V_1 he is able to appropriate all the gains from trade $(V_2 - V_1)$. Moreover, bidder 1 would be indifferent between bidding for the entire firm or only for a control stake of it. As a result the competition between the two bidders would not raise the creditors' revenue to the level they can achieve by auctioning off only the control stake of the firm.

Secondly, even if the auction procedure did not constrain creditors to auction the entire firm, there is still a problem: the ownership rights of the creditors on the minority stake of the firm are not well defined. As mentioned above, the recent proposals by Aghion et al. (1992) is the only exception. This proposal, in fact, proceeds to allocate the ownership of the insolvent firm to the creditors before the decision of what to do with the firm is taken.

Notice that even if bidder 1 purchases the firm and resells it to bidder 2 it would still be optimal for the creditors to auction off only the control stake of the firm. Consider, in fact, the following two-period situation. In the first period, the creditors of the bankrupt firm auction off either the entire firm or its control stake; while in the second period, bidders may re-trade it between each other.

We start from the second period in which the creditors trade between each other. Four observations are in order. First, independently from the number of bidders that participate in the auction this stage will take the form of a bilateral trade between the bidder who got the firm in the first period (say bidder 1) and the bidder that can maximize the ex-post value of the firm (bidder 2) – as long as these two bidders are not the same individual, of course. Secondly, if the entire firm is auctioned off in the first period, it is a weakly optimal strategy for the seller to trade only the control stake of the firm (which we assumed to be 50% of

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[5] Notice that this outcome holds true whether the auction is structured as a first- or a second-price auction.

the shares plus one) and retain the minority stake for himself. Thirdly, to keep the model of the bilateral trade as simple as possible we shall assume that with probability ψ the seller (bidder 1) will make a take-it-or-leave-it offer to the buyer (bidder 2), and with the complementary probability $1 - \psi$ the buyer will make a take-it-or-leave-it offer to the seller. Finally, notice that the highest price the buyer is willing to pay for the control stake of the firm is $\frac{1}{2}V_2$. Conversely, the lowest price the seller is willing to accept for the control stake of the firm is $\frac{1}{2}V_1$, if only the control stake of the firm is auctioned off in period one; and $\frac{1}{2}V = V_1 - \frac{1}{2}V_2$ if the entire firm is auctioned off in period one. [6] In both cases this price makes the seller indifferent between selling the control stake of the firm or retaining it for himself at a total value of V_1.

Consider first the case in which the entire firm is auctioned off in period one. The price the seller is able to obtain in period two for the control stake of the firm is

$$\frac{1}{2}\{V + \psi[V_2 - V]\}, \tag{1}$$

which yields a total revenue to the seller equal to

$$\Pi^* = \frac{1}{2}V_2 + \frac{1}{2}\{V + \psi[V_2 - V]\} = V_1 + \psi[V_2 - V_1]. \tag{2}$$

Eq. (2) identifies the highest willingness to pay of bidder 1 in the auction in period one and, hence, the equilibrium winning bid. In other words, Eq. (2) specifies the total returns to the creditors when they auction off the entire firm in period one. [7]

Conversely, in the case in which the creditors auction off only the control stake of the firm in period one the price the seller is able to obtain in period two is

$$\frac{1}{2}\{V_1 + \psi[V_2 - V_1]\}, \tag{3}$$

which is the equilibrium winning bid in the auction of the control stake in period one. Hence, the total returns to the creditors are

$$\Pi^{**} = \frac{1}{2}V_2 + \frac{1}{2}\{V_1 + \psi[V_2 - V_1]\}. \tag{4}$$

Clearly the returns to the creditors are greater when only the control stake of the firm is auctioned off in period one ($\Pi^{**} > \Pi^*$).

The intuition behind this result is simple. By auctioning off only a control stake of the firm the creditors can guarantee themselves a share of the future value of

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[6] For simplicity we assume that $2V_1 > V_2$. The whole analysis can be easily adjusted to account for the case in which the above inequality is not satisfied.

[7] Eq. (2) shows that it does not matter whether bidder 1 trades the entire firm or only its control stake in period two. He is in fact indifferent.

the firm $\frac{1}{2}V_2$ that is not going to be affected by the future trade (hence, the bargaining power) between bidders.

The phenomenon we analyze here is of the same nature as the phenomenon analyzed by Zingales (1995) in the case of an initial public offering. The main difference lies in the fact that while Zingales focuses on the difference in the private benefits from control of the two control holders of the firm (incumbent and raider) we focus instead on the difference in the transferable values of the firm in the hands of the two potential control holders (bidder 1 and 2).

3. Incentives to monitor

Another important feature of bankruptcy procedures is the protection of creditors' seniority, or the absolute priority rule. Some of the existing bankruptcy procedures, such as the Receivership in the UK, give all bargaining power to senior creditors, and consequently little violation to the absolute priority rule is observed. Others, such as Chapter 11 in the US, prescribe an active role for more junior creditors generating in this way considerable violations of the absolute priority rule (Franks and Torous, 1992). [8]

Both types of procedures achieve ex-post efficiency as long as the value of the firm is maximized. The degree of compensation of different classes of creditors may be seen in fact as a pure redistribution and therefore does not affect ex-post efficiency. How much the creditors expect to receive will, however, influence their incentives and therefore determine the ex-ante efficiency. We focus here on a specific – albeit very important – type of incentives: the creditors' incentives to monitor. It has often been argued that one role of the creditors is to monitor the debtor (Jensen and Meckling, 1976). We underline here one important trade-off. Achieving ex-post efficiency might require a violation of the absolute priority rule. However, such a violation is not always ex-ante efficient.

Any type of bankruptcy procedure may be modelled as a bargaining process. Different procedures would then correspond to different extensive forms of this bargaining game. For example Chapter 11 can be modelled as a bargaining game in which any of the creditors may propose one plan and all of them have to agree to it for the plan to be accepted. [9] The Receivership, instead, can be described as a bargaining game among creditors in which the creditor that owns the 'floating charge' has the right to make all the offers.

To see if a procedure achieves ex-post efficiency, we should therefore first of all ask: if a creditor proposes a plan that is ex-post efficient will it be accepted? In

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[8] To be more specific, under Chapter 11 violations of the absolute priority rules are frequently observed (Franks and Torous, 1989); however, their size is not conspicuous (Weiss, 1990).

[9] We assume that there is only one creditor per class.

principle, one would expect so, given that bargaining models with perfect information always achieve ex-post efficiency (this is just an application of the Coase Theorem). However, this is true only if we impose no restrictions on the strategies of the players.

The absolute priority rule could be interpreted as one of such restrictions. Thus, it is possible to think of situations in which ex-post efficiency implies the violation of the absolute priority rule; the key being the extensive form of the bargaining game.

Consider for example the bargaining game prescribed by the Chapter 11 procedure. The approval of all the classes of creditors is required for the selection of a reorganization plan. Since little or no restrictions are imposed on who can make proposals during the bargaining, these rules may lead to violations of the absolute priority rule. [10] Consider in fact a situation in which the highest value the insolvent firm may achieve, once it is reorganized, is lower than the amount of the most senior creditor's debt. Clearly, in this situation if the absolute priority rule is complied with, junior creditors will not receive any compensation from the reorganization plan. However, the only extensive forms of the bargaining game that would lead to this outcome would be one in which the senior creditor makes all the offers. Even if the junior creditor makes only one offer his compensation will be strictly greater than zero. [11] Given that Chapter 11 does not make prescriptions on the extensive form of the bargaining game, it is unlikely that the senior creditor will make all the offers and therefore it is likely that a violation of the absolute priority rule will prevail. [12]

It follows from the above discussion that in the situation described, if the extensive form of the bargaining game is such that the most senior creditor makes all the offers (as in the Receivership procedure) the absolute priority rule will never be violated. We have therefore identified two different procedures: both of them achieve ex-post efficiency, one in violation of the absolute priority rule, the other in compliance with it. The main issue is now whether the ex-post efficient allocation obtained in these two cases is also ex-ante efficient. In other words whether complying or not with the absolute priority rule has implications for ex-ante efficiency.

In what follows we look at one simple case and we show that violation of the absolute priority rule may in some cases induce too little monitoring, while in other cases it may encourage it (for a detailed analysis of this problem see Cornelli and Felli (1997a)).

Let I denote the down-payment required by an investment project which generates a random return. The entrepreneur who has the ability to undertake such

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[10] Cfr. Baird and Picker (1991), Bebchuk and Chang (1992) and Cornelli and Felli (1997a).

[11] We are considering for simplicity situations in which parties take turn in making offers.

[12] 'Cramming down', however, will limit the number of cases in which this may happen.

project, however, is cash constrained: he needs to raise the funds necessary for the investment. These funds are available from a group of creditors which are also cash constrained, hence the number of creditors the entrepreneur needs to contact is greater than one. The funds are raised from a senior creditor S in the amount $I_S < I$ at an interest rate r_S and from a junior creditor J in the amount $I_J = I - I_S$ at an interest rate r_J.

The investment project has random returns which depend on the realization of one of two states of nature. If the 'good' state of nature is realized, which occurs with probability p, the returns to the investment amount to $X > I_S r_S + I_J r_J$. If the 'bad' state of nature is realized, which occurs with the complementary probability $1 - p$, the returns will depend on whether at least one of the creditors monitors the debtor. Indeed, in the absence of monitoring, the returns amount to V', while if one creditor monitors, the project returns amount to $V > V'$.

Monitoring is costly for creditors. To keep the model as simple as possible we shall assume a fixed cost of monitoring in the amount of C. We start from the case in which $V < I_S r_S$.

We assume that it is efficient to monitor the project:

$$pX + (1 - p)V - C > pX + (1 - p)V', \tag{5}$$

or equivalently:

$$V - V' > \frac{C}{1 - p}. \tag{6}$$

We first analyse a situation in which creditors are compensated in compliance with the absolute priority rule. In our framework this means that in the bad state of nature the junior creditor does not receive any compensation. Clearly, the senior creditor is the only creditor that may have an incentive to monitor the debtor: the returns to monitoring occur only in the 'bad' state of nature and the junior creditor's compensation is zero in such a state. Condition (6) implies that the senior creditor will monitor the investment project. In fact, inequality (6) implies that the expected payoff to the senior creditor from monitoring the debtor is higher than his expected payoff from leaving the credit reach maturity without monitoring: [13]

$$pI_S r_S + (1 - p)V - C > pI_S r_S + (1 - p)V', \tag{7}$$

We can therefore conclude that when the absolute priority rule is complied with, the efficient outcome is achieved.

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[13] Notice that we restrict creditors to standard credit contracts. In other words we do not allow the creditor to offer an incentive contract to the debtor.

Consider now a situation in which, in spite of the relative seniority of creditors, the absolute priority rule is violated and the junior creditor receives a portion $(1 - \alpha)$ of the value V or V' depending on whether monitoring occurs. The important question is under which conditions would the senior or the junior creditor monitor the debtor. From the senior creditor's viewpoint the condition is that his expected returns from monitoring are higher than the expected returns from not monitoring:

$$pI_S r_S' + (1 - p)\alpha(V - I) - C > pI_S r_S' + (1 - p)\alpha(V' - I), \tag{8}$$

where r_S' denotes the interest rate in a bankruptcy regime in which the absolute priority rule is violated. From condition (8) we obtain the following necessary and sufficient condition for the senior creditor to monitor the debtor:

$$\alpha(V - V') > \frac{C}{1 - p}. \tag{9}$$

Symmetrically, the junior creditor will have the incentive to monitor the debtor if the following inequality holds:

$$pI_J r_J' + (1 - p)(1 - \alpha)(V - I) - C > pI_J r_J' + (1 - p)(1 - \alpha)(V' - I), \tag{10}$$

which gives the following necessary and sufficient condition for the junior creditor to monitor the project:

$$(1 - \alpha)(V - V') > \frac{C}{1 - p}. \tag{11}$$

Therefore a violation of the absolute priority rule may lead to a situation in which neither the senior nor the junior creditor will monitor the project although monitoring is efficient. In fact, it is possible to find parameter values in which inequality (6) is satisfied – monitoring is efficient – but both inequalities (9) and (11) are *not* satisfied – neither the senior nor the junior creditor will monitor the debtor.

Notice that a complete reversal of seniority when violating the absolute priority rule ($\alpha = 0$) will induce the junior rather than the senior creditor to monitor the debtor. This feature of the model comes from the fact that we assumed that both creditors have the same monitoring technology. If junior creditors (for example, bond holders) have a less efficient technology than senior creditors (banks) this feature of the model will disappear. [14]

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[14] Cfr. Burkart et al. (1995) for a theory of banks' seniority based on banks' lower monitoring costs and Welch (1996) for the alternative theory based on the banks' lower costs of conflict resolution.

Assume now that $V > I_S r_S + I_J r_J$ and $V' < I_S r_S$. If there is no violation of the absolute priority rule, then the senior creditor will monitor if and only if

$$I_S r_S - C > p I_S r_S + (1 - p) V';$$ (12)

that is, if

$$I_S r_S - V' > \frac{C}{1 - p}.$$ (13)

The junior creditor, on the other hand, will monitor if and only if

$$I_J r_J - C > p I_J r_J;$$ (14)

that is, if

$$I_J r_J > \frac{C}{1 - p}.$$ (15)

Since $V > I_S r_S$ and $V - V' > I_J r_J$, from Eqs. (13) and (15) it follows that there are situations in which neither the junior not the senior creditor will monitor the debtor, although monitoring is efficient. If instead a violation of the absolute priority rule occurs, the senior creditor will be more likely to monitor,

$$I_S r_S - \alpha V' > \frac{C}{1 - p},.$$ (16)

and the junior creditor will be less likely to monitor,

$$I_J r_J - (1 - \alpha) V' > \frac{C}{1 - p}.$$ (17)

However, for some parameter values the overall result is that monitoring will occur more frequently. Therefore, violations of the absolute priority rule may improve ex-ante efficiency.

4. Concluding remarks

This paper highlights the importance of protecting creditors' claims for the efficiency properties of a bankruptcy procedure. In particular the paper identifies two main effects. First, the maximization of the creditors' overall proceeds from the bankruptcy has clear ex-ante efficiency benefits and requires the explicit allocation of the ownership rights on the insolvent firm to the creditors before the reorganization plan is selected. This enables the creditors to allocate on the market only the control stake of the insolvent firm, and in doing so maximize the proceeds from the reorganization. Secondly, the distribution of these proceeds among the creditors has also ex-ante efficiency effects on the creditors' incentives to monitor the firm's behaviour. We demonstrate that the need to create monitoring incentives

for the creditors may not be compatible with a procedure that either always complies with or always violates the absolute priority rule.

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