

Corporate Bankruptcy

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The first section of this article briefly describes bankruptcy procedures in the United States and other countries. The second section describes some of the important economic issues and tradeoffs in bankruptcy.

1. Bankruptcy Law

Most countries have two bankruptcy procedures, one for liquidating the assets of failing firms and the other for reorganizing failing firms.

Bankruptcy liquidation

The bankruptcy liquidation procedure in the United States is called Chapter 7. When a firm files under Chapter 7, the bankruptcy court appoints a trustee who shuts the firm down and sells its assets. The bankruptcy priority rule that determines how the proceeds of the sale are divided is called the “absolute priority rule.” It specifies that claims are paid in full in the following order: first, administrative expenses of the bankruptcy process itself; second, claims taking statutory priority, such as tax claims, rent claims, and unpaid wages and benefits; and, third, unsecured creditors’ claims, including those of trade creditors, long-term bondholders, and holders of damage claims against the firm. Subordination agreements which specify that certain unsecured creditors rank above others in priority are followed; otherwise all unsecured creditors’ claims have equal priority. Equity holders receive the remainder, if any.

Secured creditors are outside the priority ordering. They have bargained with the firm for the right to claim a particular asset or its value if the firm defaults and/or files for bankruptcy. Secured creditors thus may receive a payoff in bankruptcy even when all other creditors receive nothing.

The bankruptcy liquidation procedures in the United Kingdom, Germany and France are similar, but are less frequently used. In Germany, the high costs of filing for bankruptcy discourage firms from filing. In the U.K., a particular type of creditor—called a floating charge creditor—has a blanket security interest in all of the firm’s assets not subject to

other secured creditors' liens. If the firm defaults, this creditor has the right to begin liquidating any assets of the firm that are not subject to secured creditors' liens. Bankruptcy liquidation begins only after the floating charge creditor has been repaid.

Bankruptcy reorganization

The bankruptcy reorganization procedure in the U.S. is called Chapter 11. Managers of firms in financial distress have the right to choose between filing for bankruptcy under Chapter 7 or Chapter 11. Under Chapter 11, existing managers of firms usually remain in control as “debtors-in-possession,” they have the exclusive right for at least six months (and normally much longer) to propose a reorganization plan for the firm and they have substantial control over the bargaining process generally. The reorganization plan specifies how much each creditor will receive in cash or new claims on the firm.

There are two separate procedures for adopting a plan. Under the most commonly used of the two, all classes of creditors and equity as a class must vote in favor of the plan. Creditors must receive at least what they would be entitled to if the firm liquidated and the proceeds were distributed according to the absolute priority rule. For each class of creditors, the required voting margin in favor of the plan is at least two-thirds in amount and one-half in number of claimants and, for equity, the voting margin is at least two-thirds of all shares. The payoff patterns under Chapters 7 versus 11 differ strongly. Under Chapter 7, high priority and secured creditors tend to receive full payoff and low priority creditors and equity receive nothing at all, while under Chapter 11, each class of creditors and equity receives partial payment. Assuming that reorganizing the firm causes it to be worth more than its assets would bring in liquidation, Chapter 11 provides a framework within which creditors and managers bargain over the distribution of the extra value.

There is also a procedure—called “cramdown”—under which a Chapter 11 reorganization can be adopted by the bankruptcy judge despite being voted down by one or more class of creditors. This procedure has higher costs and is much less frequently used.

If the parties fail to adopt a reorganization plan proposed by managers, then creditors are eventually allowed to offer their own plans. If no plan proposed by creditors is adopted, then eventually either the bankruptcy judge orders that the firm be liquidated under

Chapter 7 or the firm may be offered for sale as a going concern under Chapter 11. In the latter case, the proceeds are distributed according to the absolute priority rule.

Firms in Chapter 11 benefit from a number of provisions intended to increase the probability that they successfully reorganize. Managers are allowed to retain pre-bankruptcy contracts that are profitable and reject pre-bankruptcy contracts that are unprofitable (while non-bankrupt firms are required to complete all their contracts). They are allowed to terminate underfunded pension plans and the government picks up the uncovered pension costs. Firms' obligation to pay interest to most creditors ceases when they file for bankruptcy. With the bankruptcy court's approval, firms in bankruptcy may give highest priority to creditors who provide post-bankruptcy loans, even though much of the payoff to these new creditors will come at the expense of pre-bankruptcy creditors. Also, the firm escapes any obligation to pay taxes on debt forgiveness under the reorganization plan until it becomes profitable.

The United Kingdom, France and Germany have all recently adopted new bankruptcy procedures intended to encourage reorganization of firms in financial distress. However these procedures differ substantially from Chapter 11 and also differ among themselves. In all three countries, pre-bankruptcy managers are given much less power over the reorganization process than under Chapter 11. Instead of managers choosing between liquidation and reorganization procedures in bankruptcy, the bankruptcy judge or an official appointed by the bankruptcy court makes the decision and, if reorganization is chosen, the official formulates the reorganization plan. In France, bankruptcy officials appointed to decide whether firms in bankruptcy will be liquidated or reorganized have as their primary objective "safeguarding the business." In the United Kingdom, managers may petition the bankruptcy court to initiate a reorganization procedure called an "administration order." However floating charge creditors have the right to block administration orders, so that the procedure is infrequently used. In Germany, the bankruptcy reorganization procedure has also been infrequently used, because of high costs and high minimum payoff requirements. As a result, most reorganizations of financially distressed firms have tended to occur outside of any formal bankruptcy procedure. (See White, 1996, for a description and comparison of bankruptcy procedures in the United States, the United Kingdom, France and Germany.)

Payoff patterns in bankruptcy

For reasons of data availability, most of the empirical research on bankruptcy has concentrated on large American firms that have publicly traded debt or equity. Most large firms that are financially distressed reorganize rather than liquidate in bankruptcy, so that there is little data available on payoff rates to creditors in Chapter 7 bankruptcies. What data are available suggest that payoff rates under Chapter 7 tend to be very low. Most of the empirical research has concentrated on measuring how often Chapter 11 reorganization plans deviate from the absolute priority rule by making positive payoffs to junior creditors and/or equity when senior creditors receive less than full payoff. Studies by Franks and Torous 1989, Weiss 1990, LoPucki and Whitford 1990, and Eberhart *et al* 1990 find that violations of the absolute priority rule occur in half to three-quarters of all large firm reorganizations. Unsecured creditors typically receive payoff rates of between .50 and .70 in Chapter 11 reorganizations. Also, the average time from filing to approval of a reorganization plan is 1-2 years. Additional evidence suggests that Chapter 11 is not a cure for financially ailing firms. Hotchkiss 1995 found that about one-third of firms that reorganized under Chapter 11 underwent further financial restructuring within a few years.

Violations of the absolute priority rule in large firm reorganizations under Chapter 11 can be quantified by regressing the amount paid to equity as a fraction of unsecured creditors' claims on the amount paid to unsecured creditors as a fraction of their claims (*i.e.*, the payoff rate to unsecured creditors). Using data from studies by LoPucki and Whitford 1990 and Eberhart *et al* 1990, the results show that equityholders receive a minimum payoff of about 5 percent of the amount owed to creditors, regardless of how much creditors receive. Thus in return for agreeing to a reorganization plan, equityholders demand and get a minimum of 5 percent of creditors' claims even when firms are clearly insolvent. As creditors' payoff rate increases, the payoff to equity as a proportion of creditors' claims rises at an increasing rate. When creditors' payoff rate is around .50—a common figure—equity receives about 15% of creditors' claims. When creditors' payoff rate is around .90, equity receives about 40% of creditors claims. The fact that the payoff rate to equity rises at an increasing rate is consistent with equityholders being compensated for giving up their option on the firm's future earnings (see below for discussion).

2. Economic issues and tradeoffs in bankruptcy

In this section, I discuss some of the important economic issues and tradeoffs in bankruptcy, using a series of examples.

Creditors' incentive to race to be first to liquidate failing firms' assets

By definition, an insolvent firm has assets whose value is less than the total amount of creditors' claims. If unsecured creditors perceive that a firm is or may be insolvent, they anticipate that it will not be able to repay all its creditors in full and—as in a bank run—they have an incentive to race against each other to be first to collect from the firm. Unsecured creditors race to collect by declaring their loans in default and suing the firm for repayment. (Secured creditors have less incentive to race against each other since they can foreclose on their collateral if default occurs.) When unsecured creditors win their lawsuits, they have the right to liquidate any assets of the firm not subject to secured creditors' liens. But when individual creditors liquidate assets piecemeal, they disrupt the firm's operations and may force it to shut down even when the best use of its assets is continued operation. Also individual creditors are concerned only with repaying their own claims, not with selling the firm's assets for their maximum value (Jackson 1986).

The race by creditors to be first to collect from failing firms is an example of the prisoner's dilemma and may lead to inefficient use of failing firms' assets (Webb 1991). Suppose a firm has two creditors of equal priority, $C1$ owed 5 and $C2$ owed 4. If one or both of them races to be first to collect, then suppose the firm's assets will be liquidated piecemeal and will be worth 5 in total. As shown in Figure 1, if $C1$ races to collect but $C2$ does not, then $C1$ gets full repayment of 5 and $C2$ gets zero; while if $C2$ races to collect and $C1$ does not, then $C2$ gets full repayment of 4 and $C1$ gets 1. If they both race to collect, then suppose the expected outcome is that $C1$ gets 3 and $C2$ gets 2. Alternatively if the two creditors agree not to race against each other, then suppose the firm's assets would be worth 7 rather than 5. The assets are worth more when creditors do not race to collect because they are sold all at once rather than piecemeal and/or because they are sold when they have maximum value. Then both creditors would be paid 7/9ths of their claims, so that $C1$ receives 3.9 and $C2$ receives 3.1. Although both creditors are better off

in the no race outcome, the only equilibrium of the game occurs where they both race to be first.

Figure 1: Creditors' Incentive to Race to be First

	<i>C2 doesn't race</i>	<i>C2 races</i>
<i>C1 doesn't race</i>	3.9, 3.1	1, 4
<i>C1 races</i>	5, 0	3, 2

In this context we can interpret bankruptcy liquidation as a mandatory procedure which imposes the efficient, no race outcome. Suppose when a firm files for bankruptcy, all lawsuits by creditors are suspended and a bankruptcy trustee is appointed to sell all of the firm's assets in the most efficient way. The resulting increase in value of the assets is the justification for imposing bankruptcy liquidation as a mandatory collective procedure. This consideration is not just theoretical. LoPucki (1983) presented evidence that many bankruptcy filings in the United States occur because creditors were about to foreclose on valuable assets and force firms to shut down. In Germany and the United Kingdom, liquidations of failing firms' assets tend to be private rather than collective and failing firms are thought to shut down prematurely as a result.

Investment incentives, priority rules, and the bankruptcy decision

While creditors have an incentive to shut down failing firms prematurely by racing to be first to collect, managers of these firms may have an incentive to delay bankruptcy as long as possible, because they lose their jobs and equity loses its value when the firm is liquidated. This can also give rise to inefficient bankruptcy decisions.

The bankruptcy decision has often been modeled by assuming that equityholders and a working capital lender form a coalition which ignores the interests of other creditors (Bulow and Shoven 1978, White 1980 and 1989, and Gertner and Scharfstein 1991). Suppose bankruptcy filings must be voluntary and assume that the only bankruptcy procedure is liquidation. A failing firm has debt due immediately of 2 and debt due next period of 5. It has no cash. The liquidation value of the firm's assets is 7, but if it continues to operate until next period, it will earn either 5 or 8, each with .5 probability. In this example

liquidation is economically efficient since the firm's expected future earnings of 6.5 are less than the liquidation value of its assets. However managers and equity wish to avoid liquidation since it wipes out the value of equity. Because the firm must repay debt of 2 immediately and has no cash, it must find a lender who will lend it 2 in order to avoid liquidation. Suppose a new lender is considering making the loan, which could rank either higher or lower in priority than the old loan of 5. If the new loan is made, the firm will continue to operate for one more period and then will be liquidated. The combined return to the coalition of equity and the new lender if the new loan ranks lower than the old is $.5(5 - 5) + .5(8 - 5) - 2 = -.5$; while the coalition's return if the new loan ranks higher than the old is $.5(2) + .5(3) - 2 = .5$. (In the latter case, the coalition receives the first 2 of earnings and also receives the last 1 of earnings if the firm earns 8.) Thus the coalition prefers liquidation if the new loan would rank below the old but prefers continuation if the new loan would rank above the old. Since liquidation is the economically efficient outcome, the result is that continuation occurs too often.

The economically inefficient decision for the firm to continue operating in this example results from a combination of the coalition benefiting by shifting priority so that the last lender ranks above the earlier lender and the coalition benefiting by using the earlier lender's funds to gamble on the risky investment of continuing the firm's operations. There are many ways for managers of failing firms to shift priority so that late lenders take priority; examples include giving the late lender a security interest in some asset of the firm not already subject to a creditor's lien or the firm filing to reorganize under Chapter 11 and giving the later lender super-priority as a post-bankruptcy administrative expense. Equity's incentive for the firm to engage in risky investments because equity benefits from the up-side risk while creditors bear the down-side risk applies also to the risky investment of continuing the firm's operations. The riskier the firm's future earnings, the more strongly the coalition prefers that the firm continue operating, regardless of whether doing so is economically efficient.

When reorganizing in bankruptcy is a possibility, the coalition has an additional incentive to keep the firm operating—that of obtaining partial forgiveness of debt under a Chapter 11 reorganization plan. In the example just discussed, suppose the earlier lender

is willing to accept a reorganization plan that calls for 50% debt forgiveness. In that case the coalition's expected return from filing under Chapter 11 becomes $.5(2.5) + .5(5.5) = 4$. (Here the first 2 of the firm's earnings goes to the new lender, the next 2.5 goes to the old lender, and the equity receives the remainder, so that the coalition receives 2.5 if the firm earns 5 and 5.5 if the firm earns 8.) The next two sections give reasons why creditors may be willing to agree to reorganization plans that provide for debt forgiveness.

Because managers and equityholders have an incentive to avoid or delay liquidation of failing firms even when liquidation is the most economically efficient outcome, it should not be surprising that payoff rates to creditors in Chapter 7 are very low. There would be an efficiency gain from measures that either reduced managers' incentive to delay filing for bankruptcy or provided an incentive for creditors to initiate early, involuntary bankruptcy filings. In the United Kingdom, France and Germany, both managers and the firm's bank face the possibility of civil or criminal penalties if the firm delays filing. In addition, creditors may initiate involuntary bankruptcy filings. In the United States, there are no penalties for delay and it is difficult for creditors to initiate involuntary bankruptcy filings. However, managers are encouraged to file for bankruptcy voluntarily because Chapter 11 is favorable to their interests, as discussed above. Thus a justification for violating the absolute priority rule and for treating managers favorably in bankruptcy reorganization is that doing so reduces managers' incentives to waste the firm's assets in avoiding or delaying bankruptcy.

Bargaining in Chapter 11

When firms file to reorganize under Chapter 11, creditors and equity must bargain over and eventually adopt a reorganization plan; otherwise the firm is liquidated. The rules of Chapter 11 specify many aspects of the bargaining environment, such as that managers have the exclusive right to propose the initial reorganization plan, that all classes of creditors and equity must consent to the plan, and that eventually the firm must be liquidated if no plan is agreed on.

Bebchuk and Chang (1992) propose a model of the Chapter 11 bargaining process which shows how the rules of Chapter 11 affect the division of value of the firm between creditors

and equity. To illustrate, suppose a firm that has just filed under Chapter 11 has assets worth 10 and debt due immediately of 11. Managers—representing equity—have the right to offer the first reorganization plan and creditors must either accept or reject. If they reject, a second round of bargaining occurs in which either side may offer a reorganization plan and the other side must accept or reject. If the second plan is not adopted, then suppose the bargaining ends, the firm’s assets are liquidated, and the absolute priority rule is used to divide the proceeds. (More rounds of bargaining could be incorporated, but would complicate the example unnecessarily.) The firm’s value is assumed to change over time. Because delay is costly, the value of the firm’s assets declines by 1 during each round of bargaining. In addition, the value of the firm’s assets either rises or falls by 3 during each round of bargaining. Thus at the end of round 1, the value of the firm’s assets will either be 6 or 12 with equal probability. At the end of round 2, the value of the firm’s assets will be 2 with .25 probability, 8 with .50 probability or 14 with .25 probability.

In a common knowledge, sequential bargaining game, the party making the offer each period offers the other party an amount equal to what the recipient would get if agreement were reached one period later, which means that the offering party keeps the entire gain from reaching an agreement one period earlier. Given the offer, the recipient is indifferent between accepting the current offer or reaching agreement one period later and, therefore, accepts the current offer. Using backwards induction, each period there is no incentive to delay reaching an agreement and, therefore, in equilibrium the parties reach agreement at the earliest opportunity.

In the example, suppose creditors made the second round offer. Creditors would offer equity what equity expects to receive if no agreement were reached in the second round and the firm’s assets were liquidated. In this case equity would receive 3 if the firm’s assets were worth 14 and zero otherwise, so that equity’s expected value in liquidation is $.25(3) = .75$. Now suppose equity rather than creditors made the second round offer. Equity would propose to keep what it would receive if the firm liquidated, or .75, plus equity would keep the savings from making an agreement during round 2, which is 1. Thus in round 2, equity would propose to keep 1.75 and to give creditors the rest. Since both sides have equal probability *ex ante* of proposing the second reorganization plan, equity expects to receive

1.25 in round 2. Now consider round 1, where equity has the exclusive right to make the offer. Equity is assumed to offer creditors what they would receive if the parties agreed to a plan in round 2 rather than round 1. Since equity expects to receive 1.25 in round 2, it proposes to keep 1.25 plus the gain from an agreement being reached in round 1 rather than round 2, which is 1. Since the value of the firm in round 1 is 10, equity offers creditors $10 - 2.25 = 7.75$ in round 1 and creditors have no better alternative than to accept. Thus the outcome is for the parties to agree in round 1 to a reorganization plan which gives 2.25 to equity and 7.75 to creditors.

Now consider how the features of Chapter 11 affect the division of value of the firm. The right to propose the plan each period is valuable because the party having the right keeps the value of making an agreement one period earlier. In the example, equity's share of the firm's value is 2.25, but it would 2.75 if equity had the exclusive right to make the offer in both rounds rather than only the first. The increase in equity's share results because equity keeps all—rather than half—of the gain from an agreement being made in round 2. A second aspect of Chapter 11 is that equity must agree to the reorganization plan. Equity has an option on the firm and, because the value of the firm's assets is uncertain, equityholders have an interest in delaying agreeing to a reorganization plan in order to play out the option. Creditors must therefore compensate equity for giving up the option by agreeing to a plan. It is well known that the value of options increases as the volatility of the firm's earnings increases, so that equity gets more in bargaining over a Chapter 11 plan as the firm's earnings become more risky. In addition, the value of the option rises at an increasing rate as the initial value of the firm's assets increases. If the initial value of the firm's assets in the example is between 0 and 7 (but everything else remains the same), equity always receives 1.50. But if the initial value of the firm's assets is between 8 and 13, the value of equity increases by .25 for each unit increase in the initial value of the firm's assets. This pattern is consistent with the empirical pattern discussed above in which the payment to equity as a fraction of creditors' claims rose at an increasing rate as the payoff rate to creditors increased.

Filtering failure in bankruptcy

Some financially distressed firms are economically inefficient and should shut down, since the value of their assets is greater in some other use. An example is a Mexican restaurant in a city where the latest fad is Jamaican food, since the Mexican restaurant's furniture and equipment can easily be moved to a Jamaican restaurant where it would have higher value. There is an efficiency gain from liquidating the assets of these firms, thus allowing them to move to higher value uses. Others financially distressed firms are economically efficient and should continue to operate—at least temporarily—since their assets have no greater value in any other use. Railroads are an example, since their embankments and rails are costly to move and have higher value if they remain in place and part of a rail network. There is an efficiency gain from saving these firms. Bankruptcy reorganization in the United States in fact developed as a means of saving financially distressed railroads whose secured creditors would otherwise have foreclosed on and liquidated particular sections of track (Baird 1992).

Thus there is an efficiency justification for having two separate bankruptcy procedures: a liquidation procedure for firms that are economically inefficient and financially distressed and a reorganization procedure for firms that are economically efficient but financially distressed. However, while financial distress is easily observable, economic efficiency depends on such unobservables as the earnings of the firm's assets in their best alternative use. Type I error occurs when firms that are financially distressed but economically efficient firms are liquidated and type II error occurs when economically inefficient, distressed firms are saved. The cost of type I error is loss of firm-specific human capital and extra transactions costs (since these firms are likely to be reopened), while the cost of type II error is that of retaining assets in inefficient, outmoded uses. Filtering failure occurs when the bankruptcy procedure generates either type of error.

Different countries use different means of assigning financially distressed firms to bankruptcy liquidation or reorganization procedures and, as a result, they have different levels of type I versus type II error. In the United Kingdom and Germany, bankruptcy reorganizations are rare, so that high levels of type I error probably occur. In France, bankruptcy court-appointed officials have the responsibility to decide whether or not to save failing

firms. If these officials made unbiased decisions, then type I and type II errors would tend to occur with equal frequency. But since these officials' primary goal is to save distressed firms, high levels of type II error presumably occur. In the United States, managers have the right to choose between Chapters 7 and 11, which suggests that high levels of type II error are likely to occur.

White, 1994, uses an asymmetric information game to model whether U.S. bankruptcy procedures lead to filtering failure. Figure 1 gives an example. [Insert Figure 1 about here.] A chance event determines whether financially distressed firms are economically efficient or inefficient, where the proportion that are economically efficient is assumed to be .4. Managers are assumed to know whether their firms are efficient, but creditors do not. Managers of efficient firms always file under Chapter 11 and they propose a reorganization plan in the form of a take-it-or-leave-it offer to creditors. There are two types of reorganization plans: those involving high payments to creditors and those involving low payments to creditors. Managers of efficient firms choose which type of plan to offer. In contrast, managers of inefficient firms choose between liquidating under Chapter 7 versus filing under Chapter 11 and offering low payment reorganization plans which are identical to those offered by efficient firms.

Creditors are all assumed to be identical. When managers file under Chapter 11, creditors must decide whether to accept or reject managers' proposed plans. Creditors always accept high payment plans, but they may either accept or reject low payment plans. Creditors are assumed to know the overall probability that failing firms are efficient, but not whether individual firms are efficient or inefficient—as indicated by the dashed line in Figure 1. If creditors accept low payment plans, then these plans go into effect and the game ends. If creditors reject low payment plans, then I assume that individual firms' types are revealed, either because the old managers are replaced by new managers who give creditors more information or because firms' assets are sold at auction. Creditors receive more when firms turn out to be efficient.

Payoffs to managers and creditors, respectively, are shown in parentheses in Figure 1. Managers of efficient firms receive 3 with certainty if they offer high payment plans, but they gamble if they offer low payment plans, since they receive 4 if creditors accept, but

only 2 if creditors reject. Managers are better off if creditors accept a low payment rather than a high payment plan, since the firm pays out less in the former case. But managers are worse off if they propose a low payment plan and creditors reject than if they had proposed a high payment plan. Managers of inefficient firms receive 1 with certainty if they choose Chapter 7, but they gamble if they offer low payment plans, since they receive 2 if creditors accept, but only .5 if creditors reject. Managers of inefficient firms benefit from filing under Chapter 11 if creditors accept low payment plans, since the firm benefits from debt forgiveness and other subsidies to firms in reorganization and since managers remain in control of the firm at least for a period. But they are hurt if they file under Chapter 11 and creditors reject low payment plans, since managers are then replaced. Remaining outside of bankruptcy and filing eventually under Chapter 7 is managers' intermediate outcome, since they remain in control of the firm until it eventually shuts down.

If managers offer low payment reorganization plans, creditors receive a sure payoff of 1.9 if they accept. But they gamble if they reject, since they receive 3 or 1 if the firm turns out to be efficient or inefficient, respectively. (Although the low payment amount is assumed to equal 1.9 in the example, it is endogenously determined.)

The model incorporates many important features of U.S. bankruptcy law. It captures the fact that managers of failing firms have the right to choose between filing under Chapter 7 or Chapter 11 and that they have the exclusive right to propose the first reorganization plan. It also captures managers' ability to control information flows about the firm during at least the initial period of reorganization, since creditors are unable to determine the firm's type at the time that managers propose the reorganization plan. But if managers do not propose a plan that creditors are willing to accept, then bankruptcy courts eventually reduce managers' power and this is reflected in the model by the fact that managers learn firms' types if the reorganization plan is rejected. The model ignores the fact that firms generally have multiple classes of creditors who are treated differently in bankruptcy.

The solution to the model in Figure 1 is that managers of both efficient and inefficient firms always offer low payment reorganization plans under Chapter 11 and creditors always accept these plans. Creditors' expected return if they accept low payment plans is 1.9, which is higher than their expected return of $.4(3) + .6(1) = 1.8$ if they reject. Creditors

therefore always accept low payment plans. And since creditors always accept these plans, managers always offer them. Managers of inefficient firms receive a payoff of 2 if they offer low payment plans and creditors accept, compared to only 1 if they file under Chapter 7. Managers of efficient firms receive a payoff of 4 if they offer low payment plans and creditors accept, compared to a payoff of only 3 if they offer high payment plans. Therefore all failing firms file and successfully reorganize under Chapter 11.

In this example, there is type II error, since economically inefficient firms reorganize in bankruptcy even though the value of their assets would be higher if they liquidated. This equilibrium has the maximum amount of type II bankruptcy error, because all inefficient distressed firms reorganize under Chapter 11. The inefficient equilibrium occurs because managers of both types of failing firm benefit when creditors cannot distinguish between them: managers of efficient firms benefit because creditors accept a lower payment than they would be willing to accept if they knew that the firm were efficient; while managers of inefficient firms benefit because they are able to reorganize under Chapter 11. Creditors are willing to accept low payment reorganization plans because there are relatively few efficient firms in bankruptcy, so that their expected return when they reject these plans is low.

Other types of equilibrium may also occur in the model, however. Suppose the probability that failing firms are efficient rises from .4 to .6. Now creditors' expected return if they reject low payment plans is $.6(3) + .4(1) = 2.2$. Since this is greater than their payoff of 1.9 if they accept, they always reject. As a result, all managers of inefficient firms liquidate under Chapter 7 and all managers of efficient firms reorganize by offering high payment plans under Chapter 11. This equilibrium represents the best possible outcome in bankruptcy since there is no error of either type. Finally, partial pooling equilibria may also occur in which some but not all inefficient firms succeed in reorganizing under Chapter 11.

Thus the model shows that the American system of having separate liquidation and reorganization procedures in bankruptcy and allowing managers to choose between them could lead to either very high or very low levels of type II error in bankruptcy. It is therefore impossible to argue based on theory that the American bankruptcy system is more or less efficient than alternative bankruptcy systems.

Non-bankruptcy workouts, costly bankruptcy, shirking and underinvestment

Because bankruptcy procedures are costly, creditors and managers often attempt to avoid filing for bankruptcy by renegotiating the debt of financially distressed firms outside of bankruptcy. Such renegotiations—often called workouts—usually lead creditors to forgive part of the firm’s debt. Workouts are common in the United States (see Schwartz 1993, Gilson *et al* 1990, Asquith *et al* 1994, Gilson and Vetsuypens 1994, Franks and Torous 1994, and Tashjian *et al* 1996 for discussion and data) and are probably even more common in countries such as the United Kingdom and Germany, where the incentive to avoid bankruptcy is even greater since reorganizations in bankruptcy are rare. However Hart and Moore 1989 suggest that this ex post incentive for creditors to forgive debt may give managers an incentive to cheat by declaring financial distress even when the firm is solvent, since in an asymmetric information context creditors may not be able to determine the firm’s true financial state. This in turn may lead to other inefficiencies such as managers shirking and creditors underinvesting in the firm.

Consider the example in Figure 2. [Figure 2 about here.] Suppose in the past that creditors made loans to firms. A chance event determines whether each firm is solvent or insolvent at the time the loan comes due, where s denotes the probability that firms are solvent. Managers know whether their particular firms are solvent or insolvent and must decide whether to declare financial distress and demand that creditors agree to a workout versus to repay their debt in full. Managers of insolvent firms are assumed always to declare financial distress, but managers of solvent firms may either repay creditors in full or imitate managers of insolvent firms by declaring financial distress. After managers declare financial distress, they propose a workout in the form of a take-it-or-leave-it demand that creditors forgive part of the firm’s debt. Creditors are assumed not to know whether individual firms are solvent or insolvent, although they know the overall probabilities. They must decide whether to accept or reject the workout proposal. If creditors accept, then the workout goes into effect and the game ends. If creditors reject, then individual firms’ types are revealed, because creditors declare the firm in default and may intervene in the firm’s management and/or replace the existing managers. If the firm turns out to be solvent, then it repays creditors in full. If the firm turns out to be insolvent, then it files

for bankruptcy (in the example it does not matter whether liquidation or reorganization occurs in bankruptcy). Bankruptcy is assumed to be costly, so that all parties do badly.

Figure 2 shows managers' and creditors' payoffs, respectively, in parentheses. An important assumption is that managers of solvent firms gamble when they declare financial distress and offer a workout, since they receive 4 if creditors accept and 2 if creditors refuse, compared to 3 if they do not demand workouts and instead repay in full. Creditors similarly gamble if they reject managers' workout proposals. Creditors receive a payoff of 2 regardless of the firm's type if they accept workout proposals, while if they refuse they receive 2.5 from solvent firms and—because bankruptcy is costly—0 from insolvent firms. Creditors also receive 2.5 if managers of insolvent firms choose to repay in full.

Suppose initially that $s = .3$ and that bankruptcy is costly. In this case the equilibrium outcome is that all managers of solvent and insolvent firms declare financial distress and offer workout proposals and creditors always accept. Creditors' certain return of 2 from accepting workout proposals when managers declare financial distress exceeds their expected return of $.3(2.5) + .7(0) = .75$ when they refuse. Given that creditors always agree to workout proposals, managers of solvent firms always declare financial distress, since their return of 4 if they do so exceeds their return of 3 if they do not. Thus when bankruptcy is costly, creditors and managers jointly gain when they avoid it by negotiating a non-bankruptcy workout. But this gives managers an incentive to cheat by declaring financial distress even when their firms are solvent.

Costly bankruptcy may also distort managers' incentive to expend effort in managing their firms and cause them to shirk. Suppose managers choose an effort level at the beginning of the game which affects the probability that their firms turn out to be solvent. In particular, suppose when managers use low effort, the probability that their firms turn out to be solvent is $s = .3$, as previously assumed. But when managers instead use high effort, s rises from $.3$ to $.9$. Working harder makes managers worse off, however, so that their Figure 2 payoffs all fall by $.4$ when they use high effort. (Creditors' payoffs remain the same.) When managers use high effort, a mixed strategy rather than a pure strategy equilibrium prevails. Creditors accept workout proposals with $.5$ probability, so that managers of solvent firms are indifferent between repaying in full and proposing

workouts, since their expected return of $.5(4) + .5(2) = 3$ when they propose workouts is the same as their certain return of 3 when they repay in full. Given that managers of solvent firms may either default or repay, creditors use Bayes' Law to determine an updated probability s' that firms are solvent given that default has occurred, where $s' = ds/(ds + 1 - s)$ and d is the probability that managers of solvent firms default and propose workouts. Creditors are indifferent between accepting and rejecting workout proposals if their expected return when they reject, which is $2.5s' + (1 - s')0$ is the same as their certain return when they accept, which is 2. These conditions imply that the default rate d by managers of solvent firms must be .444. Thus when managers use high effort, a mixed strategy equilibrium occurs in which managers of solvent firms default and demand workouts with probability .444 and creditors accept workout proposals with probability .5. Managers of solvent firms are much less likely to cheat when they use high effort, since the probability of cheating is .444 under high effort compared to one under low effort. (Note that the model has no separating equilibrium in which managers of solvent firms always repay in full. This is because if managers of solvent firms always repaid in full, then the only firms that defaulted would be insolvent firms and creditors would then find it in their interest always to accept workout proposals. But if creditors always accepted workout proposals, then managers of solvent firms would choose to default rather than repay.)

Now consider whether managers make economically efficient decisions when they choose between high versus low effort. (See table 2.) Under low effort, managers' expected return is $.3(4) + .7(2) = 2.6$ and creditors' return is always 2. Together they receive $2.6 + 2 = 4.6$. Under high effort, managers' expected return is $.9[.444(.5(4) + .5(2)) + (1-.444)3] + .1[.5(2) + .5(1)] = 2.85$ and creditors' expected return is $.9[.444(.5(2) + .5(2.5)) + (1-.444)(2.5)] + .1[.5(2) + .5(0)] = 2.25$. Together they receive $2.85 + 2.25 = 5.1$, from which the cost of using high effort must be subtracted, so that the net return from using high effort is $5.1 - .4 = 4.7$. Since $4.7 > 4.6$, it is economically worthwhile for managers to use high effort. However, managers' expected return when they use low effort, 2.6, exceeds their net return of $2.85 - .4 = 2.45$ when they use high effort. Thus managers use low effort even when high effort is economically efficient. Managers' incentive to use high effort is reduced because the change in the type of equilibrium allows creditors to capture some of the return from managers' extra effort.

Because managers prefer the always cheat/use low effort equilibrium to the sometimes cheat/use high effort equilibrium, investment incentives are also distorted. Creditors' expected payoff in the low effort equilibrium is 2, while their expected payoff in the high effort equilibrium is 2.25. Assuming that the loan market is competitive, lenders who anticipate that the low effort equilibrium will prevail will be willing to make loans to the firm only if their opportunity cost of funds is less than 2. But if lenders anticipated that the high effort equilibrium prevailed, then they would be willing to make loans if their opportunity cost of funds were as high as 2.25. Assuming that lenders correctly anticipate managers' behavior, they will refuse to lend if their opportunity cost of funds is between 2 and 2.25. Thus cheating by managers may cause underinvestment.

Now suppose the bankruptcy procedure becomes more efficient, so that the assets of firms in bankruptcy are worth more. (See Roe 1983, Bebchuk 1988, Aghion *et al* 1992, Baird 1993, Adler 1994, and Rasmussen 1994 for discussions of reform proposals intended to reduce bankruptcy costs.) Since a more efficient bankruptcy procedure mainly benefits creditors, suppose when insolvent firms file for bankruptcy, creditors' payoff in figure 2 becomes 1.5 rather than 0, but managers' payoff remains the same. Does making the bankruptcy procedure more efficient improve the efficiency of managers' incentives? When managers use low effort and $s = .3$, the equilibrium is still a pure strategy equilibrium in which managers of solvent firms always default and creditors always accept workout proposals. Because bankruptcy never occurs, managers' and creditors' expected payoffs remain the same as when the bankruptcy procedure was costly. When managers use high effort and $s = .9$, the equilibrium is again a mixed strategy equilibrium. Creditors still accept workout proposals with probability .5, but solvent firm managers' probability of defaulting and demanding workouts falls from .444 to .111. Managers' expected return under high effort remains the same as when the bankruptcy procedure was costly, 2.85, but creditors' expected return under high effort rises from 2.25 to 2.40. Because managers' expected return does not change when the bankruptcy procedure becomes more efficient, managers still prefer to use low effort even though high effort is economically efficient. But the probability that managers of solvent firms default falls from .444 to .111, so that less cheating occurs. And because creditors' expected return increases from 2.25 to 2.40,

creditors are more willing to lend to the firm and the distortion to investment incentives is smaller.

Thus when bankruptcy procedures are costly, managers and creditors have an incentive to renegotiate loans ex post when the firm is in financial distress and this gives managers an incentive to use low effort even when high effort is economically efficient. Costly bankruptcy also gives managers of solvent firms a stronger incentive to cheat by declaring financial distress even when their firms are solvent and it gives creditors an incentive to reduce the amount that they lend to the firm. Note that the same points would hold if negotiations over a reorganization plan in Chapter 11 were substituted for the workout negotiation discussed here and if costly bankruptcy liquidation under Chapter 7 were substituted for the generic costly bankruptcy procedure discussed here. See Bebchuk 1991, Aghion and Bolton 1992, Schwartz 1993, Rasmussen 1994, Bester 1994, Berglöf and von Thadden 1994, and Bolton and Scharfstein 1996 for further discussion of these issues, including how managers' incentives change when the firm has multiple creditors. See Schwartz 1996 for discussion of the possibility that "bankruptcy contracts" made when creditors lend to the firm could solve these problems and give managers incentives to behave efficiently.

3. References

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