DISTRESS ODYSSEY: EXPLORING A COMMON TRI-PARTY MODEL[1]

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I believe that this article makes a substantial practical contribution to the insolvency field by combining into a single model the decision functions of the firm, the banks and the bondholders. All previous research addressed the decisions of each of those three constituencies either in isolation or in pairs of parties in conflict. By reducing guesswork, the single-model framework can lead to more efficient resolutions of conflicts resulting from financial distress.

I was led to the development of this framework through the realization that every firm, even financially distressed ones and those seeking bankruptcy protection, have some need for investment, lest they inexorably stumble or spiral toward liquidation. The introduction of the investment function, in fact, acted as the glue to bind the firm's, the banks', and the bondholders' decision functions into a single model available to all three constituencies simultaneously.

The work of Bulow and Shoven (1978) and the follow-up work of White (1980, 1983) demonstrate how inter-creditor conflicts can lead to inefficiencies when a firm is in financial distress. The impediment to efficient renegotiation in these models is the assumption that the firm cannot renegotiate with its bondholders, although it can do so efficiently with a bank. On the one hand, because bondholders claim part of the cash flows from new investment, distressed firms can have difficulty issuing equity or debt for new investment. Thus, the firm may pass up positive-NPV investments.[2] On the other hand, a distressed company may actually overinvest because shareholders receive much of the actual benefits of risky investment but bear little of the downside costs. As a result, the distressed firm may take negative-NPV projects which increase the riskiness of its cash flow.[3]

I derive the three-party model from two lines of inquiry, both based on the common denominator of the distressed firm's investment decision.

The first is to show that these investment inefficiencies are still a problem even when firms can renegotiate with bondholders. I analyze the implicit renegotiation that takes place when firms offer a basket of new securities and cash in exchange for the original bonds. Bond restructurings almost always take the form of exchange offers because the Trust Indenture Act of 1939 requires unanimous bondholder consent before a firm can alter the principal, interest, or maturity of its bonds. Exchange offers effectively alter these features but, since nontendering bondholders maintain their original claim for payments on the firm, the Trust Indenture Act is not violated.

Of course, exchanges are hard to complete. This is because, although in situations where bondholders as a group would be better off if the exchange offer is successful, those with small stakes have an incentive to hold out. This free-rider problem can be, and often is, mitigated by offering in exchange for the old bonds a more senior security, one with shorter maturity, or, when it is available, cash. Moreover, in these types of exchanges bondholders may be willing to tender at below-market prices out of fear that holding out will make them effectively junior to the new securities. But the important point is that even though exchange offers enable firms to restructure their bonds profitably, they do not, in general, result in efficient investment. The problem is that, in deciding whether to tender, bondholders take the firm's investment policy as a given. Thus, individual bondholders – each with small stakes – fail to take into account their effect on the firm's investment decision, despite the fact that their decisions, taken as a whole, affect investment behavior.

1 This article was adapted from a longer article titled "The Odyssey of Financial Restructuring Under the U.S. Bankruptcy Code" (https://decisionboundaries.com/the-odyssey-of-financial-restructuring-under-the-us-bankruptcy-code-2/) posted website on December 15, 2019.

2 This is the effect first analyzed by Myers (1977).

3 This risk-taking effect was first analyzed in detail by Jensen and Meckling (1976).

My second line of inquiry was to analyze the effects of bankruptcy law on investment. I conclude that the key features of the law – the automatic stay, the voting rules for plan approval, and the power of shareholders to retain value for themselves – all act to increase investment both in and out of bankruptcy. Whether this increases efficiency depends on whether the firm would otherwise have underinvested or overinvested as a result of financial distress. I characterize the aspects of the firm's debt structure – the seniority of bank debt relative to bond debt, the maturity structure, and the existence of restrictive covenants – that lead to underinvestment or overinvestment. I am then able to identify the situations in which Chapter 11 increases or decreases investment efficiency.

1. A SIMPLE MODEL OF WORKOUT AND INVESTMENT

In this section, I consider a simple model of a financially distressed firm with both bank and bond debt. I model the concept that it is easier to renegotiate with a bank (or a small syndicate of banks) than with numerous bondholders by assuming at first that the firm cannot renegotiate with bondholders. I relax the assumption in Section 2 below (Distressed Exchange Offers for Bond Debt), where I present a model of exchange offers.

The debt's maturity structure affects the firm's ability to work itself out of distress and is, therefore, an important issue. I assume that all of the bank debt, with face value B, is short-term, maturing at date 1. By contrast, a fraction of the face value of the bond debt, D, is due at date 1, and fraction $1-q$ is due at a later date 2. This timing reflects the fact that the bank debt generally has shorter maturity than the bond debt.

The firm has two assets: cash and/or liquid assets of Y, and an investment project which requires an investment of X at date 1 and returns a stochastic cash flow of X at date 2 distributed over the support $[0,\infty)$. I denote the cumulative distribution of X as $F(X)$, the density as $f(X)$, and the mean as $\bar{X}$. For simplicity, I assume that the firm has no fixed assets, such as plant and equipment. All parties are risk-neutral, and the risk-free interest rate is zero.

Finally, I assume that the firm is in financial distress at date 1; its assets are worth less than the face value of its obligations: $Y < B + D$. Thus, if the firm is liquidated, and the absolute priority rule is followed, shareholders receive nothing, and bondholders and the bank share between them. Assuming equal priority of bank and bond debt in liquidation, the bank gets $[B/(B+D)]Y$, which I denote L_B, and the bondholders get $[D/(B+D)]Y$, which I denote L_D. If the firm is liquidated, the bonds maturing at date 2 are accelerated to date 1, consistent with the bankruptcy code. In this section, I assume that bankruptcy is equivalent to liquidation and that Chapter 11 reorganization is ruled out. In Section 3 (Reorganization Law and Investment), I analyze how bankruptcy law's reorganization mechanism affects investment incentives in this model.

The central question is whether the financially distressed firm invests in the project at date 1. If $Y>I+B+qD$, the firm has enough cash to invest in the project and pay off the bank and bond debts maturing at date 1. In this case, the firm invests regardless of whether the project has positive or negative NPV: if the firm does not invest, the equity gets nothing; if the firm does invest, there is some chance that the equity's payoff would be positive. I assume that $Y<I+B+qD$ so that the firm needs an additional $I+B+qD-Y$ to meet its date-1 obligations and invest in the project.

The firm has several options for meeting the cash shortfall. It can try to raise new funds by issuing debt or equity, or it can try to restructure its existing bank or bond debt. I focus on the debt restructurings. I show later that the firm prefers to restructure rather than to issue new debt or equity.

1.1. Bank Debt Restructurings

I consider bank debt restructurings first because they are substantially easier to organize than bond restructurings.[4] Indeed, the Trust Indenture Act of 1939 *prohibits* bondholders changing the bonds' principal, interest, or maturity without the bondholders' unanimous consent. Even without the Trust Indenture Act, free rider problems can impede successful renegotiation. For example, if some bondholders forgive part of their debt, the value of the remaining bond debt rises. If each bondholder is small, and thus has no effect on the outcome of the negotiations, then each will refuse to restructure its portion of the debt. I discuss these issues in detail in Section 2.

In bank restructurings the firm effectively rolls over its initial loan of B and borrows an additional $1 + qD - Y$ for the investment and to pay off the bond debt due on date 1.

It can be proven[5] that:

$$\bar{X} - 1 \geq V_D - L_D \qquad (1)$$

where V_D is the market value of the bonds in this case.

V_D is the value of the bonds conditional on investment, while L_D is their value if no investment occurs. So, the difference between the two measures the value transfer

4 Glison, John, and Lang (1990) show empirically that the existence of bond debt is the most significant determinant of whether a financially distressed firm restructures successfully out of court or files for Chapter 11 reorganization.

5 For the proof, please refer to https://decisionboundaries.com/thought-leadership/the-odyssey-of-financial-restructuring-under-the-us-bankruptcy-code/, p.6.

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from the bank and shareholders to the bondholders if the firm invests. If the NPV of the project, $\bar{X} - \mathrm{I}$, is greater than this transfer, then the firm restructures its bank debt and invests.

If this transfer is positive, the firm will tend to forego positive NPV projects, those with NPV between zero and $V_D - L_D$, because the bonds act as a tax on the project discouraging investment. If it is negative, the firm may take negative NPV projects, those with NPV between $V_D - L_D$ and zero, because creditors effectively subsidize the project, encouraging investment.

This wedge is introduced because the value of the bonds conditional on investment can be greater or less than its liquidation value. If, for example, Y is close to zero, the bonds are worth almost nothing in liquidation, so bondholders benefit from the investment. By contrast, if Y is close to B+D, bondholders would get satisfied almost in full if the firm is liquidated. But, if it is not liquidated, bondholders own a risky claim which could well be below D.

This discussion suggests that there are two effects at work. On the one hand, the debt obligations tend to make investment look unattractive because existing creditors can siphon off cash from the project (Myers' (1977) "debt overhang"), which discourages investment. On the other hand, debt obligations can lead the firm to take excessive risks: the equity receives nothing if the firm is liquidated but has some value if the firm invests, even in a negative-NPV project.[6]

The maturity structure of the debt and the proportion of bank debt to total debt also matter but that discussion is outside the scope of this article.[7]

1.2. New Capital Infusions

Instead of restructuring its bank debt, the firm could try to raise new money from another bank or by issuing equity. Neither of those alternatives is as attractive as a restructuring. Similar to a restructuring, the new bank lends $I + B + qD - Y$ and receives the same date-2 payoffs. But, unlike a restructuring, some of the new money goes to pay off the existing bank debt of B at face value. We can show that the firm will be able to raise new debt financing provided that:

$$\bar{\mathrm{X}} - \mathrm{I} \geq V_D - L_D + B - L_B \qquad (2)$$

or, in other words, if the NPV of the investment exceeds the sum of the transfer to bondholders, $V_D - L_D$, and the transfer to the bank, $B - L_B$. The condition differs from that for a bank restructuring because, in a restructuring, the bank accounts for the fact that the debt is worth only $L_B < B$ in a liquidation. If the firm obtains new bank financing, the original bank receives a transfer of $B - L_B > 0$. This subsidy means that the set of investment projects that can be financed without outside debt is a strict subset of those that can be financed with a bank restructuring.

Investment is even less attractive if the firm issues equity rather than debt. The bank continues to receive a subsidy of $B - L_B$, but the transfer to bondholders increases. The bond debt conditional on investment is worth more because the date-2 portion of the debt is paid off before the equity gets anything. By contrast, when the firm issues debt, the bondholders and the new bank are on equal footing on date 2. So, the condition for investment takes the same form as inequality (2), except that V_D is greater when the firm issues new equity.

This analysis implies that the firm never issues new equity since an equity issue transfers value to bondholders which would not be transferred by a debt issue. The prediction is less clear about the choice between debt issues and a bank loan restructuring. Clearly, when inequality (1) is satisfied but inequality (2) is not, the firm will restructure its bank debt. But if both inequalities are satisfied the model has no prediction. The bank knows that if there is no restructuring the firm will issue new debt and the bank will receive B. So, in a restructuring, the bank will settle for nothing less than B. As a result, equity holders are indifferent between a debt issue and a bank debt restructuring because they must transfer B to the bank in both situations.

1.3. The Effects of Priority

So far, we have assumed that all debt has equal priority in bankruptcy. However, firms can explicitly contract for certain debts to be paid ahead of others in bankruptcy. There are two ways in which priority can affect the ability of distressed firms to raise capital in my model. First, the seniority of the existing bank debt affects what the bank would get in liquidation if it did not lend new money, thereby determining the value of the bank's next best alternative. The more junior the existing bank debt, the worse off the bank is in liquidation, so the more willing to lend. Second, the seniority of the new bank debt affects what the bank can get if it lends new money. In general, the more senior the new bank debt, the better off the bank is at any chosen interest rate. Thus, if they could, the firm and the bank would like to contract debt that is senior to the existing bonds. Of course, there are often constraints, in the form of covenants, on their ability to do so.

To see this more formally, suppose there are no seniority covenants. Then the interest rate on the new bank debt can be set at such a high level that the firm always defaults on date 2 and the senior debt gets all the date-2 cash flow X. This means that the value of the

6 See Jensen and Meckling (1978).

7 For a discussion, see https://decisionboundaries.com/thought-leadership/the-odyssey-of-financial-restructuring-under-the-us-bankruptcy-code/, p.7.

bonds conditional on new senior lending is just qD and bondholders receive their date-1 payment. The value of the bonds if the firm is liquidated is L_D, assuming, as before, that the existing bank debt and bonds have equal priority. Based on the previous section we know that the project's NPV must exceed the net subsidy to bondholders resulting from investment. So, the bank will be willing to lend, provided that:

$$\bar{X} - I \geq qD - L_D \qquad (3)$$

The right-hand side of inequality (3) is strictly less than the right-hand side of inequality (1), since $qD < V_D$; the firm is more inclined to invest when there are no seniority covenants.[8]

This analysis can tell us something about the interaction between maturity structure and seniority covenants. If the bond debt has a relatively short maturity (q near 1), the firm is likely to underinvest. In this case, a seniority covenant tends to worsen the problem, making it more difficult for the firm to raise capital. If the firm leaves out the covenant, we would expect to see the bank lend new money that is senior to the old bonds. The ability to issue such debt can counteract the efficiency created by the short maturity of the bond debt. In contrast, if the bonds have a relatively long maturity, the firm is more likely to overinvest. Therefore, if the capital structure is chosen to minimize the costs of financial distress, we would expect the long-term bond debt to contain seniority covenants in the indenture and short-term bond debt to omit such covenants.

This framework can also tell us something about the interaction between the bond debt maturity and the priority of the existing debt. Suppose that there is no seniority covenant. Then, if the original bonds are pari passu with the bank, the investment condition is given by inequality (3). But if the initial bank debt is senior to the bond debt, the condition becomes:

$$\bar{X} - I \geq qD - max(Y - B, 0) \qquad (4)$$

because the value of the junior bond debt is now $max(Y - B, 0)$. Since this is less than $L_D \equiv [D/(B + D)]Y$, the value of the bond debt if it is pari passu with the old bank debt, the firm is now less likely to invest; the bank does better in liquidation, so financing new investment is less attractive.

The shorter the maturity of the bonds, the more likely the firm is to underinvest. Therefore, the model suggests that when the bonds are relatively short term, existing senior bank debt is likely to worsen the underinvestment problem. But when the bonds are long term, the seniority of the bank debt can be a useful way of curbing the overinvestment problem. If the costs of financial distress drive capital structure choices, my model predicts that the bank debt will be senior if the bonds are long term and junior if short term.

Although the model predicts that the bank debt will be junior if the bonds are short term, it is difficult to make short-term bank debt junior in practice. To see this, suppose that if the firm does not invest and is not liquidated at date 1, it nevertheless has positive, stochastic cash flows at date 2. Thus, unlike the model above, if the firm pays off its debts at date 1, the value of the equity is positive even if the firm does not invest. The firm has three alternatives: invest, continue without investing, or be liquidated.

Now suppose that $Y \geq qD + B$ so that it is feasible for the firm to meet its date-1 obligations and continue in operations without investing. The value of the bank debt is B, which is what it is worth in liquidation if the bank debt is senior. The bank refuses to provide new funds for investment but demands a payment of B on date 1. This is more than $max(Y - D, 0)$, the bank's payoff is liquidated, and the bank debt is junior to the bonds. Therefore, even though the bank debt is contractually junior to the bonds, the bank acts as their senior. This makes the bank reluctant to lend new money, a more efficient outcome. So, in this model, if q is small enough that $Y > qD + B$, the bank acts as a senior lender. But, if q is very close to one, it is possible to induce the bank to subordinate itself to the bond debt.

2. DISTRESSED EXCHANGE OFFERS FOR BOND DEBT

So far, I have assumed that it is impossible to renegotiate with bondholders. This assumption is not too far off the mark; the Trust Indenture Act's prohibitions on changes in the amount or timing of bond debt payments forces bond restructurings to take the form of exchange offers.[9] Firms offer cash and/or a package of debt and equity securities, with the offer typically contingent on the acceptance of a specified fraction of the debt.

In this section, we analyze the extent to which this limited form of renegotiation affects the inefficiencies discussed in the previous section. The key assumption of the model is that each bondholder's stake is small enough that they ignore the effect of their tender decision on both the firm's investment decision and the value of the firms' securities. This assumption is unrealistically strong for firms with a large proportion of their bonds held by just a few institutional investors, an admittedly common situation. I make this assumption to

8 Stultz and Johnson (1985) develop this point in a model where the ability to use secured debt for new borrowing mitigates the Myers (1977) underinvestment problem. Berkovitch and Kim (1990) analyze how the priority structure affects investment efficiency under both symmetric and asymmetric information.

9 There are similarities between corporate debt exchange offers and buybacks of emerging markets debt. See Froot (1989) and Bulow and Rogoff (1989) for analyses of emerging markets debt exchanges.

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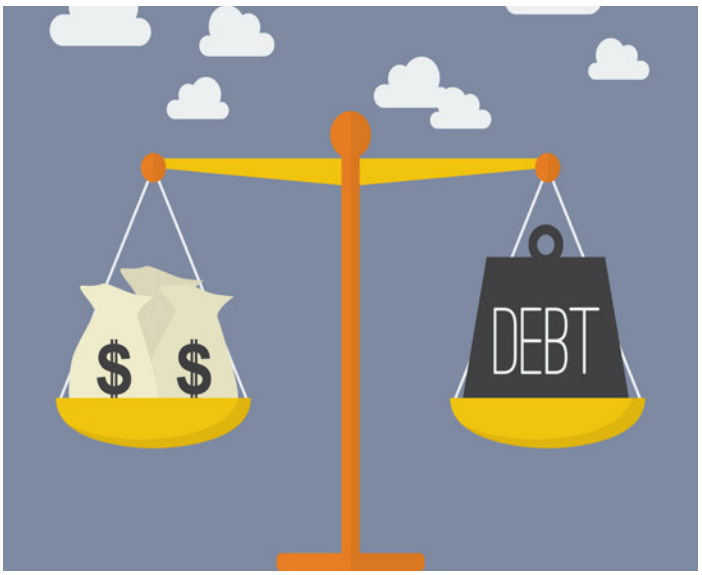
highlight the problems that arise when creditors cannot fully coordinate their actions.

I proceed in two stages. First, I analyze the profitability of exchanges assuming that the firm has ample cash to finance the investment even without a debt restructuring. I will show that an exchange is profitable only if the debt is exchanged for cash or for debt that has higher priority than the original bonds. Although this analysis has no efficiency implications – the firm invests even without an exchange – it is helpful in answering the second, more interesting, question: when can an exchange reduce cash obligations and enable the firm to invest? I will show that the bank is generally better off if the firm can exchange its bonds, that investment incentives are unaffected by the ability to exchange bonds in most circumstances, and that the ability to exchange is not equivalent to efficient renegotiation of bond debt.



2.1. Exchanges Assuming No Cash Shortage

In this subsection I assume that, while the firm is in financial distress, it does not need an exchange or a bank concession in order to invest and meet its date-1 obligations: $Y > I + B + qD$. I first consider an exchange for debt due at date 2 with a face value of p for each dollar in face value of the existing bond debt. Let X_b be the breakeven value of X, so the firm defaults at date 2 for all $X < X_b$. Shareholders receive nothing if $X < X_b$ and receive $X - X_b$ otherwise. Thus, an exchange is profitable if and only if it lowers X_b.

Let β denote the fraction of bond debt the firm exchanges. Without an exchange, $X_b = I + D + B - Y$. By contrast, if the firm exchanges, it owes the nontendering bondholders $(1-\beta)D$ and the tendering bondholders βD, so $X_b = I + (1-\beta)\,D + \beta pD + B - Y$. Here, X_b is decreasing in β if and only if $p < 1$; i.e., the firm can exchange a dollar of old debt for less than a dollar in new debt. So, if $p < 1$, an exchange is profitable and, if $p > 1$, an exchange is unprofitable.

Proposition 1: ***It is unprofitable to offer an exchange for new debt with equal priority to the old debt.***[10]

The exchange is unprofitable because of a classic holdout problem.[11] If other bondholders tender, the value of the existing bonds rises, creating an incentive to hold out. To see this, consider the decision facing the holder of $1 of bonds who is offered $1 of the new bonds ($p = 1$) due at date 2.[12] Will the holdout have an incentive to tender, assuming that all the other bondholders tender? If so, then it is an equilibrium for all bondholders to tender.

The answer depends on the payoffs of the two bonds when the firm is in default at date 2. If the firm does not default at date 2, the payoffs are quite different. Those who tender receive their pro rata share of the firm at date 2, $(X + Y - I - B)/D$, but the holdout receives q at date 1 and receives a pro rata share of the firm at date 2, $(1 - q)(X + Y - I - B)/D$. Since $(X + Y - I - B)/D > 1$, the bondholder is better off holding out.

The holdout is better off because the earlier payment on the old bonds is essentially senior to the new ones. Tendering bondholders share ratably in a risky date-2 claim. But, by holding out, the bondholder receives a safe date-1 payment while still sharing pro rata in the date-2 portion of payoffs.

This logic rests crucially on the assumption that the bondholders do not act collectively. If they could the question becomes: are we all better off if we all tender than if we all hold out? This is quite different from the original question: am I better off if I tender than if I hold out assuming everyone else tenders? In the collective case, if everyone tenders then the payoff is again $(X + Y - I - B)/D$ when the firm defaults. But if no one tenders the payoff is q at date 1 and $(X + Y - I - B - qD)/D$ at date 2. This is equal to the payoff from tendering, so bondholders as a group are indifferent between the two options when $p = 1$.

The holdout problem is even more pronounced if the firm offers to exchange junior bonds or equity for the old bonds. As before, holdouts are senior in that some of their claim is paid at date 1 before the uncertainty is realized and tendering bondholders are paid. In addition, holdouts have seniority at date 2 since the new security is subordinated debt or equity. If all bondholders tender, a holdout's claim would be risk-free since the holdout gets q at date 1, and the $1 - q$ that is owed at date 2 is senior to the claims of all

10 For the proof, see https://decisionboundaries.com/thought-leadership/the-odyssey-of-financial-restructuring-under-the-us-bankruptcy-code/, p.12

11 Roe (1987) contains the first discussion of this holdout problem.

12 We assume that $1 is a negligible portion of the outstanding bonds.

tendering bondholders, making it risk-free as well. Thus, a corollary of Proposition 1 is that exchange offers for subordinated debt or equity are also unprofitable.

Quite the opposite happens if the firm can offer a more senior bond in exchange for the old one. These types of exchanges are quite common.

Proposition 2: ***It is profitable to offer an exchange for new bonds which are senior to the old bonds.***[13]

There are two competing effects at work. Again, the difference in the payoffs from tendering and holding out depends on the payoffs of the old and new bonds when the firm is in default at date 2. As before, consider the decision facing the holder of $1 of bonds, assuming that all others tender when $p = 1$. On the one hand, the holdout's date-2 claim is worthless when the firm defaults. Since the new bonds are senior, each new bondholder is paid $(X + Y - I - B)/D$ and there are insufficient funds to pay the old junior bondholder. On the other hand, the portion q of the holdout's claim is paid at date 1, making it effectively senior to the new bonds. On the whole, given my assumption that $X > 0$ and $Y > I + B + qD$, the increased seniority at date 2 is worth more than the earlier maturity of the q portion of the claim. Instead of a holdout problem there is a *hold-in* problem; bondholders would tender for $p < 1$ despite the fact that they're worse-off as a group.

The hold-in problem is more severe when the bond debt is relatively long-term. Very short maturity debt is paid almost in full at date 1. So only a small portion of the debt can be leapfrogged in the capital structure. The short maturity of the bonds effectively gives them a degree of seniority that cannot be negated by a senior bond issue. Indeed, one can show that as the bonds become shorter-term p increases, and exchanges become less attractive to the firm.[14]

I have shown that the firm prefers exchanges for senior debt to exchanges for pari passu or subordinated debt. Although many issues have seniority covenants these types of exchanges are still common because indentures typically allow for the modification or elimination of covenants by some specified super-majority vote.[15] The exchange is then made on an *exit consent* in which the required super-majority votes to strip the old bonds of their seniority and maybe other covenants. Thus, the act of tendering consists of two actions: first to strip the old bonds of their covenant protection, and second an acceptance of the exchange for the now legally-issued senior bonds.[16]

Proposition 3: ***It is profitable to offer an exchange for cash.***[17]

Exchange offers for cash are profitable for similar reasons that senior bond exchanges are profitable. As more bondholders tender, more cash is paid out at date 1, reducing the value of the old bonds at date 2. Tendering bondholders are paid cash for the $1 - q$ portion of their claim at date 1. Since this is paid before a holdout receives payment on the $1 - q$ portion of their claim, the tendering bondholders are effectively senior to the nontendering ones. As a result, the date-2 portion of the old debt claim is less valuable. Faced with this hold-in problem, old bondholders are willing to tender at a low price.

Recall that throughout the analysis we have assumed that the firm does not have a cash shortage. If the firm does not have sufficient cash, it will use all of its cash in excess of $B + I$ to buy back debt. It is important to note that the firm would not find it profitable to issue equity or debt (with equal or junior priority to the old debt) in order to buy back bonds. The outside capital would not be senior to the untendered debt, so the required return on the outside capital would more than negate the savings on the exchange offer.

2.2. Exchanges When There Is a Cash Shortage

The above analysis assumes that the firm does not need to restructure its debt in order to invest at date 1. Exchanges have no effect on efficiency; they just redistribute value from bondholders to shareholders. We now suppose that the firm needs a concession from either the bank or the bondholders to invest at date 1. We start by assuming that $I + B < Y < I + B + qD$; the firm needs some concession to invest but has enough cash to pay off the bank and invest.

I explicitly model bank renegotiations and bond exchanges. The firm approaches the bank asking for a concession. It makes a take-it-or-leave-it offer to postpone some or all of B until date 2, perhaps along with some debt forgiveness. The firm has the option of offering an exchange to bondholders. This timing captures the idea that a firm is unable to commit to the bank not to pursue a profitable exchange offer.

Suppose the bank refuses to give the firm a concession. At this point, the firm can propose to exchange the bonds for more senior ones. I assume for the moment that there are no seniority covenants. Because the new

13 For the proof, see https://decisionboundaries.com/thought-leadership/the-odyssey-of-financial-restructuring-under-the-us-bankruptcy-code/, p.13-15

14 The property of shorter maturity debt that makes the hold-in problem relevant is that a greater fraction of promised payments comes after the resolution of uncertain cash flows. Extending the maturity from date 1 to date 1.5 would have no effect if there was no chance of insolvency before date 2.

15 Since the vote does not affect the amount or timing of the payments, it is not prohibited by the Trust Indenture Act.

16 The enforceability of exit consents remained legally unclear until January 2017 when, in a 2-2 decision, the Second Circuit reversed the court's ruling in *Marblegate*, holding that Section 316(b) prohibits only non-consensual amendments to an indenture's core payment terms.

17 For the proof, see https://decisionboundaries.com/thought-leadership/the-odyssey-of-financial-restructuring-under-the-us-bankruptcy-code/, p.16.

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bonds are senior to the old, the firm can set p, the face value of the new bonds, so that it is paid of all the date-2 cash flows. Thus, the maximum value of a unit of the new bond is $(\bar{X} - Y - I - B)/D$, provided that the firm buys back all the bonds.[18] If a bondholder does not tender, they receive only the date-1 payment, q. So, if $(\bar{X} + Y - I - B)/D > q$ or, equivalently, if:

$$\bar{X} - I \geq B + qD - Y \qquad (5)$$

an exchange offer for senior debt is feasible. In this case, the firm will want to buy back its bonds because the alternative is liquidation in which case shareholders get nothing.

Now consider the first stage of the model in which the firm approaches the bank to receive a concession. The bank knows that if it turns down the firm's offer, the firm will be able to exchange its bonds provided that inequality (5) is satisfied. In this case, the bank receives B. So, the bank will turn down any offer which has an expected value less than B.

It is possible that the firm might prefer to renegotiate with the bank to receive some date-1 debt relief rather than restructure its bonds. As long as it can defer enough of its bank debt to pay off the date-1 portion of the bonds, the strategy is feasible. So, suppose that the bank extends the maturity of its loan but requires the firm to pay B' at date 2. Assume for the moment that there is no seniority covenant in the bonds; B' can be senior to the date-2 payments on the bonds. In addition, if $Y < I + qD$ the bank has to provide new money in the amount of $I + qD - Y$. If $Y > I + qD$, the remaining cash of $Y - I - qD$ is available to pay off the bank at date 1. Since the new bank debt is senior, the minimum B' that the bank would accept satisfies:

$$\int_0^{B'} Xf(X)dX + \int_{B'}^{\infty} B' f(X)dX + Y - I - qD = B \qquad (6)$$

Proposition 4: *If $I + B < Y < I + B + qD$ and no contractual restrictions on issuing senior debt exist, the firm prefers a debt exchange to a bank restructuring.*[19]

In both an exchange offer and a bank restructuring, the bank ends up with a claim worth B. However, the exchange is less costly because the firm can take advantage of the hold-in problem; by exchanging for senior debt and leaving holdouts with a junior security, the firm induces bondholders to tender for a claim that the bank would not accept.

Now suppose instead that $\bar{X} - I < B + qD - Y$, so inequality (5) is violated. In this case, an exchange offer is not feasible without a bank concession. Thus, if the bank turns down the firm's take-it-or-leave-it offer, the firm is liquidated, and the bank gets L_B. This means that the firm can offer the bank a claim worth L_B and the bank will accept the offer. Also note that when $Y < I + B$ the bank will also accept an offer of L_B because, without such a writedown, the firm would be unable to invest at date 1.

Given an offer worth L_B and the bank's acceptance, the firm may be able to exchange its bonds. In the exchange, the maximum value of each new senior bond is $(X + Y - I - L_B)/D$, while each untendered bond is worth because there will be no funds available at date 2 to pay off the untendered subordinated bonds. Thus, the firm can complete an exchange provided that:

$$\bar{X} - I \geq qD - L_D \qquad (7)$$

Note that if the exchange is successful, the firm will be able to make the date-1 bank payment of L_B and invest I, since I have assumed that $Y > I + B > I + L_B$. If (5) is violated, however, the firm does not offer to exchange and is therefore liquidated at date 1.

There will tend to be underinvestment if the current portion of the total bond debt, qD, exceeds the liquidation value, L_D, and overinvestment if the current portion is less than the liquidation value. The minimum transfer to bondholders from investment is the best that they can be given with investment, qD, minus what they get in liquidation, L_B.

Thus, exchange offers can be profitable to the firm if it is able to exchange the bonds for more senior securities or if it can use cash to buy back the bonds for cash. But note that the ability to exchange does nothing to improve the efficiency of investment decisions of financially distressed firms if there is no seniority covenant in the bonds; it just affects who bears the cost of financial distress.[20]

We summarize these results in the following proposition:

Proposition 5: *If the firm has insufficient cash to invest, there are three possible outcomes. If the NPV of the investment, $\bar{X} - I$, is sufficiently large, the bank is paid in full, the bondholders accept an exchange, and the firm invests. For intermediate NPVs, the bank debt is forgiven to L_B, the bondholders accept an exchange, and the firm invests. If the NPV is sufficiently small,*

18 The proof that the firm will wish to buy back all the bonds applies to this case as well.

19 For the proof, see https://decisionboundaries.com/thought-leadership/the-odyssey-of-financial-restructuring-under-the-us-bankruptcy-code/, p.18-19.

20 Although the basic idea that exchange offers give limited possibilities to increase investment incentives is quite robust, the strong result of no effect is somewhat model-specific. For example, if management were only willing to invest if equity value exceeded some threshold level, the concessions from bondholders would increase the ability to invest.

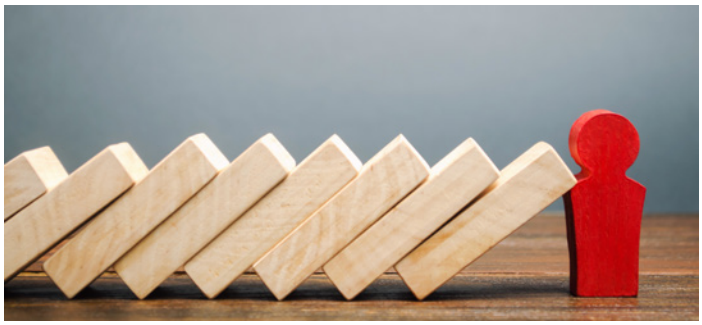
the firm is liquidated and does not invest. The possibility of a bond exchange does not alter investment when there are no seniority covenants.

The analysis assumes that there is no seniority covenant in the bonds. As discussed in Section 2.1, however, firms can get around seniority covenants through exit consents. The condition for investment continues to be inequality (7).

Thus, exchange offers combined with exit consents can be used to strip seniority covenants that would otherwise prevent a bond exchange and constrain investment; in this case exchange offers have real investment effects. But the firm can go too far; exit consents and exchange offers can reduce the value of the bonds so much that the firm actually overinvests.

3. REORGANIZATION LAW AND INVESTMENT

In this section, I focus on the three aspects of Chapter 11 that I believe are fundamental to understanding its effect on investment decisions: the automatic stay, the voting rules, and the maintenance of equity value.



3.1. The Automatic Stay

The automatic stay increases the firm's incentive to invest. To illustrate, assume that the firm files and that the automatic stay is the only feature of Chapter 11. Bondholders' claims are deferred until date 2, at which time they are either paid in full or share the firm's assets with the bank if the firm is unable to make its debt payment.

Effectively, the automatic stay extends the maturity of the bonds from $q > 0$ to $q = 0$. As we saw above, the firm has a greater incentive to invest when the debt has longer maturity. There are two separate effects. First, the firm may now have the cash needed for investment, so it may not have to borrow at date 1: Y may be less than $I + B + qD$ but greater than $I + B$. And even if the firm must borrow ($Y < I + B$), investment is more attractive because the automatic stay forces bondholders to bear more risk. Naturally, if this risk is too elevated, bondholders will object and seek the court's disapproval of the proposed investment. The above analysis assumes that the new money comes from the bank but, for practical purposes it would virtually always come from DIP financing. Thus, the new money's super-seniority leads to even greater investment incentives, which may lead potentially harmed bondholders to object to the approval of the DIP financing. Second, the automatic stay affects the bank's incentive to lend outside of bankruptcy. Since the subsidy to bondholders is reduced by the automatic stay, the bank and the firm have an incentive to restructure inside bankruptcy rather than outside. If the deadweight losses associated with bankruptcy are less than the reduction of the net subsidy to bondholders, firms will file even when they could have successfully reorganized out of court. In this case, Chapter 11 can reduce efficiency since investment is unchanged by the filing but the firm is willing to incur a deadweight cost to extract value from bondholders.[21]

3.2. Chapter 11 Voting

Investment inefficiencies arise in my model because of the inability to negotiate directly with bondholders. The underlying problem is that, unlike the bank, bondholders do not take into account their effect on the firm's investment policy.

Chapter 11 voting procedures can get around this problem, since plans of reorganization must be approved by all creditor cases and the court.

To see how the voting procedure affects restructuring and investment, suppose that the firm files and immediately proposes a POR that gives bondholders a claim on the reorganized company which, conditional on investment, is worth $L_D + \epsilon$, or just a little above the bondholders' recovery under liquidation. Furthermore, suppose that this is a take-it-or-leave-it offer and that if the plan is rejected the firm is liquidated. In deciding how to vote, a bondholder compares their return if the plan is successful with their recovery if it is not. If the plan is successful, all bondholders share $L_D + \epsilon$, and L_D otherwise. Thus, they all support the plan and the result is efficient investment.

Why does the voting mechanism work while an exchange offer does not? The answer is that the voting procedure does not allow bondholders to be treated differently depending on their vote, whereas tendering and nontendering bondholders are treated differently. In an exchange offer, a bondholder compares the value of the new claim with the value of the old claim *conditional on success* of the exchange offer because it is possible for the bondholder to retain their old claim if the tender offer is successful. But if the conditions for acceptance under the voting procedure are met, those who do not vote for the plan are compelled to accept

21 This implicitly assumes that a firm which defaults must file for bankruptcy. However, in this situation, if bankruptcy proceedings are costly, bondholders may choose not to force the firm into bankruptcy despite default. They know that bankruptcy results in the imposition of the automatic stay which may delay payment as much as default. In this case, the automatic stay can effectively be achieved without an actual filing.

Continued from p.43

the POR.[22] Thus, the voting procedure can be used to internalize the effects of the investment decision and get around the holdout and hold-in problems, thereby improving investment efficiency.

Thus, the voting rule can help the firm obtain concessions from bondholders. Even if the bank is willing to lend outside of Chapter 11, the firm may be better off filing and taking advantage of the voting procedure to obtain a transfer from bondholders. This is likely to be the best strategy when concessions are large. Thus, if the bonds are relatively short term, senior, or protected by seniority covenants, they are generally more valuable outside of Chapter 11 than inside. In these cases, we would expect firms to file.

3.3. Maintenance of Equity Value

One of the most salient features of Chapter 11 is that shareholders typically retain a stake in the firm, even though creditors are not paid in full. This is a result of a number of procedural rules on the formation and acceptance of a POR, including the exclusivity period and the cramdown.

The fact that the equity retains some value in most reorganizations even if creditors are not paid in full has important implications for behavior outside of bankruptcy. In my model the firm has only two alternatives: to obtain new funds and invest or go bankrupt and liquidate. In practice, however, there's a third option: to file, invoke the automatic stay, and maintain control continuing operations without new funds for investment.

To develop this idea, I consider the following extension of my Section 1 model. Suppose that if the firm continues in operation without investing, it receives a date-2 payoff of X_C (with mean $\overline{X_C}$) in addition to the date-1 liquidation value Y. In order to focus on a continuation threat rather than a value-maximizing strategy, I assume that continuation is inefficient; total value is higher if the firm liquidates than if it continues without investment ($\overline{X_C} < 0$). The value of the bonds if the firm follows the continuation strategy is V_D^C. The bank and the firm together get $\overline{X_C} + Y - V_D^C$ if the firm continues without investing. If the firm invests, their combined payoff, as before, is $\overline{X} - I + Y - V_D$. Finally, if the firm is liquidated, their combined payoff is L_B, with the equity getting nothing.

Suppose that, among the three alternatives, liquidation is the most attractive to the bank and equity combined, so that:

$$L_B > max(\overline{X} - I + Y - V_D, \overline{X_C} + Y - V_D^C) \qquad (8)$$

Then, absent Chapter 11 reorganization, the firm will be liquidated.

But, now suppose that the firm can file for Chapter 11, invoke the automatic stay, defer debt payments until date 2, and retain control. This is collectively inefficient for the bank and shareholders since $L_B > \overline{X_C} + Y - V_D^C$. The bank would like to pay the firm to liquidate rather than continue, but it cannot. Any payment from the bank to the firm cannot go to shareholders before it goes to the firm's other creditors for it not to be considered a fraudulent conveyance. Given this constraint, the firm's threat is credible; shareholders are better off continuing in operation in the hope that X_C is sufficient to pay creditors at date 2, thereby giving the equity a positive return.

So, the bank has two options. It can let the firm file, or it can provide new money for investment. If the joint returns from investing are larger than those from continuation in Chapter 11, i.e.:

$$\overline{X} - I - V_D \geq \overline{X_C} - V_D^C \qquad (9)$$

the bank will lend money for investment. If not, the firm will file.

The option to file can increase efficiency. If (9) is satisfied, the firm will be more likely to invest. This is efficient if $V_D - L_B > 0$, the case in which the firm underinvests without filing. If, however, $V_D - L_D < 0$, the firm would otherwise overinvest and the filing only aggravates the inefficiency. By contrast, if (9) is violated, Chapter 11 is always inefficient since the firm continues rather than liquidating, and $\overline{X_C} < 0 < Y$.

We can thus draw the following inferences. First, when the bonds are short term, the bank debt is senior, and the bonds have seniority covenants, underinvestment is likely to be a problem and Chapter 11 can be helpful. Second, when investment is risky relative to continuation, investment tends to be more attractive to the bank and equity because bonds are worth less. In this case, the likely effect of a filing is to encourage investment rather than to give the firm an easy way of avoiding efficient liquidation.

CONCLUSION

By focusing on the distressed firm's investment process, this article develops a single decision model for the distressed firm, its banks and its bondholders.

The model sheds light on out-of-court decisions (e.g., tendering, restructuring, new money, etc.), in-court decisions (e.g. voting, objecting, etc.), and indeed the filing decision itself.

22 A dissenting member of an approving class who gets less than the liquidation value of their claim can object to the plan. If successful, this will cause the plan to be defeated. This does not accomplish the same thing as holding out in a successful exchange offer. In that situation, other creditors make concessions while the holdout creditor's claim is unaffected.

We hope that this framework's single-model nature will result in more efficient resolutions of financial distress situations by, among other things, avoiding excessive bondholder oppression and value-destroying filings, setting parameters for bank restructuring and new lending, and identifying when a filing is likely to increase value.

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Carlos Abadi is the Managing Director of DecisionBoundaries, LLC, an international boutique financial advisory firm focused on financial restructuring, litigation support, and financial engineering.

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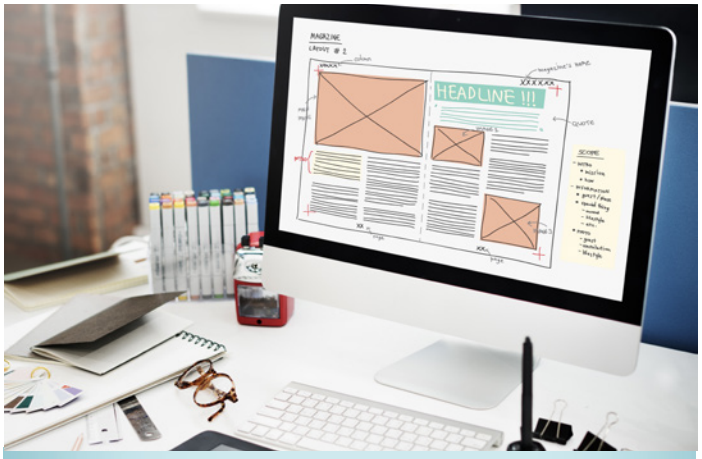

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