



Resolution of financial distress under Chapter 11

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Abstract

We develop a contingent claims model for a firm in financial distress with a formal account for renegotiations under the U.S. bankruptcy procedure (known as Chapter 11). Shareholders and two classes of creditors (senior and junior) alternatively propose a reorganization plan subject to a vote. The bankruptcy judge can intervene in any renegotiation round to impose a plan. The multiple-stage bargaining process is solved in a non-cooperative game-theory setting. The calibrated model yields the liquidation rate, the duration of Chapter 11 and the frequency of deviations from the Absolute Priority Rule, which are consistent with empirical evidence.

Introduction

A corporation in financial distress can either negotiate privately with its claimants or file for protection under legal bankruptcy procedures. The recent bailout of some major U.S. companies during the latest crisis has emphasized the complex and critical impact that bankruptcy can have on the economy as a whole.¹ In the USA, Chapter 11 of the Bankruptcy Code offers an alternative to the liquidation of a bankrupt firm by defining a legal context in which the firm can reorganize its activities in order to emerge as a viable entity. Over the last few years, Chapter 11 has become the dominant mode of resolution of financial distress for large public companies. Among the 213 bond defaults recorded by Moody's from 1997 to 2005, Davydenko (2010) documents that 54% of them are technical defaults (i.e. missed payment), while 37% are resolved through Chapter 11, and only 9% are resolved out of court. These figures highlight the need for a better understanding of the bankruptcy mechanism.

The aim of this paper is to formally model the characteristics of Chapter 11 negotiations and to analyze the determinants of reorganization outcomes. The modelling of financial distress has primarily focused on out-of-court renegotiations. For instance, Fan and Sundaresan (2000) view renegotiations as a *cooperative* Nash bargaining game in which claimholders maximize the renegotiation surplus to avoid

costly liquidation. However, the assumption of a cooperative game for renegotiations may be harder to sustain for Chapter 11. Indeed, Brown (1989) and Gertner and Scharfstein (1991) argue that firms in default will cease private renegotiations and file for bankruptcy when hold-out problems are severe. Gilson et al. (1990) and Datta and Iskandar-Datta (1995) provide empirical support for this view. Furthermore, the bargaining procedure under Chapter 11 is structured in rounds. During each of these rounds, one class of claimholders has the opportunity to propose a reorganization plan. This is why we model the strategic interaction between claimants in Chapter 11 as a multiple-stage bargaining process, and solve it in a non-cooperative game-theory setting.

While Hege and Mella-Barral (2005), Hackbarth et al. (2007), and Ayotte and Morrison (2009) previously analyzed debt renegotiation with multiple creditors, our paper is the first to do so within the legal framework imposed by the Chapter 11 procedure. In particular, equityholders benefit from an exclusivity period that allows them to propose the first plan. If this plan is not ratified, the other classes of claimants each propose their own plan in subsequent rounds. The repeated failure to adopt a reorganization plan may eventually lead to the firm's liquidation. In the Chapter 11 models by Moraux (2002), François and Morellec (2004), Galai et al. (2007), and Broadie et al., 2007, liquidation may be triggered by the asset value staying below the default threshold for a lengthy period of time. But these papers fail to acknowledge the impact on the outcome of the decisions of the negotiating players, as well as the influential role that is played by the bankruptcy judge. Empirical studies by LoPucki and Whitford (1990), Chang and Schoar (2008), and Heron et al. (2009) document significant judicial discretion in the negotiation process. In our model, the judge decides whether or not negotiations will move on to the next round, and may impose a particular plan (possibly at the expense of one class of claimants—a situation referred to as a cramdown).

Our game-theoretic approach determines the possible equilibria (liquidation, reorganization, or continuation to the next round) for each renegotiation round and for every possible asset value. By specifying a standard diffusion process for the asset value, we associate a probability to each of these equilibria, which then yields a probabilistic representation of the Chapter 11 procedure with formal bargaining. Once the model is calibrated to the characteristics of firms entering Chapter 11 as well as to the bankruptcy timeline and costs, it realistically replicates stylized facts about liquidation rates, time spent under Chapter 11, and frequency of deviations from the Absolute Priority Rule (APR).

In line with empirical evidence, our model generates a relatively lengthy bankruptcy procedure (average time spent under Chapter 11 is more than two years in our base case). This result is driven by the non-cooperative nature of the bargaining game and the uncertainty surrounding judge intervention. Indeed, in this setting, claimholders often have an incentive to “push their luck,” by proposing an uncompromising plan which, if not accepted, might be crammed down by the judge. This, in turn, increases the odds of a plan being rejected and delays the final agreement among claimants. Obviously, this also encourages deviations from the APR. Interestingly, our model shows that, unlike in earlier empirical work, deviations from the APR are not limited to undue wealth transfers to equityholders. APR violations may also benefit senior and, to a lesser extent, junior creditors. This is because the rationale for “pushing one's luck” applies equally to any claimholder who has the opportunity of proposing a plan, at any negotiation round (and not only to equityholders in the first round).

Finally, our model also adequately reflects that Chapter 11 is hardly a liquidative procedure (with a liquidation rate as low as 16% in our base case). Costs of financial distress drive the likelihood of liquidation. But although the firm is put at risk during lengthy negotiations, the asset-value dynamics and the magnitude of financial distress costs, once calibrated to actual economic data, make liquidation a relatively infrequent outcome for large firms. The other reason for the infrequency of liquidation is that

it takes the generalized rejection of a plan for the judge to call for liquidation. But given Chapter 11 voting rules, it is generally easy for a claimholder proposing a plan to “buy” the vote of one class of claimants by offering it slightly more than the liquidation payoff (see however Baird and Rasmussen, 2009, who argue that recent financial innovations may hamper the coalition formation process in Chapter 11 negotiations).

The remainder of the paper is organized as follows. We formally introduce the negotiation process under Chapter 11 in Section 2. In Section 3, we solve the game by backward induction and characterize the possible equilibrium outcomes. Section 4 presents the data and calibration method used to implement the model numerically. Model results are analyzed and compared to empirical evidence in Section 5. Section 6 concludes.

Section snippets

The negotiation model under Chapter 11

In this section, we model the negotiation process among claimants of a firm that is bankrupt under the U.S. legal Bankruptcy Code. Our goal is to make the model closely suited to the main features of the Chapter 11 procedure, which are briefly described below. More details can be found in White (1989) for instance....

Solving the negotiation game

In this section, we solve for the equilibrium strategies of the three strategic players, and obtain, for each player, the expected value of the outcome of the negotiation game at the moment the default event is triggered....

Numerical implementation

This section presents the model calibration. A sample of firms filing Chapter 11 is specifically constructed to estimate firm-specific parameters like asset-return expectation and volatility, coupon rate, and share of senior debt. Other parameters including costs and duration of the bankruptcy procedure are set according to recent empirical studies on Chapter 11....

Analysis of results

We start by reporting the main output of the model, namely, the different plans proposed at each round as a function of the asset value. This allows us to identify the possible equilibria and their corresponding asset-value range. Next, we infer the probabilities associated to each outcome, the average time spent in Chapter 11, as well as the frequency and magnitude of violations of the Absolute Priority Rule (APR)—four quantities that we can relate to empirical data....

Conclusion

In this paper, we have developed and solved a non-cooperative game to model renegotiations under the bankruptcy law. By doing so, we hope to contribute to the modelling of financial distress in the contingent-claims literature by opening “the black box” of the Chapter 11 bargaining process. We show that rational claimholders can assess the likelihood of bankruptcy outcomes (liquidation or reorganization under different types of plans), using information about the firm and the legal procedure.
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...The major weakness of these studies is that the regulator sets the closure point (an asset-to-deposit threshold) exogenously. That is to say, the regulator would not take into consideration the strategies implemented by the insured bank in determining their closure policies, which is at odds with the observed fact that FDIC is legally required to preserve the maximum value of the failing bank and minimizing the cost of bankruptcy¹. The introduction of Israeli option to federal deposit insurance pricing is a better match with the reality that both the banks and the FDIC have the right to exercise the put option....

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...We predict that informal processes are preferred only when the total value of all claims in a formal bankruptcy procedure – as perceived by the holders of such claims – is less than the total value of the firm in an informal process. Under such a condition, claimholders may choose an informal process because all parties are better off as a result of the positive surplus that can be divided according to their bargaining power.³ The condition presented requires that each claimholder perceives the informal restructuring process as a Pareto improvement compared to the formal bankruptcy procedure....

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