THE NORWEGIAN SCHOOL OF ECONOMICS AND BUSINESS ADMINISTRATION

The Empty Creditor Hypothesis

An empirical study of the effects of credit insurance on the choice between bankruptcy and private restructuring

by

Nils Henrik Gjøstøl Aspeli and Kristoffer Riis Iden

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Thesis Supervisor: Associate Professor Carsten Bienz

Abstract

The term *empty creditor* refers to a creditor who has obtained insurance against default, but who otherwise retains control rights in and outside bankruptcy. Several commentators have raised concerns that such creditors pose problems for private debt renegotiations and that they influence bankruptcy settlements. We analyze the problem empirically by studying a sample of 218 distressed debt restructurings in the U.S. between 1995 and 2010. Our study shows that the existence of credit insurance does not significantly impact the choice between private renegotiation and bankruptcy, but that other factors play a more important role. In particular, a private workout is more likely to succeed when firms have higher going-concern values prior to their restructuring effort and if more of a firm's debt is owed to banks and private lenders. Restructuring privately is less likely to succeed when more debt is public or owed to trade creditors, when leverage is high, and when there is greater information asymmetry between a firm and its creditors. We also present stock price evidence which suggests that the market treats private workouts more favorably than bankruptcy. This lends support to previous research which indicates that restructuring in bankruptcy is generally more costly than restructuring privately.

Preface

The impact of credit insurance on creditors' incentives in debt renegotiations is an issue that has received attention from the media, regulators, and practitioners over the past few years. Even so there exists little empirical work from which conclusions can be drawn. The need for such studies is present, especially because the issue may influence financial regulation of credit derivatives markets in the future.

Our aim in this paper has been to empirically analyze the empty creditor problem for which there is a theoretical foundation, but which has not been systematically tested in previous research. This required us to engineer an empirical test based on observable firm characteristics, and to collect large amounts of data. In our case, the latter proved to be the most challenging due to the lack of disclosure in the over-the-counter (OTC) market. Ideally we wished to include credit default swaps (CDS) in our analysis as a continuous variable using notional outstanding volume. However, we recognized early on, by consulting industry practitioners and searching various databases, that historical records of notional volumes of CDS on single-name reference entities are not readily available. Nonetheless, this information is becoming more available as trading moves through centralized clearinghouses and information services companies, such as Markit, continue to collect trading data from several trading desks. Such advances offer the chance to improve on the analysis that we conduct in this paper in the future.

As for our own contribution, the completion of this thesis would not have been possible without the feedback and support from Associate Professor Carsten Bienz, our thesis supervisor. We would also like to thank Halvor Hoddevik of Arctic Securities ASA for his expert advice and Stein Fossen for providing us with access to the Compustat and CRSP databases. We also extend our gratitude to Professor Lynn M. LoPucki, professor of law at the UCLA School of Law and visiting professor at Harvard Law School. Access to his Bankruptcy Research Database was an invaluable contribution to our empirical work.

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Nils Henrik Gjøstøl Aspeli	Kristoffer Riis Iden

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1. Introduction

One of the more significant innovations in finance in the past two decades is the development of credit derivatives, of which credit default swaps are the most common. The market for CDS contracts has grown exponentially and reached a peak in 2007 when the gross notional amount outstanding exceeded USD 60 trillion (Deutsche Bank, 2009). Until that time, the developments in the credit derivatives market was welcomed as an effective means to hedge credit risk. It was also thought to facilitate risk diversification on a broader scale, and even contribute to the soundness and stability of the financial system (Greenspan, 2004). The onset of the financial crisis in 2007, however, pulled much of this praise into question. Warren Buffet, for instance, has labeled complex financial derivatives, like credit default swaps, as "financial weapons of mass destruction". There has also been genuine concern that the interconnectedness and opacity of the CDS market hides risk and may threaten the system at times of stress (ECB, 2009).

The criticism aimed at credit derivatives has also been extended to other areas of finance. One much-debated issue is related to the impact that the CDS market may have on the debtor-creditor relationship, particularly in the instance of corporate financial distress. The debate is grounded in the very principles that derivates are built upon, namely the decomposition and transfer of different types of risk. These transfer mechanisms, it is argued, can have negative side-effects for the incentives of creditors to act in the best interest of the firms in which they have a stake. At the heart of the issue lies the fact that credit insurance not only allows the buyer to transfer credit risk to the seller, but can also cause separation between a creditor's control rights and cash flow rights.

The terminology to describe the problem has been developed by legal scholars Henry Hu and Bernard Black in their work on equity and debt decoupling (Hu and Black, 2008a; 2008b). In their words, ownership of debt can be viewed as a package of economic rights to receive payment of principal and interest, and contractual and legal rights, like enforcing the terms of a debt contract and to participate in bankruptcy proceedings (Hu and Black, 2008b). Credit derivatives allow a creditor to decouple his economic rights from his legal rights. In other words, while the CDS contract provides insurance against losses from default, control rights are retained through ownership of the underlying debt contract. The result may be an

empty creditor whose incentives may be skewed compared to how creditors are traditionally viewed by law and contracting practice. Taken to its length, the empty creditor hypothesis undermines the assumption that creditors will strive to keep a solvent firm out of bankruptcy and that they will maximize the value of an insolvent firm.

The notion of empty creditors has received widespread attention from the media, academia and practitioners. Investor George Soros, for example, linked the AbitibiBowater and General Motors bankruptcies to the fact that some bondholders owned CDS and stood to gain more by bankruptcy than by reorganization (Soros, 2009). *The Economist* recently argued in an article that the availability of credit default swaps has undermined the premise that "creditors always attempt to keep solvent firms out of bankruptcy" (Economist, 2009). Furthermore, the topic spurred a reaction from the International Swaps and Derivatives Association (ISDA) that published a research note in 2009 attempting to dispel many of the arguments underlying the empty creditor hypothesis (Mengle, 2009).

Yet there exists little empirical evidence either in favor or against the hypothesis. Hu and Black present some examples of potential instances where empty creditors have played a part, but they admit that their evidence is based on "possibilities, rumors, practitioner articles (which often don't name instances) and conversations with bankruptcy lawyers, bankruptcy judges, and other knowledgeable market participants" (Hu and Black, 2008). Mengle (2009) cites the proportional number of out-of-court restructurings and bankruptcies before and after the boom of the CDS market as evidence against the empty creditor hypothesis, but omits any other factors that may explain the results. The empty creditor hypothesis has also been studied using an analytical model. Bolton and Oehmke (2010) develop a formal economic model, by comparing contracting outcomes with and without CDS, and predict that the CDS market may serve to strengthen creditors' bargaining power *ex ante* which raises the debtor's pledgeable income and helps reduce the incidence of strategic default. The commitment role of CDS has also been explored in other papers that mostly focus on the impact of CDS on bank's incentives to monitor, or on the ability of CDS to improve risk sharing. Duffie and Zhou (2001), for instance, show that CDS allows for the decomposition of credit risk into components that may help banks overcome a potential lemons problem when hedging credit risk. Similarly, Arping (2004) argues that CDS can help

reduce a problem with moral hazard between banks and borrowers, provided that CDS contracts expire before maturity.

In this paper we analyze the empty creditor problem from an *ex post* perspective. As we will argue later, one implication of the empty creditor hypothesis is that hedged creditors are less likely to approve an out-of-court restructuring than unhedged creditors. Nonetheless, the choice between a private workout and formal bankruptcy proceedings depends on several factors, including the complexity of a firm's capital structure, asset tangibility and outstanding liabilities. Therefore, a full analysis of the relationship between the likelihood of an out-of-court restructuring and hedging with credit default swaps needs to control for these other factors. In order to complete such an analysis we study a sample of 218 distressed debt restructuring attempts in the United States between 1995 and 2010. Our sampling methodology follows Gilson et al. (1990) and identifies financially distressed firms by their poor stock price performance. Incidences of bankruptcy are supplemented to the sample and drawn from the LoPucki Bankruptcy Research Database (2010). In our sample, 86 companies successfully restructure their debt out of court, while 132 firms file for Chapter 11 bankruptcy. We provide detailed summary statistics of both subsamples and present univariate and multivariate analyses that shed light on what determines a firm's choice between bankruptcy and restructuring privately.

Our findings suggest that financial distress is more likely to be resolved privately when firms have higher going-concern values prior to their restructuring efforts and if more debt is owed to banks and private lenders. A private restructuring is less likely to succeed when more debt is owed to public lenders and trade creditors, when the firm is highly leveraged and when there is greater information asymmetry between a firm and its creditors. Even after all these results are incorporated in our models, we find no evidence that the presence of credit default swaps on a firm's debt influences the choice between bankruptcy and private renegotiation.

Our study falls in the category of literature that examines corporate financial distress from an *ex post* perspective. While no other empirical studies, to our knowledge, have addressed the impact of credit default swaps on the choice between a private workout and formal bankruptcy, related evidence has been generated. Gilson et al. (1990) study a sample

of financially distressed firms during 1978-1987 that are forced to restructure their debt. They find that financial distress is more likely to be resolved through private renegotiation when more of the firm's assets are intangible and relatively more debt is owed to banks, and less likely to succeed when there are more distinct classes of debt outstanding. Jostarndt & Sautner (2007) perform a similar study under the non-interventionalist German bankruptcy code, and find that private restructurings are more likely to succeed for a firm that is higher leveraged, owe more debt to banks, and exhibit higher going-concern values. These findings are in line with James (1995) who finds that banks are more likely to forgive principle and swap debt for equity if less outstanding debt is owed to public lenders. Similarly, Asquith, Gertner and Scharfstein (1994) find, through a study of distressed high-yield bond issuers, that successful private workouts are impeded by coordination problems between private and public creditors.

The remainder of this paper is structured as follows. Section 2 provides the theoretical basis for the empirical study that follows. We give a brief introduction to credit default swaps and their role as hedging instruments before elaborating further on debt decoupling and its implications for debt governance. We also discuss firms' incentives to choose between private renegotiation and bankruptcy as alternative mechanisms for dealing with financial distress. Section 3 presents our hypotheses and the empirical proxies for our sample that we derive on the basis of the theoretical discussion. Section 4 describes the data and sampling method. Section 5 presents the empirical analysis and results. Section 6 concludes.

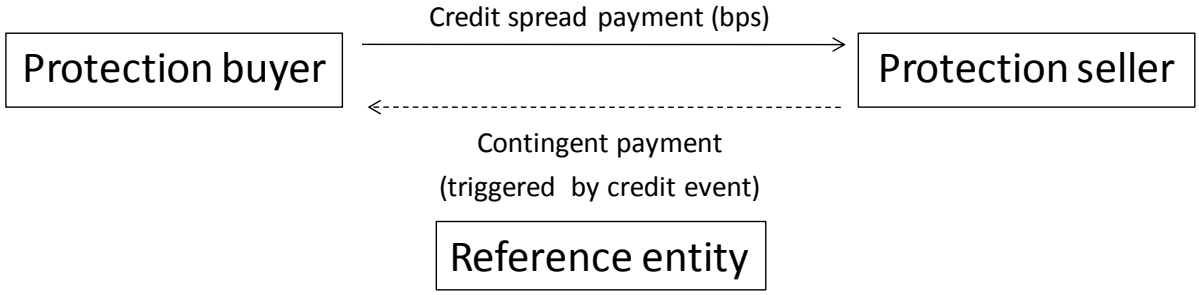
2. Credit default swaps, empty creditors and the economics of bankruptcy

2.1 Credit default swaps explained

The empty creditor hypothesis is built upon the assumption that a creditor is able to completely separate legal ownership of corporate debt from the economic risk associated with holding that debt. Credit derivatives that strip out credit risk from underlying debt securities can be used for just such a purpose. The most important and widespread credit derivative in use today is credit default swaps.

Simply stated, a credit default swap is a swap contract where the swap seller agrees to pay the swap buyer some given amount in the event of a default of some third party, or what is often referred to as the reference entity. In return, the swap buyer agrees to make periodic payments to the swap seller. These payments are usually referred to as the spread, or premium, and are typically expressed in basis points per annum (J.P. Morgan, 1999). The swap contract is structured such that the present value of the swap is zero at the time of agreement, which means that the expected present value of the buyer's periodic spread payments equals the expected present value of the seller's payment upon default. This implies that the spread paid by the swap buyer effectively functions as a market-based probability measure of the default risk of the reference entity.

Illustration 1: CDS contract

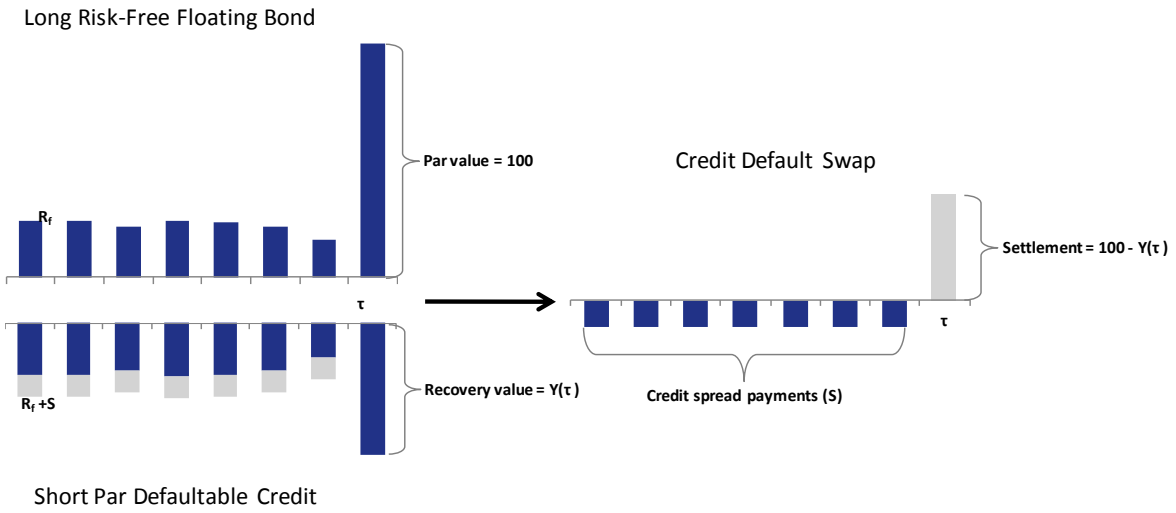


Source: J.P. Morgan (1999)

In basic terms, a CDS can be seen as linear combinations of simpler, more standardized financial contracts. Using an arbitrage argument we can replicate a long position in a CDS by taking a short position in the risky credit issued by the reference entity and a long position in a risk-free bond paying a floating interest rate with the same maturity (Duffie, 1999). We assume the risky credit pays a floating interest with a spread S over the risk-free bond. If a credit event takes place, as shown in Illustration 2 at time τ, the position is closed by buying back the reference credit and at the same time selling the risk-free floater. We see that this trade perfectly replicates the payoff of a CDS contract that references the risky credit, and that the spread S must equal the credit spread paid by the protection buyer in the CDS agreement.[1]

[1] In practice this arbitrage argument is somewhat modified due to technical factors like reverse repo special rates and transaction costs.

Illustration 2: Components of a CDS



Source: Duffie (1999)

CDS contracts can, in principle, reference any type of credit or debt security, but are in broad terms often classified into three different groups (ECB, 2009). The first group consists of contracts that offer protection to the credit risk of a single corporate, government or sovereign entity. These contracts are often referred to as single-name CDS contracts. Secondly, there exist CDS contracts that reference indices consisting of a pool of several single-name CDSs. CDS indices have gained popularity in recent years, and may be used as a measure of credit risk in the broader economy or of sovereign states. Well known examples are indices like iTraxx, which tracks corporate bonds, and SovX, which tracks sovereign bonds. Thirdly, basket CDSs reference a portfolio of several entities and typically contain some sort of tailored trigger mechanism.[2] Additionally, there exist CDS contracts traded on non-public debt or loans, or what are often referred to as a Loan Credit Default Swaps (LCDSs), as well as other more specialized contracts.

The developments in the CDS market have changed the face of credit trading and have had wider repercussions for the financial markets, of which we choose to highlight three of the more important issues. Firstly, it has been argued by many that credit derivatives markets have induced efficiency benefits by enabling a better allocation and pricing of credit risk in the economy. Former Federal Reserve Chairman Alan Greenspan pointed to the CDS market's ability to enhance the price discovery mechanism through "the collective knowledge held by market participants" (Greenspan, 2002). This observation is

[2]A basket CDS is often triggered by the nth-to-default in the reference basket (e.g. 1st-to-default, 2nd-to-default)

supported by Blanco et al. (2005), who find evidence that CDS spreads lead the spreads in the associated cash bond market for corporate issuers, which indicates that CDS spreads are a better measure of credit risk. However, whether this increased liquidity is to the benefit of corporate borrowers is questioned by Ashcraft and Santos (2009), who fails to find evidence that the onset of CDS trading have lowered the borrowing cost for the average corporate borrower.

Secondly, critics of credit default swaps maintain that the instruments pose a threat to financial stability. Much of the concern is that too much risk is concentrated at a limited number of dealers and underwriters that are "too-big-to-fail". Counterparty risk is also hard to assess because the CDS market is interconnected and inherently non-transparent. It is feared that this combination increases the strain on the financial system in times of stress (ECB, 2009). The growth of credit derivatives markets also enables large amounts of financial leverage to be hidden outside regulated financial institutions in the so-called shadow banking system. This was arguably an important factor behind the credit bubble and the ensuing financial crisis (Krugman, 2009). Measures to tackle these potential problems have therefore been proposed. Some suggestions are to bring CDS trading onto public exchanges or to introduce a central clearinghouse to reduce counterparty risk. Other proposals aim to bring more transparency to the market.[3] New financial regulations, for example in the form of Basel III, should also be expected to take a more conservative view on credit derivatives (Standard & Poor's, 2010).

Finally, the emergence of CDS contracts has changed important aspects of the debtor-creditor relationship. In essence, CDS contracts enable the decomposition and transfer of the credit risk of the underlying reference entity (Hull, 2008). As a result, the risk and cash flows of a security can be completely separated from physical ownership of that security. This aspect of CDS contracts can impact traditional debtor-creditor relationships as a creditor may hold the contractual rights associated with ownership without having any economic interest in the owned asset. It is this decoupling phenomenon that forms the basis for the empty creditor hypothesis.

[3] Some of these proposals have already been implemented. For example, the North American and European conventions have been changed to allow CDS contracts to pay the spread upfront in the initial trade, and later pay standardized coupons of sizes 100 bps or 500 bps (Markit, 2009). Prior conventions entailed a payment of the credit spread during the entire life of the contract which made each single trade unique. *Ad hoc* measures aimed at reducing gross outstanding notional through trade compression have also been implemented (Deutsche Bank, 2009)

2.2 Debt decoupling and the empty creditor hypothesis

The framework to describe empty creditors was developed by legal scholars Henry Hu and Bernard Black who drew attention to how credit derivatives affect the incentives of bondholders and other market participants. They apply the unbundling principle inherent in financial derivatives to a firm's capital structure and describe the separation of economic entitlements from ownership rights for equity and debt. Hu and Black's (2008a; 2008b) primary focus is to point out how the current legal statutes inadequately capture the development in derivatives markets, which leads them to explore the possible implications of financial decoupling. Recently, finance scholars Patrick Bolton and Martin Oehmke have developed a model using insight from traditional financial contracting literature that in many ways formalizes the implications that Hu and Black (2008a; 2008b) have explored (Bolton and Oehmke, 2010). In the following we explain the empty creditor hypothesis building on both sets of approaches.

a) Empty creditors and their implications for debt renegotiations

Initially Hu and Black (2008a) focused their work on equity decoupling and lapses in the regulation for corporate control and corporate governance. Rules governing public firms generally assume that share ownership translates into certain ownership rights. Their nature can be economic in the form of dividend, liquidation or appraisal rights. Or they can be legal rights to vote, uphold fiduciary duties, bring suits against the company, inspect corporate records and so on (Hu and Black, 2008a). However, derivatives, such as options, futures and equity swaps, and the widespread market for share lending, now offer low-cost and effective ways to separate economic ownership from voting ownership. Through ownership combinations of the underlying shares and a coupled asset, shareholders can build up greater voting rights than economic ownership, or what Hu and Black (2008a) call *empty voting*. Oppositely, *hidden (morphable) ownership* refers to a situation where investors have greater economic ownership than formal voting rights.

Hu and Black (2008a) argue that empty voting and hidden ownership can lead to unwanted market behavior. Actual voting positions can be concealed from public scrutiny and mandatory bid rules can be circumvented. Decoupling ownership rights from economic obligations can also lead to distorted behavior on the part of shareholders who may choose

to disregard their fiduciary duties or even act against the interests of the firm. Such behavior has attracted the attention of regulators and court rulings have already set precedence to curtail the use of derivatives and share lending contracts to create hidden ownership positions.[4] There is also a trend towards greater disclosure requirements of equity swaps and other cash-settled equity derivatives. Hu and Black (2008b) argue that such disclosure requirements should also be extended to credit derivatives, including credit default swaps.

Although the discussion on debt decoupling is more recent and less developed than the one for equity decoupling, the same basic principles can be applied to debt contracts as to equity securities. A debt contract entitles the owner to contractual rights to receive interest payments and principal, default rights and voting rights to waive financial covenants or to enforce bankruptcy upon a non-compliant debtor. In bankruptcy a creditor's rights extends to voting for a liquidation or reorganization plan, or assuming control of a distressed entity. Just as shareholders can hedge their economic exposure with equity derivatives, bondholders can insure against default risk using credit derivatives. An *empty creditor* resembles an *empty voter* as a creditor that has traded away all economic risk, but retains other contractual and voting rights. As for hidden ownership, non-disclosure is the norm as bondholders are seldom required to reveal their positions (Hu and Black, 2008b).

Hu and Black put forth several suggestions for how debt decoupling can have negative implications for the relationship between creditors and debtors and they use credit default swaps to illustrate their examples. By holding CDS contracts, creditors can fully hedge their positions, but still retain contractual rights and full voting rights within bankruptcy. Pushing the point further, Hu and Black (2008b) argue that creditors can build up negative economic ownership in a firm, implying that the value of their overall position increases with credit risk or if a credit event occurs: "An investor might, for example, hold USD 200 million of a company's bonds, but have bought credit protection on USD 500 million notional amount of bonds" (Hu and Black, 2008b). The authors postulate that the incentive problems of hedged creditors can take place both out of and within bankruptcy. A creditor with zero or negative economic interest in a firm may prefer that a company fail, and may therefore oppose an out-of-court restructuring in order to trigger the contractual payoff on the credit default swaps. Within bankruptcy, hedged creditors do not have any interest in

[4] See CSX v Children's Investment Fund (June 2008)

maximizing the value of the firm and may as a result vote for less efficient decisions on liquidation versus continuation, or on post-reorganization capital structures (Hu and Black, 2008b).

Finally, Hu and Black (2008b) argue that widespread debt decoupling can contribute to systemic financial risk. Firstly, debt decoupling complicates renegotiation of debt contracts, which on a large scale poses systemic risk as debtors are unable to resolve defaults privately with lenders. Secondly, decoupling can reduce the incentives of lenders to monitor and assess credit risk correctly – a matter that is complicated by securitization and longer ownership chains. Third, debt decoupling can exacerbate liquidity shocks by making it difficult to readily identify counterparties in a transaction. The wide distribution of credit risk impedes a collaborative effort by regulators and market participants to address a liquidity crisis. In addition, the rigidity of the debtor-creditor relationship caused by debt decoupling means that liquidity in the form of refinancing as a substitute to renegotiation will tend to dry up in a downturn, when it is needed the most (Hu and Black, 2008b).

b) Economic model of empty creditors

Hu and Black (2008a; 2008b) primarily study the empty creditor problem from an *ex post* perspective and describe what implications empty creditors can have for debt renegotiations. Bolton and Oehmke (2010) build on these insights as they set out to analyze the empty creditor problem using a more formal economic model. Their model, however, also incorporates a view of the *ex ante* effects that the existence of credit protection can have on the debtor-creditor relationship.

Bolton and Oehmke (2010) analyze a firm that is considering a positive net present value (NPV) project that can be financed by issuing debt. The authors assume that the firm faces a limited commitment problem, a problem that has been thoroughly discussed in previous literature, for example by Bolton and Scharfstein (1990) and Hart and Moore (1998). Under the assumption of limited commitment the firm can issue debt to external investors, but has no way to credibly commit to paying out cash flows from the investment project in the future.

The model presented by Bolton and Oehmke (2010) posits that defaults can happen for two reasons. Firstly, default can happen from a lack of *liquidity*, when the firm is unable to honor the cash payment obligation written in the debt contract due to insufficient available funds at some interim point in time. Secondly, defaults can happen for *strategic* reasons, when the firm diverts cash flow away and refuses to pay the debtor – even if the firm's cash flows were sufficient to cover the payment obligations. Using this relatively simple economic framework Bolton and Oehmke (2010) are able to analyze consequences that CDS contracts have on debt contracting outcomes both from an *ex ante* and *ex post* perspective, and reach conclusions that in some ways diverge from the views presented by Hu and Black (2008a; 2008b).

Outcome without CDS contracts

First, Bolton and Oehmke (2010) assume that the firm has no CDS contracts traded on its debt and that the firm is considering an investment project requiring an initial investment outlay of F at Date 0. The project generates cash flows over two discrete time periods, Date 1 and Date 2. The cash flows are assumed to be stochastic with two possible outcomes in each time period. In particular, we let $\{C_1^L, C_1^H\}$ and $\{C_2^L, C_2^H\}$, with $C_1^L < C_1^H$ and $C_2^L < C_2^H$, represent the two sets of cash flow realizations, with θ and φ as the associated high cash flow probability at Date 1 and Date 2, respectively. Next, we assume that the firm has no equity, meaning that the initial investment will have to be fully debt financed. If the firm is able to obtain debt financing, the contract specifies a payment of the face value R at Date 1. We also assume that $C_1^L < F < R$, thus implying that the debt must be risky. If the firm defaults on the contractual payment R at Date 1 the creditors have the right to force the firm into bankruptcy. Otherwise, the project is allowed to continue and the firm can collect the Date-2 payments.

The main insights of the model arise from the assumption of limited commitment, which is implemented by only making the C_1^L cash flow verifiable by outside investors. This means that any amount higher than the low Date-1 cash flow can be diverted away from the investor. In particular, it will be possible for the firm to divert the amount $C_1^H - C_1^L$ away from the creditors by defaulting strategically in outcomes where the project in fact has realized C_1^H. Moreover, we assume that the Date-2 cash flows cannot be contracted at Date 0, but that the outcome is realized to the firm at Date 1, and that this cash flow can be made

verifiable to the creditors at Date 1 by paying a verification cost of $(1-\lambda)C_2$, with $\lambda \in (0,1]$. This latter assumption opens for the possibility of debt renegotiations by enabling the firm to pledge some portion of the Date-2 cash flow to the lender following a default at Date 1. In order for the firm to repay the contractual amount R in the high cash flow state we therefore have that the following incentive constraint must be satisfied:

$$C_1^H - R + C_2 \geq C_1^H + (1-q)\,\lambda C_2 \tag{1}$$

The constraint tells us that the firm will repay the debt at Date 1 when the value of complying with the contractual agreement, as given by the left hand side (LHS), is larger than the value of defaulting strategically. The latter choice, as given by the right hand side (RHS), entails a renegotiation of the debt where the debtor is given a fraction q of the Date-2 cash flow with an associated verification cost (λ). Solving Equation (1) for R, we thus see that the maximum face value (R) that satisfies the incentive constraint under both Date-2 cash flow realizations is given by the following equation:

$$R = C_2^L(1-\lambda(1-q)\,) \tag{2}$$

Furthermore, by assuming that the firm will always be able to honor this incentive compatible repayment in the high cash flow state at Date 1 – that is, given that $C_1^H \geq C_2^H(1-\lambda(1-q)\,)$ – we get the following maximum *ex ante* investment outlay that satisfies the incentive constraint:

$$\hat{F} = \theta C_2^L(1-\lambda(1-q)\,) + (1-\theta)\lambda q(\varphi C_2^H + (1-\varphi)C_2^L) \tag{3}$$

Given that the incentive constraint expressed by Equation (1) holds and that the investment does not exceed $\hat{F}$, strategic defaults will not happen in equilibrium, and all defaults that happen for liquidity reasons will be perfectly efficient. If the investment outlay exceeds $\hat{F}$, however, the project can either by financed with strategic defaults happening in equilibrium, or the firm may not be able to raise debt financing at all.

The first case is shown to arise in the interval given by $\left(\widehat{F}, F'\right]$. That is, the project can be financed with debt with strategic default in equilibrium given that the probability of a high cash flow at Date 2 satisfies the following condition:

$$\varphi > \bar{\varphi} \equiv \frac{(1-\lambda)C_2^L}{(1-\lambda)C_2^H + \lambda q\left(C_2^H - C_2^L\right)} \tag{4}$$

This assumption yields the following maximum face value and associated maximum *ex ante* investment outlay consistent with the incentive constraint:

$$R = C_2^H(1-\lambda(1-q)) \tag{5}$$

$$F' = \theta\left[\varphi C_2^H\left(1-\lambda(1-q)\right) + (1-\varphi)\lambda C_2^L\right] + (1-\theta)\lambda q[\varphi C_2^H + (1-\varphi)C_2^L] \tag{6}$$

The second case, where no financing can be obtained at all, arises when the investment outlay exceeds the maximum of $\widehat{F}$ and F'. This happens since the firm will now choose to default strategically in both Date-1 states.

In conclusion, we note how two types of inefficiencies arise from the contracting outcomes outlined above. Firstly, inefficiencies arise as an effect of the firm defaulting strategically in the low cash flow state at Date 1 (C_1^L) in the case of investment outlay $\widehat{F} < F \leq F'$ and probability $\varphi > \bar{\varphi}$. Secondly, inefficiencies arise from underinvestment in the case where $F > \max\left(\widehat{F}, F'\right)$, since the firm will not be able to attract financing to the project even though it is NPV positive. The three possible contracting outcomes without CDS contracts are summarized in Table 1**.**

Table 1: Contracting outcomes without CDS protection

Investment (F)	$F \leq \widehat{F}$	$\widehat{F} < F \leq F'$	$F > \max\left(\widehat{F}, F'\right)$
Financing possible?	YES, for all φ	YES, for $\varphi > \bar{\varphi}$ (with strategic default)	NO
Maximum face value (R)	$R = C_2^L(1-\lambda(1-q))$	$R = C_2^H(1-\lambda(1-q))$	n/a

Source: Bolton and Oehmke (2010)

Outcome with CDS contracts

Next, we extend the model by introducing the option for the lender to buy credit protection by entering into a CDS position of size π. The existence of CDS contracts imply that the borrower must compensate the lender to a larger degree in a debt renegotiation than without, since the CDS contracts reduce the lender's loss from a default by the amount of credit protection. Given that the amount of credit insurance π exceeds $q\lambda C_2$, we have a new incentive constraint given by the following equation:

$$C_1^H - R + C_2 \geq C_1^H + \max(\lambda C_2 - \pi, 0) \quad (7)$$

By comparing Equation (1) and Equation (7) we can easily see how CDS contracts function as a commitment device. We see that the RHS of Equation (7) is strictly smaller than the RHS of Equation (1), and we therefore have that the firm's incentive to default strategically must be reduced. It can also easily be shown that setting the level of credit protection equal to $\pi = \lambda C_2^L$ will lead to an unambiguous efficiency increase, since the project's ability to attract debt financing is increased without sacrificing any renegotiation surplus (Bolton and Oehmke, 2010). At this level of credit protection, the maximum face value with no strategic default consistent with the incentive constraint given by Equation (7) is equal to $R = C_2^L$. The associated maximum investment outlay is given by:

$$\tilde{F} = \theta C_2^L + (1-\theta)[\varphi\lambda \max(C_2^L, qC_2^H) + (1-\varphi)\lambda C_2^L] > \hat{F} \quad (8)$$

Equivalent to the case without CDS presented earlier, contracting is also possible with strategic default in equilibrium for an interval $(\tilde{F}, \tilde{F}']$, for Date-2 high cash-flow probabilities given by:

$$\varphi > \tilde{\varphi} \equiv \frac{(1-\lambda)C_2^L}{C_2^H + \lambda C_2^L} \quad (9)$$

In this case the maximum incentive compatible face value is equal to $R = C_2^H$ with associated maximum investment outlay given by:

$$\tilde{F}' = \theta[\varphi C_2^H + (1-\varphi)\lambda C_2^L] + (1-\theta)[\varphi\lambda \max(C_2^L, qC_2^H) + (1-\varphi)\lambda C_2^L] > F' \quad (10)$$

Table 2: Contracting outcomes with CDS protection

Investment (F)	$F \leq \tilde{F}$	$\tilde{F} < F \leq \tilde{F}'$	$F > \max(\tilde{F}, \tilde{F}')$
Financing possible?	YES, for all φ	YES, for $\varphi > \tilde{\varphi}$	NO
Maximum face value (R)	$\mathrm{R} = \mathrm{C}_2^{\mathrm{L}}$	$\mathrm{R} = \mathrm{C}_2^{\mathrm{H}}$	n/a
Outcome compared to no CDS protection	$\tilde{\mathrm{F}} > \hat{\mathrm{F}}$ (strategic defaults reduced)	$\tilde{\mathrm{F}}' > \hat{\mathrm{F}}'$ (underinvestment reduced)	$\max(\tilde{\mathrm{F}}, \tilde{\mathrm{F}}') > max(\hat{\mathrm{F}}, \mathrm{F}')$ (underinvestment reduced)

Source: Bolton and Oehmke (2010)

We thus have two positive efficiency effects from CDS contracts at this level of protection. Firstly, CDS contracts increase the level of initial investment outlays that can be financed without strategic default happening, since $\tilde{F} > \hat{F}$. Secondly, the existence of CDS contracts will attract financing for projects with strategic default in equilibrium that previously were unable raise capital, since $max(\tilde{F}, \tilde{F}') > max(\hat{F}, F')$. In this model setup, the introduction of a CDS market thus decreases the incidence of strategic default and increases the set of companies that can receive financing.

Next, consider what happens when credit protection is raised above the level given by $\pi = \lambda C_2^L$. It can then be shown that renegotiations following liquidity defaults in some cases will no longer be possible. The lenders have become empty creditors. To see the effect, consider the case where the firm is renegotiating the debt at Date 1 for liquidity reasons when the expected Date-2 cash flow is C_2^L. In this case, a successful renegotiation of the contract is no longer possible, since $\pi > \lambda C_2^L$. That is, the creditor's payoff on the CDS contract (π) triggered by the default of the reference entity is larger than the maximum cash flow the firm can pledge (λC_2^L), and a successful debt renegotiation is therefore impossible.

But although credit protection with $\pi > \lambda C_2^L$ can derail debt renegotiations that in themselves would have been *ex post* efficient, the outcome does not necessarily need to be *ex ante* inefficient. This is the case when the increased commitment enables projects to obtain financing that otherwise would remain unfinanced, and when the gain from fewer strategic defaults more than outweighs the loss associated with inefficient liquidity default renegotiations.

To see this, first consider the former case, which arises when $\tilde{F} \geq \tilde{F}'$. From Table 2 we see that this implies that the last project to receive financing under low credit protection, $\pi = \lambda C_2^L$, will be financed efficiently without strategic default in equilibrium. It will therefore be efficient to raise the level of credit protection to $\pi = \lambda C_2^H$ for projects that would otherwise not have been financed. That is, in the case where $\tilde{F} \geq \tilde{F}'$ it may be efficient to raise credit protection to a level of $\pi = \lambda C_2^H$ for projects with $F > \tilde{F}$. The high level of credit protection will thus enable these projects to receive financing – albeit with strategic default in equilibrium. Secondly, consider the latter case when $\tilde{F}' \geq \tilde{F}$. From Table 2 we see that the marginal project is financed with strategic default in equilibrium under low credit protection ($\pi = \lambda C_2^L$). Given that the cost associated with lost renegotiation surplus is more than outweighed by the efficiency gains from reduced strategic defaults it will be efficient to set the credit protection to a high level ($\pi = \lambda C_2^H$) for projects with $F > \tilde{F}'$. This can be shown to be the case whenever $\theta > \lambda$.

In conclusion the model predicts an unambiguous efficiency gain from introducing credit protection at a low level ($\pi = \lambda C_2^L$), since this level of credit protection decreases the incentive for firms to default strategically, and decreases the level of underinvestment without skewing creditors' incentives in beneficial renegotiations following liquidity defaults. Moreover, the model also predicts that for some cases it may also be efficient to raise credit protection to $\pi = \lambda C_2^H$. In particular, it is efficient to set protection to a high level for investment projects that would otherwise be unable to obtain financing, and in cases where the efficiency gains from reduced strategic defaults more than outweighs the loss of renegotiation surplus.

Creditor's choice of credit protection

Next, we consider what level of credit protection the lender will choose compared to the efficient contracting outcome outlined above. In the model by Bolton and Oemhke (2010) creditors are assumed to choose their level of credit protection after the terms of the firm's debt contract are determined. The creditors thus take the debt face value R as given. The level of credit protection is also assumed to be non-committable, meaning that the lender can choose to change his level of protection after the initial level of protection is set. The authors argue that the lender's inability to commit to a given level of credit protection is

reasonable given the low level of disclosure in the credit derivatives market. The opacity of the CDS market makes it unlikely that the firm knows whether the lender holds credit protection on its debt – and even less likely that it knows whether the level of protection has changed. Moreover, the insurance premium f paid by the creditor is assumed to be fairly priced, meaning that the market for CDSs correctly anticipates the creditors' renegotiation incentives for a given level of insurance π. The creditor is then assumed to evaluate different levels of credit protection *ex ante*. Trivially, we have that it must be optimal for the creditor to set the level of credit protection to $\pi = \lambda C_2^L$ since this strengthens his position in a renegotiation without reducing any renegotiation surplus. However, it can be shown that the creditor may increase the level above $\pi = \lambda C_2^L$ as long as his expected payoff increases, overall efficiency notwithstanding.

Firstly, in the case where the marginal project can be financed without strategic default under low credit protection ($\pi = \lambda C_2^L$), that is, when $F \leq \tilde{F}$, the creditor is shown to choose high credit protection ($\pi = \lambda C_2^H$) under the following condition (Bolton and Oehmke, 2010):

$$C_2^H > \begin{cases} \frac{1-\varphi}{(1-q)\varphi} C_2^L, & \text{when } \mathrm{qC_2^H} > \mathrm{C_2^L} \\ \frac{1}{\varphi} C_2^L, & \text{otherwise} \end{cases} \tag{11}$$

Secondly, there also exists an interval $\left(\tilde{F}, \tilde{F}'\right]$, where financing with low credit protection ($\pi = \lambda C_2^L$) is possible with strategic default in equilibrium, where the creditors will choose high credit protection ($\pi = \lambda C_2^H$) when condition (11) holds and $\lambda > \theta$. We thus see that inefficient, over-insured empty creditors arise from the model setup when the project's probability of a high Date-2 cash flow is high, and when the verification cost is low compared to the probability of a high Date-1 cash flow ($\lambda > \theta$).

In conclusion, Bolton and Oehmke (2010) predict the following effects on the debtor-creditor relationship from the introduction of CDS contracts. Firstly, CDS contracts are shown to function as a commitment device which increases efficiency by reducing strategic defaults and increase the set of projects which can obtain financing. Credit protection may in the case of some investment projects create empty creditors, but these contracting outcomes are still *ex ante* efficient since financing is made available to more companies. This conclusion diverges from Hu and Black (2008b) who posits that the existence of empty

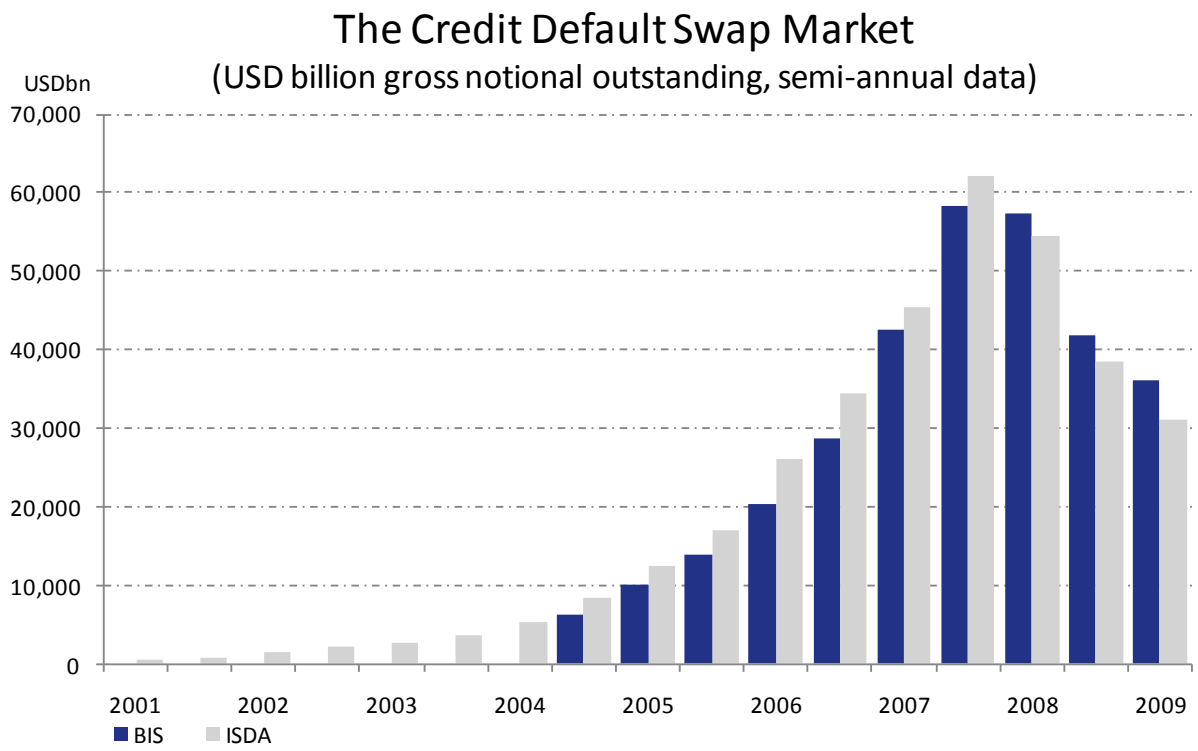
creditors may create inefficiencies *per se*. Secondly, Bolton and Oehmke (2010) predict that creditors may in some cases over-insure, creating inefficient empty creditors. Using the insights from the model framework the authors go on to describe possible measures to curtail the problem, including denying empty creditors voting rights in bankruptcy proceedings and making non-binding out-of-court restructurings a credit event. The authors express concern over such measures by arguing that they would not only eliminate the inefficiencies that arise from possible empty creditor problems, but would also eliminate the efficiency gains associated with the CDS contracts function as a commitment device. Finally the authors prescribe increased disclosure of creditors' CDS positions, both in bankruptcy proceedings and in day-to-day trading of credit derivatives, as a measure that would increase creditors' commitment to a given level of credit protection and reduce the incentive to over-insure.

c) Evidence of the empty creditor hypothesis

Hu and Black (2008b) initially formulated the empty creditor hypothesis, and Bolton and Oehmke (2010) have formalized its impact on the debtor-creditor relationship. But do we observe empty creditors in practice? Due to the low disclosure of debt ownership and hedging positions, concrete evidence of empty creditors is sparse. However, a study of the characteristics of the credit derivatives market should at least warrant the possibility of their existence.

The first indication is the sheer size of the CDS market. According to the ISDA, the CDS market grew from USD 631 billion notional outstanding in 2001 to over USD 62 trillion notional outstanding at its peak in late 2007, before settling to a level of just over USD 32 trillion in 2009. Part of the reason for this growth is that CDS contracts can be traded independently of the underlying debt securities, allowing the CDS market to grow to a multiple of the underlying debt market. This, in turn, opens for the possibility that creditors can fully hedge their debt exposure and even build up negative economic ownership by over-hedging.

Graph 1: Gross notional outstanding



The number of gross notional outstanding CDS contracts shown above is based on estimates. The BIS (Bank for International Settlements) collects data from central banks on a semi-annual basis. Each central bank collects data voluntarily reported by banks and dealers in its jurisdiction and calculates aggregate national data, which the BIS then compile. The ISDA (International Swaps and Derivatives Association) publishes a semi-annual market survey, which includes notional amounts of CDS bought and sold, based on voluntary responses from 60 institutions.

Source: BIS and ISDA

Evidence is also found by looking at the major CDS market participants. After credit default swaps were pioneered by J.P. Morgan in the mid-90s, commercial banks have been among their biggest users. One of the reasons is that the CDS market has enabled banks and other types of lenders to hedge credit risk associated with specific exposures in ways that were not previously possible. In practice, because CDS contracts strip out specific risk from an underlying security, and can be traded without the reference entity's knowledge or consent, CDS hedging allow banks to shift credit risk off their balance sheets without selling the loans outright and damaging client relationships in the process (BoE, 2001). A result of this is also that banking itself has become more transaction-based and less reliant on direct customer interaction (Parlour and Plantin, 2008).

From a bank's perspective, credit risk management using CDS contracts can also have regulatory benefits. It may, for instance, facilitate the transfer of credit risk away from bank

holding companies that are subject to regulatory capital requirements, towards entities with lower economic costs associated with holding the risk. Hedging of credit risk through CDS contracts can also have administrative and judicial benefits compared to the more complex transaction associated with the sale and transfer of the underlying loan (BoE, 2001). For these reasons, commercial banks are among the largest players in the credit derivatives market (ECB, 2009).[5] Additionally, commercial banks are among the largest lenders in the corporate credit market. It is therefore natural to assume that some of these banks may have incentives that would make them empty creditors on some portion of their loan exposures.

Another major group of CDS market participants are hedge funds and other risk seeking investment funds (BoE, 2001). They generally act as speculators that seek to make returns from pricing discrepancies between the CDS and related cash bond, or what is often referred to as a basis trade (O'Kane and McAdie, 2001). Otherwise, they may seek to profit from directional trades based on a view on the outlook of the credit quality of the reference entity. As hedge funds and investment funds are also large holders of corporate debt, they are prime candidates to become empty creditors.

CDS markets have also been important for the growth of structured finance, which may contribute to empty creditor problems. Among others, CDSs have been a quintessential tool in the structuring of synthetic collateralized debt obligations (CDO) (ECB, 2009), a form of CDO where exposure is gained through the use of a CDS referenced to the underlying entities instead of outright ownership. CDOs can impede renegotiation of the contractual relationship between borrowers and lenders due to their complicated ownership structures. For instance, CDO trustees may have limited incentives to be actively involved in workouts and different tranche holders can have opposing economic interests in the fate of the CDO they own (Hu and Black, 2008b).

Even if certain characteristics of the CDS market seem favorable to the empty creditor hypothesis, it is difficult to obtain hard evidence of empty creditors on the basis of actual credit events. The lack of evidence is in large part due to the fact that CDS positions of

[5] The demand for CDS contracts has also led to the growth of an industry of credit protection sellers that consists of traditional insurance companies, as well as specialized sellers of credit protection, also referred to as monolines. Failed insurance giant AIG was a particularly important player in this market (ECB, 2009).

specific creditors are not disclosed – even after a firm files for bankruptcy – which means that real-life examples of empty creditors are mostly anecdotal. Hu and Black (2008b), for example, refer to a case where a junior creditor in a bankruptcy court was complaining that the firm's value was too high, even though that assessment would hurt the class of debt the creditor held. One case involving Goldman Sachs in the aftermath of the bailout of AIG in 2008 has also often been cited, although it does not qualify as a credit event. More specifically, Goldman upheld its right to demand full collateral from AIG, regardless of the adverse impact that the demand had on the liquidity of the distressed insurer. Apparently, Goldman, having hedged its exposure to AIG with credit default swaps, was an empty creditor of AIG (Hu, 2009). Other anecdotal evidence includes Mirant Corporation, an energy company that in 2003 sought bankruptcy protection after failing to negotiate with its lenders who had bought credit protection. Rumors of empty creditors have also surfaced in recent bankruptcies involving US auto companies Chrysler and General Motors, amusement park operator Six Flags, property investor General Growth Properties and Canadian paper manufacturer AbitibiBowater (see Appendix B for an overview).

d) Testing the empty creditor hypothesis

Given that it is hard to observe empty creditors directly, we can only test for their presence using indirect approaches. In doing so, it is useful to break down the arguments that Hu and Black (2008b) make into operational hypothesis that can be analyzed individually. Firstly, the empty creditor hypothesis assumes that a hedged creditor within bankruptcy will try to increase the value of their CDS positions by manipulating the value of the settlement. This argument, however, seems unlikely based on how the rules regulating the settlement procedures work.

The settlement procedures set forth by the ISDA opens for either physical or cash settlement of a CDS contract. Under physical settlement, which was the market convention until 2005, the protection buyer delivers the defaulted bonds to the protection seller in return for payment of the bond's par value. Once the bonds are delivered, the CDS buyer will have no incentive to affect the price of the defaulted obligations. Under cash settlement, the protection seller pays the loss amount to the buyer, where the loss amount is the difference between the bond's par value and post-default value determined in a settlement auction.

The settlement auction usually takes place within 30 days of the Credit Event Determination Date, and eliminates the need for physical delivery of the bonds. The auction also includes safeguards to deter aggressive bidding, such as penalizing crossed bids and offers as well as requiring bid and offer prices to be within a fixed spread of each other (Mengle, 2009). These safeguards, and the limited time from a credit event takes place until settlement, effectively decouples compensation from the bankruptcy proceedings and prevents participants from manipulating the auction.

The second prediction of the empty creditor hypothesis is that creditors can benefit from building up negative economic exposure to a distressed debtor. This argument also seems unlikely because the strategy would be prohibitively expensive. As long as the CDS market is efficient, CDS spreads will incorporate the expected loss of insolvency and therefore rise in line with a firm's probability of distress. For an over-hedging strategy to succeed a CDS buyer would have to successfully anticipate a credit event at a considerable length of time before it actually occurs, when spreads are still low. Unless a trader has superior knowledge or some form of inside information to base the trades on, the possibility to profitably implement such a strategy is likely to be slim.

A third, and more feasible prediction of the empty creditor hypothesis, is related to the exercise of contractual rights prior to bankruptcy. For a creditor that owns CDS on a debtor that becomes distressed, the value of the CDS positions will increase in relation to the deterioration of the credit quality of the debtor. The creditor can choose to unwind his position at any time at the given market price, or he can hold on to the CDS contracts until their outcome is decided. For creditors that do not unwind their CDS positions, the choice is usually between restructuring outside bankruptcy and restructuring in bankruptcy. The empty creditor hypothesis predicts that hedged creditors are less likely to approve an out-of-court restructuring than hedged creditors.

The reason is related to how debt restructurings are treated as a credit event. Under the ISDA definitions, a credit event is defined as the occurrence of one or more of the following six events: bankruptcy, failure to pay, obligation acceleration, obligation default, and repudiation/moratorium (ISDA, 2003). An empty creditor would therefore prefer for a firm to restructure in bankruptcy, rather than restructure privately, because the bankruptcy

filing would constitute a credit event and trigger payment on the creditor's CDS positions. The value of the CDS positions will also be higher in a bankruptcy restructuring if one assumes that bankruptcy is more costly for the firm than a private workout.

It should be noted that prior to 2009, restructurings were also considered to be a credit event under the North American market convention, and it still is in Asian markets. However, in order for a restructuring to qualify as a credit event it was required to be binding for all creditors holding the obligation. In practice this means that out-of-court restructurings have never triggered a credit event, since private workouts are rarely accepted by the full majority of creditors (Mengle, 2009). The reason is that it is difficult to obtain consent from all creditors in an exchange offer because non-pivotal bondholders have incentives to free-ride (Grossman and Hart, 1980).

Even if firms with hedged creditors are less likely to restructure out of court, the choice between a private restructuring and bankruptcy is complicated by a broad range of factors that influence the relative cost of the two solutions. The relevant issue is whether hedging with credit default swaps systematically leads to a choice of bankruptcy over a private workout, after these other factors are accounted for. It is this question that we test empirically by analyzing a sample of distressed U.S. firms that have either successfully completed an out-of-court restructuring or filed for bankruptcy.

2.3 The economics of bankruptcy

Our approach requires an understanding of the bankruptcy process, including its costs and benefits. In this section we will therefore discuss the mechanisms of the U.S. Bankruptcy Code as well as a firm's incentives for choosing between private renegotiation and bankruptcy as alternative mechanism for dealing with financial distress. This discussion will contribute to the derivation of our proxy variables that serve as inputs in our analysis.

A firm is in financial distress when the liquid assets of the firm are not sufficient to meet the current requirements of its hard contracts (Hotchkiss et al., 2008). Hard contracts, in this case, refer to contracts that guarantee periodic payments such as debt obligations owed to bondholders. One way to resolve financial distress is through a restructuring of the firm's financial contracts. This restructuring can be achieved by negotiating with lenders to

reduce current obligations or defer them to a later date. Otherwise, the debt contracts can be exchanged with softer securities that have residual rather than fixed payoffs. In general, a debt restructuring provides relief from financial distress by replacing existing debt with new contracts that reduces interest or principal payments, extends the contracts' maturity, or exchanges the debt for equity securities.

The exchange of impaired claims for new securities can either be completed in a bankruptcy court or through a private renegotiation with creditors. The relative cost of each alternative and the benefits to different stakeholders will be influenced by the rules governing the bankruptcy process and the interests of the parties involved.

a) Rules and procedures of the U.S. Bankruptcy Code

Bankruptcy proceedings in the U.S. are governed by the Bankruptcy Reform Act of 1978 and, more recently, by the Bankruptcy Reform Act of 2005. Most bankruptcies fall under either Chapter 7 or Chapter 11 of the bankruptcy code. Chapter 7 dictates the sale and liquidation of a corporation's assets overseen by a trustee who is appointed by the courts. Proceeds from the asset sales are distributed to claimholders in order of the seniority of their claims. In Chapter 11, on the contrary, the goal of the bankruptcy proceedings is for the firm to emerge as a going concern. The claims against the firm and its operations undergo a formal reorganization that must be court-approved. Although creditors can initiate an involuntary Chapter 7 filing against a firm, the incumbent management retains the exclusive right to challenge any such petitions. As a result, most bankruptcies at least start out as management-initiated Chapter 11 reorganizations (Hotchkiss et al., 2008).

Reorganization under Chapter 11 is designed to limit the abruptions to a firm's daily operations. In general, continuity is ensured by allowing incumbent management to maintain control of the business. An automatic stay provision protects the firm against outside claims by halting all payments of interest and principal. The firm is also allowed to seek debtor-in-possession financing (DIP) that covers outlays for routine business expenses while the firm restructures. DIP financing is granted super-seniority which essentially strips seniority covenants from existing debt. This reduces the default risk of the new loan and encourages lending (Hotchkiss et al., 2008).

The reorganization plan states how the outstanding claims against the firm will be satisfied. Debt is usually grouped into classes according to priority and other characteristics and the plan formally specifies what each class will receive out of their pre-bankruptcy claims. The creditors' compensation will usually be in the form of new debt securities, cash, equity, or a mix of all three. In addition to organizing the debtor's outstanding liabilities, a reorganization plan may also impose substantial changes on a firm's operations. Asset sales are commonly used to free up liquidity and spin off unprofitable operating units.

Before a restructuring plan is approved, the bankrupt firm must demonstrate that it will not be forced to re-file for bankruptcy because of poor operating performance or an unsustainable capital structure. Despite these restrictions, the debtor retains the exclusive rights to propose a reorganization plan within 120 days of filing the bankruptcy petition. Before the rules were tightened in the Reform Act of 2005, this exclusivity period could also be extended at the discretion of the bankruptcy judge. Once a firm submits a plan within the exclusivity period, its creditors only have the choice to accept or reject the plan. Acceptance of the plan requires a two-thirds majority in terms of the value of the claims in each impaired class (or one-half in number, whichever is largest).

In some cases, the firm and its creditors are able to agree on most terms of a restructuring deal before bankruptcy proceedings begin. Pre-packaged bankruptcies are a hybrid between a Chapter 11 filing and an out-of-court restructuring in which a pre-negotiated reorganization plan is filed together with the bankruptcy petition itself. The benefits of pre-packaged filings are that a vote on the reorganization plan can be taken almost immediately, saving time and costs in bankruptcy (Gilson et al., 1990).

In order to protect and organize the interests of the claimholders, Chapter 11 allows the appointment of committees to represent each claimholder class before the court. Committees normally consist of the seven largest members of a class of debt that are willing to serve. They have the power to hire legal counsel and other professional services whose costs are paid for from the assets of the debtor firm. Unsecured lenders are normally always represented by a committee and additional committees to represent other stakeholder classes, such as stockholders, can be appointed at the discretion of the bankruptcy judge.

If the different claimholder classes cannot agree on a reorganization plan, the bankruptcy court has the power to impose a *cram down* on dissenting classes as long as the plan is fair and equitable – that is, as long as the market value of the new securities that are distributed at least equals what each claimholder would receive in a liquidation sale. In practice, cram downs are very rare because they lead to a special hearing in which the court determines the going-concern value of the firm (Klee, 1979). These hearings are considered extremely time consuming and expensive. Avoidance of cram downs also explains deviations from the absolute priority rule under which senior creditors are compensated in full before junior claims are granted. The reason is that classes that receive nothing in a reorganization plan are automatically deemed to oppose it which gives senior creditors an incentive to relinquish parts of their claims in order to reach an agreement. Empirical studies also show that deviations from the absolute priority rule are common in practice (Franks and Torous, 1989; Eberhart et al., 1990; and Weiss, 1990).

b) The choice between bankruptcy and private renegotiation

The choice between restructuring privately or within bankruptcy will depend on the relative costs of the two choices. Under the lower-cost alternative, the firm's value will remain higher after the restructuring, which will give claimholders the chance to receive more favorable terms. We usually distinguish between direct and indirect costs related to financial distress. Direct costs include out-of-pocket costs such as fees for legal services and financial advice. Indirect costs include all other hidden costs of undergoing financial distress, examples of which are the cost of foregoing positive NPV investment opportunities and the distraction of managers' time and efforts. Both direct and indirect costs are generally assumed to be higher for bankruptcies than for out-of-court restructurings because the bankruptcy process is more time consuming and complex. The bankruptcy proceedings are slowed down by formal rules for filing motions and disputing claims. Furthermore, bankruptcy lawyers have an incentive to prolong the proceedings because their fees are paid from the debtor's assets as a priority claim.

Direct measurement of the costs of bankruptcy and private restructurings is difficult, but some evidence has been generated. Gilson et al. (1990) measure the cost of restructuring public debt through exchange offers and find it to be as low as 0.6%, on

average, of the book value of assets. In the same study, the time spent restructuring out of court is found to be significantly lower than the time spent in bankruptcy, which indicates that indirect costs are lower as well. Evidence is also found in the stock market's reaction to a workout versus a bankruptcy filing. Chatterjee et al. (1995) report less negative abnormal returns for announcements of restructurings than bankruptcy filings. Furthermore, Franks and Torous (1994) find that senior lenders are more willing to relinquish their claims in favor of junior claimants in a private workout than in bankruptcy. In other words, senior creditors prefer a smaller fraction of a potentially more valuable firm in a workout, indicating that workouts are less costly than bankruptcy.

The cost disadvantage of bankruptcy is offset by factors that impede an out-of-court agreement among all claimholders. A restructuring attempt may not succeed if some claimants hold out for more generous terms or if conflicts materialize between holders of different classes of debt. Such problems often result from the fact that individual lenders have incentives to free-ride on the expectation that other creditors will make the necessary concessions to complete the restructuring (Grossman and Hart, 1980). Typically, coordination problems between creditors are more severe in private workouts because an out-of-court restructuring requires the unanimous consent of all creditors. In a formal bankruptcy process, however, most decisions require only a specified majority of the holders of each class of debt. Alternatively, creditors can be forced to accept the terms by court intervention. The automatic stay provision of the bankruptcy regulations also avoids a run on the company by its lenders to collect reimbursement or seize collateral, and ensures an orderly queuing of claims.

Hold-out problems are likely to increase in line with the number of creditors that participate in the restructuring since it will be harder to coordinate the interests of all parties. Smith and Warner (1979) argue that private debt is easier to restructure because it is owed to fewer lenders. On the other hand, fewer lenders could lead to bargaining deadlocks if individual creditors feel more powerful in the negotiations. It is also generally thought that conflicts among creditors increase with the complexity of a firm's capital structure. Differences in terms of seniority, security and other characteristics call for different settlement terms that often undermine the interests of claims in different classes.

Agreeing on a restructuring plan that seems equitable to all parties will therefore be more difficult.

Coordination problems between lenders of different classes may also increase if the firm is highly leveraged. The reason is that the value of junior claims increases with the riskiness of the firm's assets, while the value of senior claims decreases with risk. While the latter group has their claims secured in the assets of the firm, junior claims exhibit equity-like characteristics whose properties resemble a call option as the firm becomes distressed. Senior lenders with collateralized claims may therefore prefer a liquidation or asset sale to ensure a safe distribution, while junior creditors and out-of-the-money shareholders may prefer to uphold business as usual because it provides them with a potential upside (Hotchkiss et al., 2008). In a study related to this problem, Gertner and Scharfstein (1991) present a model where the existence of multiple classes of creditors can lead to inefficient decisions on liquidation versus reorganization.

Negotiation problems will also depend on the type of debt that is being restructured. The holdout problem is thought to be particularly severe for public bonds. The reason is that, under the Trust Indenture Act of 1939, a change in the interest, principal or maturity of public debt outside of bankruptcy requires the unanimous consent of all bondholders. Even if an out-of-court restructuring could be completed by an exchange offer, the cost of the restructuring will be born entirely by those who choose to exchange their bonds. If individual bondholders realize their decision to hold out will not materially affect the outcome of the restructuring, they may have a rational incentive to oppose a restructuring, even if it is in the collective interest to avoid bankruptcy.

Lower success of a private workout has also been associated with relatively more debt being owed to trade creditors and less debt being owed to bank lenders. The number of trade creditors is often quite large and their claims are relatively heterogeneous, which exacerbates renegotiation problems. The same argument applies to a firm with significant contingent liabilities, such as a product liability or pension obligations, where the claimants can number in the thousands. Banks and other private lenders, on the other hand are usually fewer in number and are considered to be more forgiving in debt renegotiations. These lenders usually have stronger incentives to provide financing in the short-term in order to

lock-in customers in the long-term, since it will be easier for them to internalize the benefits associated with assisting the distressed firm (Petersen and Rajan, 1995). Gilson et al. (1990) finds evidence that bank lenders are more willing to settle outside Chapter 11 and also argues that they perform a better role of monitoring their debtors.

Conflicts among creditors aside, consent for a private restructuring plan will be harder to obtain if there is greater information asymmetry between stockholders and creditors concerning the value of a firm. Managers control inside information and they have incentives, aligned with those of stockholders, to improve outside perceptions of the firm in order to maximize the value of their claims in a restructuring. DeAngelo et al. (1994) show that distressed firms use accounting accruals to influence restructuring negotiations, while Heinkel and Zecher (1993) demonstrate that distressed firms have the incentive to disguise a firm's true value and avoid liquidation. Creditors are likely to anticipate this, and the resulting lemons problem will serve to impede private workout efforts. In Chapter 11, the problem of asymmetric information is likely to be much less pronounced. Firms are required to make extensive disclosures of their financial and operating data and additional information is revealed through court testimony by experts and company insiders.

3. Hypotheses and variables

We are now in a position to develop a set of hypotheses about what determines a firm's choice between bankruptcy and a private restructuring and tie them to observable firm characteristics. Table 3 provides an overview of our hypotheses and test variables.

Hypothesis 1 (H1): Firms with outstanding credit insurance on their debt will have a lower probability of completing a successful out-of-court restructuring.

Our main concern is to test the effect of a firm's exposure to credit insurance on the choice between private restructuring and bankruptcy. In line with the empty creditor hypothesis, we make the assumption that a firm on which credit default swaps are traded will be less inclined to restructure privately. Hedged creditors have stronger bargaining positions and may have more to gain by bankruptcy than their unhedged counterparts. Since CDS contracts are not publically traded, market data on CDS transactions and who holds what positions are not readily available. We therefore rely on a dummy variable that equals

one if there are CDS traded on a company's debt in the year of the restructuring/bankruptcy and zero otherwise.

Hypothesis 2 (H2): Firms with higher going-concern values tied up in intangible assets and assets that generate firm-specific rents will be more likely to renegotiate debt out-of-court.

The previous section argued that bankruptcies are, in general, considered to be more costly than a private restructuring. The expected cost saving from settling out of court, however, is likely to vary among firms. Since direct costs in a restructuring are not readably observable, we choose instead to distinguish between firms based on their expected loss of going-concern value. The empirical proxy that we use is a measure of enterprise market to book value.

The market to book value is likely to be higher for a firm that has more intangible assets or a combination of assets that generate firm-specific rents, such as growth-opportunities, human capital and operating synergies that depend on the composition of the assets. Such a firm is also likely to find bankruptcy more expensive due to the indirect costs associated with bankruptcy, such as managerial distraction, loss of consumer and supplier confidence, and because bankruptcy often leads to asset sales. Asset sales are more common within bankruptcy because covenant violations that would otherwise have prevented them can be waived by a judge if the court views the sale necessary to preserve the firm's chances of survival. Fully secured lenders may also add pressure to sell assets that would reimburse their claims. In addition, buying assets from a distressed firm is safer in Chapter 11, because the sale is executed and guaranteed by a court order.

One potential problem with using the market to book value for a firm is that it may reflect some or all of the market's expectations about how well the firm will be able to deal with financial distress. In this case the variable will inadequately capture a firm's *ex ante* going-concern value. In order to take this fact into consideration we take the average of the market and book values for equity and debt over the two years prior to the first mention of a firm's restructuring effort. By doing so, we obtain a more unbiased measure of a firm's going-concern value as judged by its market to book value.

Hypothesis 3 (H3): Creditor conflicts and deficient lender coordination reduce the likelihood of a successful private restructuring.

In order to capture the severity of the holdout problem and creditor conflicts we apply several different proxies. Firstly, we assume that troubled debt is more likely to be restructured outside Chapter 11 when it is owed to fewer lenders. Secondly, higher leveraged firms are assumed to be more prone to bankruptcy than lower leveraged firms. Intuitively, one could argue that higher leverage exacerbates the level of financial distress and will land a firm more quickly in bankruptcy. Jensen (1989), however, argues that since firms with high leverage have going-concern values far above their liquidation values they will have more to lose in bankruptcy and will therefore restructure out-of-court. This may be true of some firms that face financial distress due to excessive debt levels, but the nature of our sampling method means that the majority of the firms are not only financially distressed, but economically distressed – i.e. they have negative operating cash flows. For such firms, going-concern values may be much closer to liquidation values. And as we noted in the section above, higher leverage can increase the coordination problems between lenders of different classes, which may only be resolved in bankruptcy. We measure leverage as total assets over total liabilities and make the hypothesis that higher leverage reduces the chance of an out-of-court restructuring.

Third, we employ as a proxy the portion of public debt that the firm owes, normalized by total liabilities. As we argued previously, restructuring public debt is difficult because it requires the unanimous consent of all bondholders to change the indentures of the bonds and individual bondholders have a rational incentive not to participate in the negotiations. A high portion of public debt is therefore believed to reduce the probability of a successful out-of-court restructuring. By the same token, a high portion of trade debt is likely to impede a private workout. Firms that are more reliant on trade debt may also view Chapter 11 favorably because super-priority provisions make it easier to raise working capital through DIP financing. As a proxy for the importance of trade credit we use the amount of trade payables over total liabilities. Finally, we also test the amount of bank debt, divided by total liabilities. A high portion of bank debt is assumed to increase the chances of an out-of-court restructuring because bank lenders are generally fewer in number and more willing to negotiate terms.

Table 3: Hypotheses and variables

Hypothesis	Explanation	Proxy variables	Definition	Source	Expected impact on restructuring outcome for increase in variable
H1: Credit insurance	Creditors who have bought credit insurance will be in a tougher bargaining position and may prefer a restructuring in bankruptcy in order to receive a payoff on their insurance positions	Availability of CDS on a firm's debt	Dummy variable equal to 1 if the firm's debt has traded CDS contracts and 0 otherwise	Datastream, Worldscope, Factiva	Lower probability of successful private restructuring
H2: Firm value	Firms with more intangible and firm specific assets are expected to experience a higher destruction of value in bankruptcy and therefore have more to gain from a private workout	Enterprise market to book ratio	Market value of common equity plus book value of debt and preferred / Book value of common equity plus book value of debt and preferred (2-year average)	CRSP, Compustat, Company filings	Higher probability of successful private restructuring
H3: Creditor conflicts	Firms with more complex, heterogenous debt structures are expected to find an out-of-court restructuring more difficult. The type of debt being restructured is thought to influence the expected outcome with public and trade credit likely to increase the severity of holdout problems among creditors. Higher leverage increases coordination problems between senior and junior lenders	Leverage	Total assets over total liabilities	Compustat, Company filings	Lower probability of successful private restructuring
		Number of financing contracts	Number of debt securities listed in 10-K filing	Company filings, Datastream	Lower probability of successful private restructuring
		Fraction of public debt	Total public debt over total liabilities	Compustat, Company filings	Lower probability of successful private restructuring
		Fraction of bank debt	Total bank debt over total liabilities	Compustat, Company filings	Higher probability of successful private restructuring
		Fraction of trade debt	Trade payables over total liabilities	Compustat, Company filings	Lower probability of successful private restructuring
H4: Information asymmetry	Creditors with information disadvantages may prefer to opt for a court supervised restructuring in order to ensure a fair disclosure of information	Stock-return volatility	Standard deviation of returns measured three to five years prior to restructuring	CRSP, Datastream, Worldscope	Lower probability of successful private restructuring
		Fraction of bank debt	Total bank debt over total liabilities	Compustat, Company filings	Higher probability of successful private restructuring

Hypothesis 4 (H4): Higher informational asymmetry between debtors and creditors reduces the chance of a private workout.

We attempt to measure the degree of information asymmetry by looking at the stock return volatility of the firms in our sample. Stock return volatility may reflect the market's perception of changes in value. Companies whose values are harder to judge by outsiders are likely to experience more volatility in their returns than more transparent companies as prices "jump" according to the release of new information. Given that stock returns are a noisy measure that reflects all available information and will be influenced by a firm's future prospects, we isolate the returns between three and five years prior to the debt restructuring attempt. Finally, the portion of bank debt financing may also be used as a proxy for asymmetric information. The reason is that banks generally perform a good monitoring role of their debtors and because bank debt usually contains extensive covenants that reveal information about a firm's operating strengths and weaknesses. A higher portion of bank debt should therefore decrease information asymmetry problems and increase the chance of a private workout.

4. Data and sample selection

Our approach to testing the impact of CDS on the choice between bankruptcy and a private restructuring requires us to identify two subsamples of firms that have completed either action in the face of financial distress. While identifying bankrupt firms if fairly straightforward, there are no clear definitions for what constitutes an out-of-court restructuring. A debt restructuring does not require an official announcement and SEC filings about a restructuring often lack detail. Debt may also be restructured in several rounds over a prolonged period of time. In order to deal with these complications we employ a two-step sampling procedure which first identifies financially distressed firms by their poor stock price performance and then establishes whether a private restructuring attempt or bankruptcy has occurred.

This sampling method is a modified version of that used by Gilson et al. (1990) which calculates three-year cumulative common stock returns and isolates firms from the bottom fifth percentile on a yearly basis. Sampling firms based on their stock price returns has a

clear theoretical foundation. It is reasonable to assume that distressed firms consist of assets with low, or even negative, NPV, and that they operate with poor cash flow performance. Such characteristics should be easily identified by capital markets and will manifest themselves as lower prices on the financial claims issued by the firm. In fact, if we assume that capital markets have rational expectations, we should expect that a firm's financial troubles will be discounted in the share price long before they actually arise (Muth, 1961).

Firms with very poor stock price performance should therefore be expected to either be in financial distress or at least be in the process of becoming distressed. Compared to a simple search for firms that have gone through a financial restructuring, the method offers a clear advantage by eliminating non-distressed firms that have voluntarily restructured their debt for other reasons than avoiding default. Additionally, the method provides a more representative sample compared to a search for firms that have defaulted on their obligations, because it also picks up restructurings that have been successfully completed without any defaults (Gilson et al., 1990).

The first stage of our sampling procedure was to identify all traded companies on the NYSE, NASDAQ and AMEX stock exchanges in the period 1995 to 2010. From the initial sample of 12,703 firms, we removed firms with securities whose quoted price was constant throughout the entire period (primarily various trust securities), which left us with a total of 8,898 firms. Next we calculated three-year cumulative common stock returns for each separate firm on a monthly basis, and the corresponding lower fifth percentile. From this we computed a stratum of 1,627 firms, which consists of companies that traded with a three-year cumulative common stock return below the calculated fifth percentile in at least 6 months consecutively at any time during the 15-year sampling period.

Note that we have constructed our sample using a somewhat finer definition, both in terms of returns and sampling interval, compared to Gilson et al. (1990), which operated with an initial stratum of 447 firms. Our method should therefore increase the probability of picking up distressed companies compared to previous studies. It is also worth noting that the choice of sampling criteria represents a trade-off between the strata size and the ability to pick up relevant firms.

The use of a higher cut-off percentile, a shorter time limit for calculating cumulative returns, and using non-consecutive rather consecutive sampling (i.e. not requiring firms to be within the lower fifth percentile for back-to-back periods) would lead to a larger stratum – and vice versa. Although a larger stratum would probably enable us to pick up more distressed firms, it would also come at the cost of a considerably higher work load in the subsequent steps of the analysis. Our sampling criteria were therefore chosen by seeking to optimize the trade-off between these two considerations. However, for the sake of completeness, we have also included a sensitivity analysis in Table 4 that shows how other sampling criteria choices would affect the stratum size.

Table 4: Sensitivity analysis of the number of sampled firms on sampling criteria

Consecutive sampling

	Number of months					
Percentile (%)	1	2	3	6	12	24
1.0%	850	644	546	374	179	44
2.5%	1,763	1,446	1,249	866	455	125
5.0%	2,807	2,406	2,147	1,627	916	299
7.5%	3,591	3,169	2,874	2,256	1,388	500
10.0%	4,221	3,755	3,452	2,810	1,862	711

Non-consecutive sampling

	Number of months					
Percentile (%)	1	2	3	6	12	24
1.0%	850	688	601	431	233	72
2.5%	1,763	1,532	1,360	1,025	603	204
5.0%	2,807	2,520	2,297	1,877	1,234	513
7.5%	3,591	3,280	3,051	2,533	1,797	839
10.0%	4,221	3,892	3,634	3,120	2,343	1,210

The table shows a sensitivity analysis of the number of firms that remained in our sample after the first stage of the sampling procedure, subject to changes in the sampling criteria. Percentile, on the left, refers to the cut-off percentile calculated for each firm based on three-year cumulative stock returns. All firms with cumulative stock returns below this percentile were kept in the sample. Number of months refers to how many months in the 15-year period the firms had cumulative stock returns below the cut-off percentile. Consecutive sampling means that the firms had stock returns below a given percentile, for a given number of months consecutively. Using non-consecutive sampling, the months in which the firms entered the sample could be spread arbitrarily throughout the entire 15-year period.

In the next step of the sampling procedure, we performed manual searches on each separate company in the sampled stratum using Dow Jones & Company's Factiva news

database.[6] The search criteria were selected in order to best identify companies that have either successfully completed a private restructuring or have filed for bankruptcy.[7] For each firm we noted whether it had gone through an out-of-court restructuring or bankruptcy, the dates of the first and last mention of the event and, if applicable, what type of restructuring the firm had carried out. Out-of-court restructurings were identified using the definition proposed by Gilson et al. (1990). A debt restructuring is defined as a transaction in which an existing debt contract is replaced by a new contract with one or more of the following consequences: (i) required interest or principal payments on the debt are reduced; (ii) the maturity of the debt is extended; or (iii) creditors are given equity securities (common stock or securities convertible into common stock), or what is often referred to as an exchange offer. In addition, we also demanded that the restructuring must have been undertaken in response to an anticipated or actual default. If no indications of a restructuring or bankruptcy were found, the company was discarded from the sample. Moreover, restructurings that were found to be the result of government sponsored bailouts or other federal guarantees were also discarded.

Two complications did, however, arise in relation to our sampling method. Firstly, we quickly realized that many of the firms in our sample were drawn from what is often referred to as "the dotcom period". In most cases these "dotcom" companies were fully equity financed, and were therefore not relevant from a debt restructuring perspective. Additionally, many of these companies were typically very small at the time they entered into our sample, which made it difficult to find any relevant news postings surrounding their fate. These two factors complicated the search process and made it more tedious. Nevertheless, a substantial portion of our sample is made up of IT and related companies due to their lackluster performance after the burst of the asset bubble in the early 2000s.

Secondly, and perhaps more serious, we discovered that our sample had an underrepresentation of firms that filed for bankruptcy due to the way Datastream outputs bankrupt companies. To get a correct representation of bankruptcies we therefore supplemented our sample with bankrupt firms from Professor Lynn M. LoPucki's bankruptcy

[6] More specifically we used the Factiva search engine on the following sources: *Reuters, Wall Street Journal, Bloomberg Dow Jones, and Financial Times*. In some cases we also relied on other information sources to supplement the information gathered on Factiva, most notably Google Finance.

[7] We used the following search keywords: *debt restructuring, restructure, restructured, bankrupt, bankruptcy, distress, distressed, default, and defaults*.

database. In order to ensure consistency between the out-of-court and in-court subsamples we demanded that companies sampled from the LoPucki database were reported to have engaged in debt restructuring efforts prior to filing for bankruptcy. The firms for which a private restructuring had been attempted were again identified by searching the Factiva database for company statements and news reports. In this way we ensured that the total sample consisted of companies that had all tried to restructure their debt, and whose efforts could be categorized into either successful or unsuccessful outcomes.

After the two subsamples were constructed, we collected stock price data, balance sheet information and other relevant data from various sources. Common stock return data were obtained from The Center for Research in Security Prices (CRSP), while information on the composition of firms' liabilities and outstanding number of financing contracts are taken from company filings found in the EDGAR (SEC) Database. Balance sheet and income statement data is collected from Standard & Poor's Compustat Database. In addition, we used the Thomson Reuters Datastream database to obtain data on CDS contracts traded on the firms' debt, as well as to verify the number of outstanding public debt contracts.

5. Results

5.1 Sample characteristics and univariate analysis

Most of the debt-restructuring activity in our sample is clustered around two time periods that coincide with general U.S. recessions. The first time period, between 1999 and 2003, marks the burst of the dotcom bubble and the economic downturn that followed (Kindleberger and Aliber 2005). The second wave of restructurings occurs between 2007 and 2009, which coincides with the recent financial turmoil that spilled into a global economic recession.

In total, about 55% of the total restructuring attempts in our sample occur between 1999 and 2003, while 31% take place between 2007 and 2009. If we compare the frequency of out-of-court restructurings to bankruptcies, private workouts seem to be relatively more common during the most recent recession. Of all the restructuring attempts between 1999 and 2003, 32% were completed out-of-court, while the same proportion between 2007 and

2009 is 47%. There is, however, no significant trend in the relative frequencies of successful and unsuccessful private restructurings if we look at the sample as a whole.[8]

Table 5: Sample time series by restructuring outcome

Year	Total	Successful restructurings	Unsuccessful restructurings (bankruptcies)	Percentage of successful restructurings
1995	1	1	0	100.0%
1996	1	1	0	100.0%
1997	2	1	1	50.0%
1998	8	3	5	37.5%
1999	17	8	9	47.1%
2000	18	3	15	16.7%
2001	24	8	16	33.3%
2002	33	7	26	21.2%
2003	27	12	15	44.4%
2004	6	4	2	66.7%
2005	9	2	7	22.2%
2006	4	2	2	50.0%
2007	11	5	6	45.5%
2008	29	13	16	44.8%
2009	28	16	12	57.1%
Total	218	86	132	39.4%

Time series of observed debt restructuring activity between 1995 and 2010 by starting date and eventual outcome. 86 firms in our sample successfully restructure privately, while 132 firms file for bankruptcy. A debt restructuring attempt is defined as the replacement of a debt contract that results in reduced interest or principal, extended maturity or a debt-for-equity swap. Evidence of debt restructuring events are identified by searching the Dow Jones and Company's Factiva news database.

Alternatively, we can break down the two subsamples by sector. The classification in Table 6 is based on the Global Industry Classification System (GICS). Successful out-of-court restructurings occur less often for companies classified under Materials, Telecommunication Services and Consumer Discretionary, measured as a percentage of the subsample size. Firms under Industrials, Health Care and Financials are relatively more prone to restructure privately in our sample. As a trend over time, Information Technology and Telecommunications firms feature more frequently in the early 2000's, while Financials

[8] The absence of a significant time trend in the share of out-of-court and in-court debt restructurings is found by running a simple ordinary least square (OLS) regression given by $\%successful = \beta_0 + \beta_1 year$. We find a p-value of 0.1750 for the β_1 coefficient (0.1060 if only the years 1999-2003 and 2007-2009 are included).

make up a significant share in 2008 and 2009. Consumer Discretionary is the largest industry sector featured in our sample and makes up over 30% of the total.[9]

Table 6: Restructuring outcome by industry sector

	Energy	Materials	Industrials	Consumer Discretionary	Consumer Staples	Health Care	Financials	Information Technology	Telecom	Utilities
Out-of-court (% of subsample)	4 (5%)	3 (3%)	13 (15%)	23 (27%)	4 (5%)	6 (7%)	13 (15%)	12 (14%)	5 (6%)	3 (3%)
In-court (% of subsample)	4 (3%)	12 (9%)	15 (11%)	43 (33%)	8 (6%)	3 (2%)	11 (8%)	13 (10%)	19 (14%)	4 (3%)
Total (% of sample)	**8 (4%)**	**15 (7%)**	**28 (13%)**	**66 (30%)**	**12 (6%)**	**9 (4%)**	**24 (11%)**	**25 (11%)**	**24 (11%)**	**7 (3%)**

Sample of firms that attempt a debt restructuring divided by sector and outcome. The sectors are based on the Global Industry Classification System (GICS) and the classification for each firm is found in the Compustat database. The table shows how firms in each subsample are divided among the different sectors, expressed as a number and as a percentage of the subsample and total sample.

Table 7: Successful and unsuccessful restructurings with CDSs traded on debt

	Successful			Unsuccessful			Total		
Year	#	%		#	%		#	%	
1999	0	-		0	-		0	-	
2000	0	-	Avg.	0	-	Avg.	0	-	Avg.
2001	0	-	13%	2	13%	6%	2	8%	8%
2002	2	29%		1	4%		3	9%	
2003	3	25%		2	13%		5	19%	
2004	0	-		0	-		0	-	
2005	0	-		2	29%		2	22%	
2006	0	-		2	100%		2	50%	
2007	2	40%	Avg.	2	33%	Avg.	4	36%	Avg.
2008	3	23%	38%	6	38%	47%	9	31%	43%
2009	8	50%		8	67%		16	57%	
Sum / average	18	25%		25	21%		43	23%	

Time series of firms that have outstanding CDS traded on their debt in the year of their restructuring attempt. The table classifies each firm by whether it completes a successful private restructuring or if the restructuring attempt is unsuccessful and the firm files for bankruptcy. The years that are shaded refer to periods that coincide with general recessions where debt restructuring activity is higher than normal. We show both the number of firms with CDS in each year, and the percentage of firms with CDS. Information on CDS is gathered from Thomson Reuters Datastream.

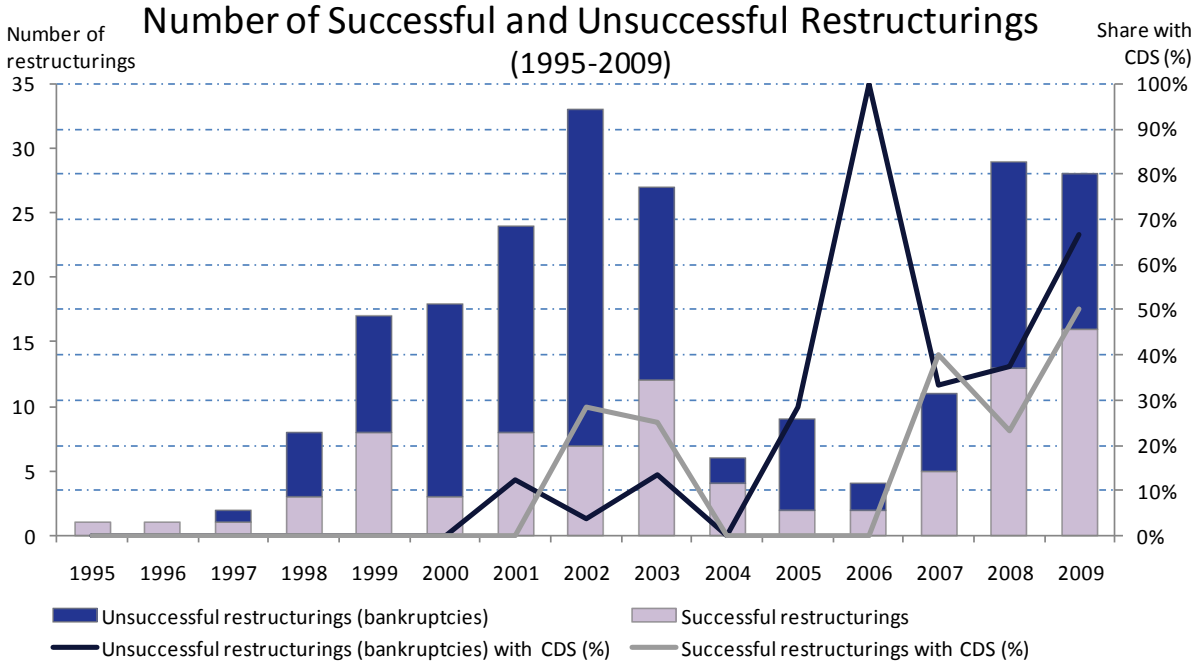
The CDS market was still in its infancy during the first wave of corporate financial distress between 1999 and 2003 and, as a result, only ten firms in our sample that are drawn from this time period have outstanding CDS contracts traded on their debt. As shown in

[9]The industry consists of the sub-industries Automobiles and Components (2510), Consumer Durables and Apparel (2520), Consumer Services (2530), Media (2540), and Retailing (2550).

Table 7, these ten firms are equally distributed between successful and unsuccessful private restructurings and make up 13% and 6% of the two subsamples in the period, respectively. Only 8% of the firms in the total sample have outstanding CDS in the period between 1999 and 2003.

By 2007, however, the CDS market had grown exponentially for several years. Between 2007 and 2009, twenty-nine companies, or almost half of the total sample in this period, have outstanding CDS on their debt. Out of the total of twenty-nine, thirteen belong to the sample that successfully restructured their debt privately, while sixteen companies belong in the sample that went bankrupt. In relative terms, 38% of the first group and 47% of the second group, traded with CDS between 2007 and 2009. Whether there is a significant correlation between the outcome of the restructuring attempt and outstanding CDS (Hypothesis H1) is, however, difficult to ascertain with a univariate analysis given the limited size of our sample. The multivariate regressions in the next section shed more light on the issue by measuring the marginal effect of CDS after other factors have been adjusted for.

Graph 2: Sample time series by outcome



Overview of debt restructuring activity in our sample divided into successful and unsuccessful outcomes. The graph also shows the percentage of each subsample that have outstanding CDS traded on their debt in the year of their restructuring attempt.

Table 8 contrasts selected characteristics of the firms in our sample by whether or not they successfully restructure their debt outside of Chapter 11. Wilcoxon rank sum tests for the means and medians of the two subsamples are included for each variable. We find that firms that complete an out-of-court restructuring have higher enterprise market to book values, than those that file for bankruptcy, but the difference is not significant. One explanation for this result is that the variance in the price-book variable is high within each subsample. In hypothesis H2 we argued that firms with higher market to book values are likely to find bankruptcy more expensive and we would generally expect these firms to have incentives to restructure privately.

Several measures of the firms' indebtedness and liabilities are also included. The variables that we have tested are bank, public and secured debt, as well as trade payables and net pension obligations, all as a share of total liabilities.[10] Of these, only the portion of public debt is statistically significantly different between the two subsamples. The conclusions are consistent with hypothesis H3 which posits that public debt should feature more in failed restructurings attempts due to higher coordination problems between public bondholders.

There is no significant difference, however, in the mean and median number of outstanding financing contracts between the subsamples.[11] In order to adjust for size we also test the number of financing contracts divided by total liabilities and find this variable to be significantly higher for the companies that restructure out-of-court (p-value 0.0288). This would seem to contradict our predictions if we assume that the number of financing contracts is a measure of the complexity of a firm's capital structure. More claimholders as measured by the number of debt contracts would be expected to complicate a private workout.

[10] All of these variables have been collected from the Debt/Long-Term Financing/Notes Payable/Etc. Note and Employee Benefit Note in the latest 10-K filed by the company prior to the first mention date, except Accounts Payable which was retrieved from Compustat. Net pension liabilities for companies with defined contribution benefit plans are set to zero.

[11] Number of financing contracts is the number of financing agreements (public debt, bonds, credit facilities, and other agreements) counted in the Debt/Long-Term Financing/Notes Payable/Etc. Note from the latest 10-K filed by the company prior to first mention date. The variable is scaled by a factor of 100.

Table 8: Sample characteristics

	86 succsessful restructurings				132 unsuccsessful restructurings				Wilcoxon rank-sum test (p-value of z test)	
Characteristic	Mean	Median	Min.	Max.	Mean	Median	Min.	Max.	Mean	Median
Market value/book value (EV, 2 year avg.)	1.58	1.25	0.60	8.45	1.02	1.19	-30.31	6.44	0.1443	0.3480
Debt/total liabilities (book values)										
(i) Bank debt	0.32	0.22	0.00	1.08	0.26	0.23	0.00	0.89	0.3476	0.7820
(ii) Public debt	0.27	0.19	0.00	0.81	0.37	0.33	0.00	2.27	0.0077 ***	0.0130 **
(iii) Secured debt	0.33	0.22	0.00	1.08	0.29	0.27	0.00	0.97	0.9387	0.2680
(iv) Convertible debt	0.06	0.00	0.00	0.73	0.04	0.00	0.00	0.75	0.5886	0.6290
(vi) Net pension liabilities	0.01	0.00	-0.05	0.31	0.02	0.00	-0.05	0.33	0.5689	0.5860
Number of financing contracts outstanding	7.1	4.5	1.0	41	7.3	5.0	1.0	73	0.1367	0.0610 *
Number of financing contracts/total liabilities	1.2	0.6	0.0	10.5	0.6	0.3	0.0	7.1	0.0288 **	0.0270 **
Number of public debt contracts outstanding	2.8	0.0	0.0	37	3.4	1.0	0.0	68	0.1239	0.0300 **
Number of public debt contracts/total liabilities	0.1	0.0	0.0	0.8	0.1	0.0	0.0	1.0	0.1217	0.0300 **
Book value of total assets (USDm)	4,761	960	57	73,781	6,471	1,223	209	103,914	0.1204	0.4060
Total liabilites/book value of assets	0.80	0.77	0.21	2.93	0.99	0.86	0.34	7.76	0.0011 ***	0.0060 ***
Long-term debt/book value of assets	0.50	0.45	0.00	2.13	0.63	0.55	0.03	4.53	0.0049 ***	0.0052 ***
Prior 3-year accumulated common stock return										
(i) Unadjusted returns (%)	-45.9%	-67.5%	-98.1%	729.9%	-55.1%	-74.6%	-100.0%	210.4%	0.7255	0.3360
(ii) Abnormal returns (%)	-56.9%	-90.1%	-100.0%	478.6%	-85.4%	-97.6%	-100.0%	66.2%	0.0001 ***	0.0001 ***
Estimated beta (3 to 5 years prior)	0.98	0.86	-0.19	2.94	1.02	0.82	-0.01	5.41	0.9078	0.7730
Yearly stock return volatility (3 to 5 years prior)	45.4%	44.8%	4.2%	112.0%	51.0%	46.9%	15.1%	158.5%	0.1719	0.3690
Age (years since IPO/major merger)	15.1	10.7	1.0	83.3	15.3	7.6	0.6	100.9	0.0330 **	0.0310 **
Length of debt restructuring (days)	139	65	30	1066	161	107	30	648	0.0032 ***	0.0520 *

(* p < 0.10, ** p < 0.05, *** p < 0.01)

Sources: The Center for Research in Security Prices (CRSP), EDGAR (SEC) Database, Lynn M. LoPucki Bankruptcy Research Database, Standard & Poor's Compustat Database, Thomson Reuters Datastream.

Nonetheless, we may be able to reasonably explain the results if we break the number of total financing contracts into public[12] and private[13] contracts. While the difference in the number of public debt contracts divided by total liabilities is insignificant between the two subsamples, it is the number of private contracts that makes the total number of financing contracts (normalized by total liabilities) a significant variable. This result is consistent with our predictions and with bankruptcy theory. Firstly, we would expect the number of creditors per unique financing contract to be higher for public debt than private debt, and the holdout problem can therefore be expected to be less severe for private debt. Secondly, as discussed previously, private lenders such as banks and other financial sponsors tend to be more forgiving in renegotiations. A higher number of private debt contracts, compared to public debt contracts, may therefore be consistent with a higher probability of completing a successful out-of-court restructuring (hypothesis H3).

The mean asset size of firms that successfully restructure out of court is considerably lower than for firms that file for bankruptcy in our sample, but the difference is statistically insignificant due to the variability in size within each subsample. We can conclude, however, that firms in the out-of-court sample are much lower leveraged than their in-court counterparts. Wilcoxon rank-sum tests are significant both when leverage is measured as the book values of total liabilities over total assets and when it is measured as the book values of long-term debt over total assets.[14] This result is in line with hypothesis H3 and our discussion in Sections 2 and 3, which emphasizes the potential conflicts between junior and senior creditors in a highly leveraged firm. While senior creditors with collateralized claims may have more to gain from liquidation, junior creditors have an option-like residual claim whose value depends on the survival of the firm, when the firm value is deeply out-of-the-money.

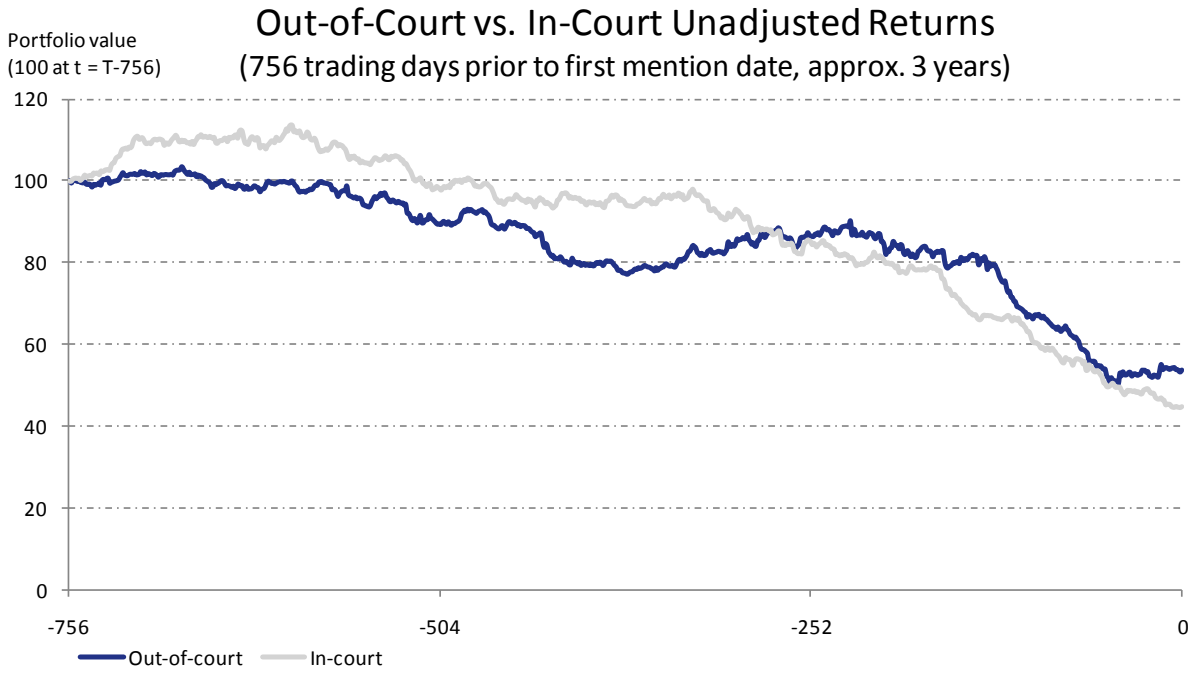
There are no significant differences in the mean and median unadjusted cumulative common stock returns between the two subsamples when the returns are measured over a three-year period, counting back from the first mention of a firm's restructuring attempt.

[12] Number of public debt contracts is the number of active publically traded debt securities found in Datastream prior to first mention date. This variable is also scaled by a factor of 100.

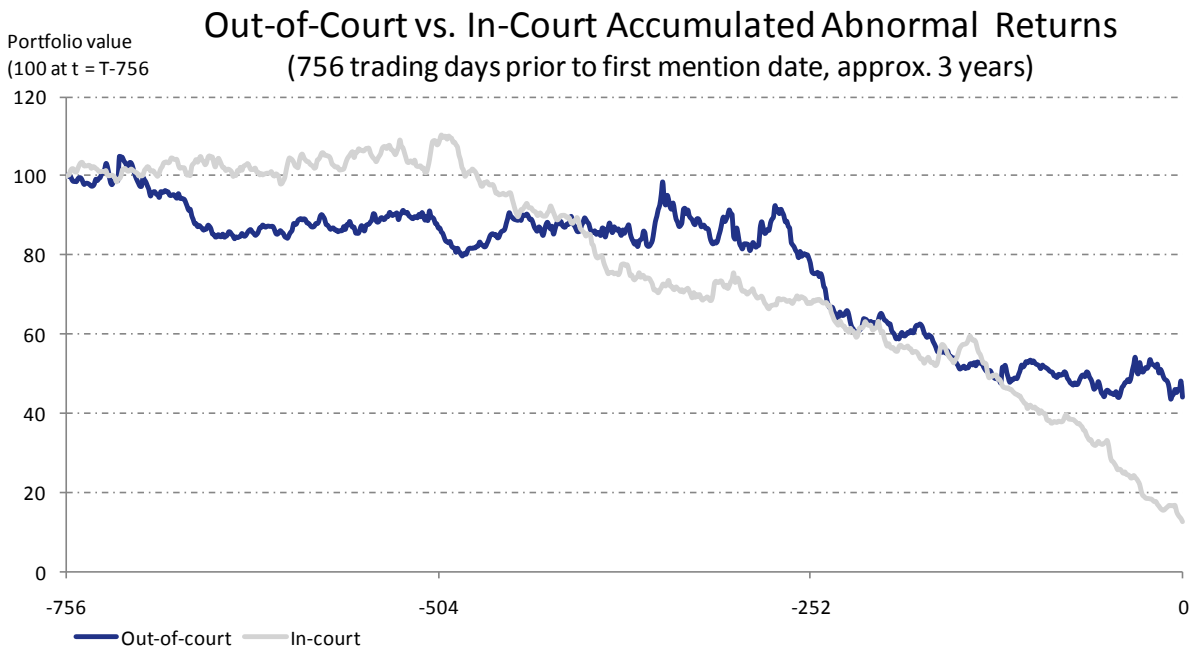
[13] The number of private debt contracts is the difference between the total number of financing contracts and the number of public contracts

[14] Total liabilities, total assets, and long-term debt are retrieved from Compustat using the last balance sheet date prior to first mention date.

Graph 3: Three-year unadjusted and abnormal cumulative sample returns



The graph shows cumulative unadjusted returns for two portfolios made up of firms that restructure out-of-court and firms that end up in bankruptcy, respectively. Firms enter the portfolio 756 trading days prior to the date that signifies the first mention of its restructuring effort. Returns are calculated from the daily prices reported by CRSP.



The graph shows cumulative abnormal returns for two portfolios of firms in the out-of-court and in-court subsamples. Abnormal returns are calculated using a single-factor model based on CAPM (see footnote 16) and the daily CRSP equally-weighted return index.

Source: The Center for Research in Security Prices (CRSP)

Nonetheless, we recognize that if the out-of-court restructurings and bankruptcies in our sample are not distributed evenly over time, then the market return will be an important determinant of the stock returns of the firms in each subsample. In order to take market returns and systematic risk into account, we have estimated three-year cumulative abnormal returns for each subsample using a single-factor model.[15] Abnormal cumulative returns are significantly higher for the firms that restructure privately, a result that is also robust to changes in the estimation period for the returns (see Appendix C).

Table 9: Estimated risk measures

	86 succsessful restructurings		132 unsuccsessful restructurings		Wilcoxon rank-sum test (p-value of z test)		One-tailed t-test
Characteristic	Mean	Median	Mean	Median	Mean	Median	Mean
Estimated beta (β)							
3 to 5 years prior	0.98	0.86	1.02	0.82	0.7255	0.3360	0.2270
1 to 5 years prior	1.11	1.00	1.07	1.02	0.7481	0.7770	0.6498
Yearly stock return volatility							
3 to 5 years prior	45.4%	44.8%	51.0%	46.9%	0.1719	0.3690	0.0555 *
1 to 5 years prior	51.3%	48.4%	57.6%	54.3%	0.0455 **	0.0250 **	0.0261 **

(* p < 0.10, ** p < 0.05, *** p < 0.01)

Table of estimated betas and total stock return volatility for the two subsamples of out-of-court and in-court restructurings. Both beta and volatility have been estimated over two different time periods, measured in years prior to the first mention of a firm's restructuring attempt. All figures are calculated based on daily price observations from CRSP.

Source: The Center for Research in Security Prices (CRSP)

An analysis of stock returns furthermore allows us to make inferences on how the two subsamples differ in terms of systematic and unsystematic risk. Table 9 presents summary statistics of the most relevant observations. To begin with, there are no significant differences in the estimated mean and median betas – a result that is also robust to changes in the estimation period. We do, however, find the mean stock return volatility to be lower for the out-of-court subsample, particularly if we measure the volatility between 1 and 5 years prior to the first mention of a firm's restructuring attempt. OLS regressions of the volatility of the two subsamples with respect to the estimated betas, year, firm size and a dummy variable for the restructuring outcome, also supports these conclusions. The results

[15] Abnormal returns are estimated using a single factor model, where $r_{jt} = \alpha_{jt} + \beta_j r_{mt} + \varepsilon_{jt}$. In the model, α_{jt} represent firm-specific expected return, r_{mt} is the market return, and ε_{jt} is a mean zero error term. The beta coefficients (β_j) are estimated for each separate firm using returns 5 and 3 years prior to the first mention date. We require the firm-specific expected return to equal zero in the cross section (i.e. CAPM). The estimates are next used to estimate daily abnormal returns (γ_{jt}) using a residual approach, where $\gamma_{jt} \equiv r_{jt} - E(r_j) = r_{jt} - \beta_j r_{mt}$. Market returns are estimated by using the daily CRSP equally-weighted return index, and are time-matched on a daily basis to each separate firm in the sample.

in Table 10 confirm that stock return volatility is significantly higher for firms that go bankrupt, even after these factors are accounted for.

Table 10: OLS regression of volatility determinants

Variable	Successful restructuring	Ln(Assets)	Beta 3 to 5 years prior	Beta 1 to 5 years prior	Year	R-Squared
Volatility 3 to 5 years prior	-0.081 ***	-0.054 ***	0.136 ***	-	0.0004 ***	0.8572
Volatility 1 to 5 years prior	-0.095 ***	-0.062 ***	-	0.114 ***	0.0005 ***	0.8794

(* p < 0.10, ** p < 0.05, *** p < 0.01)

Results of ordinary-least-square regressions with volatility as the dependent variable. As independent variables we use a dummy variable for restructuring outcome, beta and year. Beta and volatility are measured over two different time periods measured in years prior to the first mention of a firm's restructuring attempt. The table shows the coefficients of the regression result and p-values.

Source: The Center for Research in Security Prices (CRSP)

These findings seem to imply that the firms in our sample that restructure privately exhibit lower idiosyncratic risk, on average, than the firms that enter bankruptcy. This must be the case since total risk, measured by volatility, is lower for the out-of-court sample, while there is no difference in systematic risk, measured by beta. The result is robust even when volatility and betas are measured several years prior to the time when the firms first enter financial distress. We can tie this directly to hypothesis H4 which states that more volatile stock returns are correlated with a lower probability of completing a successful private workout because volatility is a proxy for the degree of asymmetric information between a firm and its creditors. In fact, idiosyncratic risk is closer linked to asymmetric information and the analysis above demonstrates that such risk is significantly higher for firms whose private restructuring attempts are unsuccessful. Asymmetric information impedes private restructuring efforts because creditors may suspect that owners and managers have incentives to overstate the true value of the firm. Creditors may therefore prefer a court-supervised restructuring in cases with high informational asymmetries, since this entails greater information disclosure compared to an out-of-court restructuring (Hotchkiss et al., 2008).

Table 8 also shows that the firms that restructure privately are generally younger than the firms that file for bankruptcy. One explanation for the age difference is that older firms are more likely to have developed complex organizational and financial structures. This complexity can add to coordination problems between creditors and make private

restructuring more cumbersome. Even though the age difference between the subsamples is significant, age is also highly correlated with size, which is probably a better proxy for organizational complexity.

Finally, firms that restructure their debt privately require an average of 139 days, compared to 161 days for firms that go bankrupt, to complete the restructuring attempt. This difference is significant at the 1% level. The time spent restructuring is measured from the first public mention of a firm's restructuring attempt until the last public mention, or the bankruptcy filing date.[16] Firms that file for bankruptcy spend an additional 456 days, on average, in bankruptcy court before they reemerge. These results are consistent with our prediction that bankruptcy cases are more time consuming, and presumably more expensive, than private workouts.

While Table 8 compares different characteristics of the two subsamples, Table 11 provides an overview of how each variable in the analysis correlates with the others. The results are mostly consistent with the univariate findings and with what we would expect based on the theoretical discussion in Section 2. Firstly, we note that the CDS variable is positively and significantly correlated with firm size, but negatively and significantly correlated with the level of bank financing. These results are reasonable given that CDS contracts mostly reference the public debt of larger corporations (LCDSs are an exception). Table 11 also concludes that, on the basis of a univariate analysis, we are unable to find any correlation between restructuring outcome and the presence of credit default swaps (hypothesis H1). Moreover, the level of public financing is positively and significantly correlated with firm size. Bank financing is also significantly correlated with the size variable, but with the opposite sign. These findings are reasonable given that larger firms should be expected to have better access to public financing, while smaller firms are more dependent on banks and other private lenders to finance their operations (Tirole, 2006). We also find a negative and significant correlation between firm size and the number of private financing contracts.

The correlations between firm size and risk also confirm our previous findings. Firm size is negatively correlated with stock return volatility and the result is significant at the 5%

[16] The empirical distribution of time spent restructuring is truncated at 30 days in our sample, since the restructuring period for firms that only have a single public mention has been set to 30 days by default during the sampling.

Table 11: Correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Ln(Assets)	1.0000												
(2) Liabilities/Assets	0.0193	1.0000											
	(0.7766)												
(3) Public/Liabilities	0.1522	-0.0354	1.0000										
	(0.0246) **	-0.6034											
(4) Bank/Liabilities	-0.2445	-0.1119	-0.2521	1.0000									
	(0.0003) ***	-0.0994 *	-0.0002 ***										
(5) Accountspay./Liabilities	-0.0816	-0.1357	-0.2268	-0.0463	1.0000								
	(0.2301)	-0.0454 **	-0.0007 ***	-0.4966									
(6) Numberoffin./Liabilities	-0.5593	-0.1905	-0.1243	0.1898	0.0275	1.0000							
	0.0000 ***	-0.0048 ***	-0.0669 *	-0.0049 ***	-0.6866								
(7) Numberofdebt/Liabilities	-0.0509	-0.0414	0.4434	-0.0910	-0.1725	-0.0645	1.0000						
	(0.4543)	-0.5436	0.0000 ***	-0.1807	-0.0107 **	-0.3432							
(8) Numberofprivate/Liabilities	-0.2961	-0.1251	-0.1593	0.0521	0.1672	0.3250	-0.0833	1.0000					
	0.0000 ***	-0.0652 *	-0.0186 **	-0.4441	-0.0134 **	0.0000 ***	-0.2207						
(9) CDS	0.5499	0.0274	0.0747	-0.1840	-0.1194	-0.2478	0.0031	-0.1061	1.0000				
	0.0000 ***	-0.6872	-0.2723	-0.0064 ***	-0.0785 *	-0.0002 ***	-0.9638	-0.1183					
(10) P/B EV (2-year average)	-0.1479	-0.0570	0.0463	0.0506	0.0688	-0.0021	0.0733	-0.0042	-0.1397	1.0000			
	-0.0290 **	-0.4025	-0.4962	-0.4571	-0.3118	-0.9755	-0.2815	-0.9508	-0.0393 **				
(11) Beta (3 - 5 years prior)	0.0787	0.0158	0.1245	-0.1624	-0.0508	-0.0501	0.1339	-0.0747	0.0827	0.0634	1.0000		
	-0.2707	-0.8251	-0.0805 *	-0.0223 **	-0.4775	-0.4829	-0.0599 *	-0.2953	-0.2467	-0.3745			
(12) Volatility (3 - 5 years prior)	-0.1531	0.0242	0.0928	-0.0035	-0.0470	0.1599	0.1098	0.0705	-0.1091	0.1641	0.1777	1.0000	
	-0.0238 **	-0.7227	-0.1720	-0.9585	-0.4897	-0.0181 **	-0.1060	-0.2999	-0.1083	-0.0153 **	-0.0122 **		
(13) Out-of-court	-0.1149	-0.1545	-0.1676	0.1273	0.0077	0.2076	-0.0267	0.1811	0.0198	0.1063	-0.0318	-0.0277	1.0000
	-0.0905 *	-0.0225 **	-0.0132 **	-0.0606 *	-0.9098	-0.0021 ***	-0.6952	-0.0073 ***	-0.7709	-0.1175	-0.6563	-0.6846	

(* p < 0.10, ** p < 0.05, *** p < 0.01)

Sources: The Center for Research in Security Prices (CRSP) , EDGAR (SEC) Database, Lynn M. LoPucki Bankruptcy Research Database, Standard & Poor's Compustat Database, Thomson Reuters Datastream.

level. Beta, on the other hand, is uncorrelated with firm size, which indicates that idiosyncratic risk decreases with size. The fact that firm-specific risk is lower for bigger firms can be explained as the result of two distinct mechanisms. Firstly, the risk of a larger firm should be expected to be lower *per* se, since larger firms are often more diversified and better established in the markets that they operate in. Secondly, informational asymmetries should also be expected to decrease with firm size since monitoring and bonding cost as a share of the total firm value is likely to exhibit economies of scale (Jensen and Meckling, 1976). A larger firm should therefore be expected to be subject to more scrutiny from external analyst, as well as be expected to offer greater disclosure to outside investors.

5.2 Multivariate regression analysis

The analysis in the previous section provides evidence that the firms in the two subsamples differ with regards to the empirical proxies we use to test the hypotheses that we formed in Section 3. In most cases the results support our predictions on how credit insurance, firm value, creditor conflicts and asymmetric information will affect the choice between bankruptcy and private debt renegotiation. Testing one variable at a time, however, disregards the marginal influence that an explanatory variable can have on the restructuring decision, given a firm's other characteristics. In order to test the *ceteris paribus* effect of our independent variables we therefore employ probit regressions that relate the probability of a successful private renegotiation to our proxies and other control variables.

In the probit models, the dependent variable equals one for a firm that successfully completes an out-of-court restructuring and zero if the restructuring attempt fails and the firm files for Chapter 11. A positive sign on the coefficient of an independent variable therefore suggests that the probability of a private workout increases with the size of that variable. The independent variables used in the regression are the same as the ones presented in the previous section and should be familiar. Unless otherwise specified, the variables are calculated using market and balance sheet data that most closely predate the beginning of a company's restructuring effort. These values best capture a firm's financial and operating condition prior to the restructuring.

Table 12 shows maximum-likelihood estimates for several probit regression models. In Model 1 we have included all proxy variables that we would expect to influence the

dependent variable. The control variable for firm size, the natural logarithm of total assets, has no influence on the results. This variable is therefore removed in Model 2, along with the number of public debt contracts divided by total liabilities, which is also insignificant. The price-book and volatility variables requires up to five years of data prior to the first mention date, and we are therefore not able to calculate this variable for all firms in the sample. The first two models address this problem by only including firms where these measures are found, thus making 169 observations available. Model 3 excludes the price/book and volatility variables, which raises the number of observations to 218. Model 4 is a selection of the independent variables with the highest explanatory power, and also excludes the CDS variable.

First and foremost, we find no evidence for hypothesis H1 that the presence of credit default swaps on a firm's debt reduces the likelihood of a successful private restructuring. The effect of credit insurance is insignificant in all our regressions. One reason for this result is that our proxy variable may not adequately capture the implications of the hypothesis that we wish to test. Ideally we would like to measure the proportion of a firm's creditors' debt holdings that are insured by CDS. Such information is, however, not publicly disclosed. Neither is it possible to obtain trading data on the notional amounts of CDS outstanding on a firm's debt dating back more than one year.[17] The dummy variable that we employ in our regressions may simply be too broad a measure to pick up any effect that credit insurance has on the negotiations between creditors and debtors.

Another possible explanation is that our sample is too small to capture any systematic differences that CDS make, or that we have inadequately adjusted for other and more important factors. Although one should be careful to interpret the explanatory powers of a regression, pseudo R-squared measures in our model are about 20%, which suggests that there are other factors that may be critical to the success of a private renegotiation. Some of these factors may be either unsystematic or impossible to quantify (e.g. the relative bargaining abilities and personalities of the parties involved).[18] A final possibility is simply

[17] The Depository Trust & Clearing Corporation (DTCC) reports trading data, but only dating one year back. Creditex and Markit also provide some data, but only for actual credit events.

[18] The presence of other explanatory variable is in effect an endogeneity problem (omitted variable bias), which we discuss in more detail below

that the empty creditor hypothesis is unfounded and that we cannot observe the phenomenon in practice.

The regressions do, however, lend support to hypothesis H2 which states that firms with higher going-concern values are more likely to restructure privately. The enterprise price-book variable, measured as a two-year average, is significant in all the regressions (p-value of 0.000) and has the expected sign. This variable is likely to separate between firms based on their expected loss of value within bankruptcy, assuming that price-book measures the degree to which a company's assets are intangible or generate firm-specific rents. Such firms have more to lose in bankruptcy proceedings which are often invasive and increase the likelihood of asset sales.

Table 12: Multivariate probit regressions

	Model 1			Model 2			Model 3			Model 4		
	dF/dx	p-value		dF/dx	p-value		dF/dx	p-value		dF/dx	p-value	
Ln(Assets)	0.001	(0.976)										
Liabilities/Assets	-0.471	(0.004)	***	-0.478	(0.003)	***	-0.219	(0.027)	**	-0.502	(0.002)	***
Public/Liabilities	-0.399	(0.049)	**	-0.369	(0.041)	**	-0.293	(0.036)	**	-0.403	(0.023)	**
Accountspay./Liabilities	-0.760	(0.014)	**	-0.771	(0.012)	**	-0.333	(0.147)		-0.720	(0.018)	**
Numberofdebt./Liabilities	0.095	(0.714)										
Numberofprivate./Liabilities	0.167	(0.012)	**	0.167	(0.005)	***	0.059	(0.022)	**	0.162	(0.004)	***
CDS	-0.020	(0.876)		-0.023	(0.839)		-0.018	(0.853)				
P/B EV (2-year average)	0.187	0.000	***	0.189	0.000	***				0.180	0.000	***
Volatility (3 - 5 years prior)	-0.348	(0.108)		-0.346	(0.102)							
Year	0.028	(0.034)	**	0.029	(0.028)	**	0.028	(0.008)	***	0.032	(0.007)	***
N	169			169			218			170		
Adjusted-R^2	0.2190			0.2180			0.1080			0.2030		
χ^2	50.23	(0.000)	***	50.09	(0.000)	***	31.52	(0.000)	***	46.75	(0.000)	***
Log Likelihood	-89.5			-89.6			-130.5			-91.8		

(* p < 0.10, ** p < 0.05, *** p < 0.01)

Probit regressions with dependent variable equal to one if a firm successfully restructures privately and zero otherwise. The table reports marginal effects and p-values for four different variations of the main model. Liabilities/Assets is the book value of total liabilities over total assets taken from Compustat. Accountspay./Liabilities is the amount of outstanding trade credit divided by total liabilities, also from Compustat. Numberofdebt. and Numberofprivate refers to the total number of individual financing contracts the firm holds and the number of private financing contracts, respectively. The number of contracts is taken from 10-K and 8-Q reports found in the EDGAR (SEC) online database. CDS is a dummy variable equal to one if the firm has CDS traded on its debt. Information on CDS is taken from Datastream. P/B EV is the market value of equity and book value of liabilities divided by the book value of equity and liabilities. This variable is measured as a two-year average prior to the first mention date. Volatility is measured as the volatility in daily stock returns over a period 3-5 years prior to a firm's restructuring attempt. Price data is taken from CRSP. Year marks the year of the beginning of a firm's restructuring effort.

We also find evidence for hypothesis H3, which states that creditor conflicts decrease the likelihood of a private workout, and that they manifest themselves as expected. Public debt is usually more difficult to restructure privately due to legal clauses that require unanimous consent to change the core terms of a bond, and holdout problems among dispersed ownership groups. Public debt over total liabilities is significant at the five percent level in all the regressions and impacts the likelihood of a private restructuring negatively. We find no evidence that the number of public debt contracts as a share of total liabilities influences the restructuring decision, but a higher portion of private debt contracts does increase the likelihood of avoiding Chapter 11. As an alternative measure we could have employed a proxy for the portion of bank debt. This variable is naturally correlated with the portion of public debt, but in other regressions not presented here the portion of bank debt is significant at the 5% level and increases the probability of a successful out-of-court restructuring.[19] This is consistent with our predictions that bank lenders are easier to reach a private solution with than public lenders.

Our other proxies for the severity of creditor conflicts also carry the expected signs. We assume that trade debt is difficult to restructure privately because trade creditors are often more numerous and smaller in size, which can lead to a higher degree of holdout problems. The amount of trade credit over total liabilities, which we use as a proxy for the importance of trade credit, is significant at the 5% level in all the regressions, except Model 3, and its coefficient is negative. Furthermore, our leverage variable, measured as the book value of total liabilities over assets, indicates that firms with higher leverage find a private restructuring less likely. This is consistent with our hypothesis that higher leverage exacerbates conflicts between creditors with different seniority.

The regressions do not, however, lend particularly strong support for hypothesis H4 that asymmetric information between the firm and its creditors increases the chances of bankruptcy. We use the volatility of firms' stock returns three to five years prior to the restructuring attempt as a proxy for informational asymmetry. This variable is not significant at the 10% level, although it does carry the expected sign. Nonetheless, in the previous section we already tested and found a significant difference in the volatility of the stock

[19] For example a probit model with 1 = successful private restructuring and 0 = failed private restructuring and with independent variables: liabilities over assets, bank debt as a portion of liabilities, CDS, year and enterprise price-book yields a positive coefficient and a p-value = 0.036 for the bank debt variable

returns between our two subsamples. This result was robust even after we accounted for firm size, systematic risk measured by beta and year. So while the marginal effect of volatility is not very strong in our probit regressions we still have evidence supporting the fact that firms that restructure out of court generally exhibit less volatile stock returns than the bankruptcy candidates.

If we also interpret the portion of bank debt as a proxy for the information asymmetry problem, then the regressions do support hypothesis H4. As we already mentioned, the bank debt variable is significant in other regressions and is higher for firms that restructure privately. This is conducive to hypothesis H4 because bank lenders generally perform a good monitoring role and bank debt comes with strict covenants. However, we have also suggested that bank debt may be a proxy for the severity of the holdout problem, and our regressions do not allow us to separate between these two effects.

5.3 Endogeneity concerns

One of the most important assumptions of the regression analyses in the previous section is that the regressors used in the models are exogenous. This assumption requires the independent variables to be uncorrelated with the error term in the regression model (Woolridge, 2009), which may not be true for several reasons. Firstly, endogeneity problems can arise due to reverse causation. Reverse causation implies that the independent variables may in fact be determined simultaneously with, or as a function of, the dependent variable. Secondly, endogeneity problems may occur if relevant explanatory variables are omitted from the model, meaning that the causal relationship that is estimated by the model is also dependent on one or more factors that are not included in the regression. Finally, endogeneity problems can be the result of sampling errors. If these issues are left unchecked, it may lead to an unbiased and inconsistent regression result.

In our case, the biggest endogeneity concerns are related to reverse causation and omitted variables. Problems with reverse causation can be relevant if financing decisions and capital structure choices are based on expectations of future restructuring outcomes. For example, firms may expect their restructuring prospects to be better if they rely more heavily on bank financing than public debt, and will attempt to alter their capital structure accordingly *ex ante.* By the same token, capital structure decisions may also be affected by

creditors' expectations of a restructuring outcome. If lending choices are influenced by how creditors assess a firm's chances of restructuring privately or entering bankruptcy it may affect the leverage variables that we use in the regressions (Liabilities/Assets, Public/Liabilities and Accountspay./Liabilities).

Reverse causation may also be a problem if market expectations of the restructuring outcome affect the price of debt and equity securities issued by a firm. This may result in an endogeneity problem for the price/book variable that we use in the regressions. Finally, and important in the context of empty creditors, lenders' choice of credit protection, through the purchase of CDS contracts, may be endogenously affected by their expectations of future distress and the likely outcome of a renegotiation of the debt issued by the reference entity. We would expect the latter problem to be more severe for our regression results if we had used a continuous variable based on notional amount outstanding instead of a binary variable.

Our regression models may also be fraught with endogeneity problems related to omitted variables if there are unobserved factors, for which we have no relevant proxies, that affect the restructuring outcome. One example of such a factor is the nature of the relationship between management and creditors and the relative bargaining strengths of both parties.

One way to check for and potentially correct endogeneity problems is to use a two-stage instrumental variable (IV) estimator. A two-stage IV model can be performed by first regressing each potentially endogenous variable in separate reduced-form models. In each reduced-form model the endogenous variable is estimated using a selection of instrument variables, as well as variables that can be assumed to be exogenous. The instrument variables are variables that are correlated with the endogenous covariates and at the same time uncorrelated with the error term in the original structural model. Next, the fitted residuals from each of the reduced-form models are regressed in the original structural probit model. One can then test whether the variables in the original regression are endogenous using a multiple linear exclusion restriction, where the null hypothesis states that all the regression coefficients of the predicted residuals from the reduced-form models simultaneously equal zero in the structural model. If the null hypothesis is rejected, the

problem can be corrected by replacing the endogenous variables in the structural model with the predicted values from the reduced-form models.

The most crucial aspect of the two-stage IV estimator procedure is to identify appropriate instrument variables that are both relevant and exogenous. Firstly, each instrumental variable must have predicative power on one or more of the potentially endogenous variables in the reduced-form regressions. If this condition is not upheld, we say that the instrumental variables are weak. In that case, the predictions based on the second stage structural model will be poor, since the reduced-form models will inadequately predict the variability in the endogenous regressors. At the same time, all instruments must be exogenous, meaning that they are uncorrelated with the error term in the main regression. If this condition is breached, the IV estimation is inconsistent and the endogeneity problem will persist. The problem of identifying instrument variables that satisfy both the conditions to be relevant and exogenous becomes harder as the number of potentially endogenous variable increases, since the procedure demands at least one instrument for each endogenous regressor.

In our case, if we assume that all the variables except *Year* in Model 3 and 4 are potentially endogenous, then we must identify at least five instrument variables in order to estimate a two-stage IV model. We recognize that it is difficult to identify this many instrument variables and that this poses a severe limitation to the effectiveness of the IV approach in our context. Nonetheless, we have illustrated the procedure for a two-stage IV probit regression based on Model 4 where we try to investigate whether endogeneity problems are present.

To perform the regression we have chosen the following instrument variables. Firstly, we use dummy variables that represent sector affiliation, defined by the two first digits in the firm's GICS code, in order to instrument the variables Public/Liabilities, Accountspay./Liabilities, and Numberofprivate./Liabilities. There are 11 sectors in total, from which we select dummy variables for the sectors *Industrials*, *Consumer Discretionary*, and *Information Technology.* Although we observe some differences in restructuring outcomes across sectors, we see from Table 6 that outcomes are fairly evenly distributed for the three sectors selected as instruments. In addition, sector affiliation should not be expected to be

associated with reverse causation (e.g. a firm cannot be expected to change its sector based on expectations of future restructuring outcomes). The selected sector instrument variables should therefore be expected to be exogenous. At the same time we would expect sector affiliation to have high predictive power on capital structure choices, for example on the level of public financing and working capital (accounts payable).

Next, we have included firm *age*, defined as the time from IPO or major merger to the first mention date of a firm's restructuring attempt, as an instrument variable. One can argue that this variable is likely to be uncorrelated with the restructuring outcome, as older firms should not be more or less prone to bankruptcy. At the same time it can be argued that age is correlated with the price/book variable since older firms are generally larger or more mature and trade at lower price/book multiples because they have fewer growth opportunities.

Finally, we have included as instruments the book values of *total capital* (debt and equity), and *leverage* (debt over total capital) two years prior to the restructuring. The *total capital* variable must by construction be correlated with firm size, and therefore also the price/book variable, since a large firm is likely to remain so two years later. The *leverage* variable should be correlated with the leverage measures in the structural model, since capital structure choices should be expected to be firm-specific and lagging in the sense that they are unlikely to change abruptly. At the same time, both the *total capital* and *leverage* measures are likely to be uncorrelated with the restructuring outcome as they are sampled from the firms' balance sheets at least two years prior to the first mention of a restructuring attempt taking place. The variable *year* is kept as an exogenous variable and left in the structural model without any reduced-form estimation.

The results from the two-step IV estimation are shown in Appendix D. The first five models contain the reduced form equations for each of the possibly endogenous variables, and the last model shows estimates for the structural model based on Model 4 (Table 12). The p-value of the chi-square test operator under the null hypothesis is equal to 0.7299, which means we are not able to reject the null hypothesis that our regressors are uncorrelated with the error term in the original equation. However, we must emphasize that this conclusion is not particularly strong. We observe that the reduced-form models have

very low predictive power, and that the significance of the endogenous variables in the second stage structural model all but disappears. This result stands in contrast to those of the original regression in Model 4, where all regressors are significant at the 5% level. This would seem to indicate that the instruments used are weak and we must therefore conclude that any (potential) endogeneity problems inherent in our analysis remain unsolved.

6. Conclusion

This study analyses the debt restructuring attempts of 218 financially distressed firms between 1995 and 2010. 86 firms in our sample successfully complete an out-of-court restructuring while 132 firms end up filing for bankruptcy after a private restructuring had failed. Our principal interest has been to determine whether firms that have credit insurance outstanding on their debt will systematically be more inclined to end up in bankruptcy than firms that do not have credit insurance. According to legal scholars Hu and Black (2008b), such insurance can give rise to empty creditors that have more to gain from a debt restructuring within bankruptcy. Our study, however, finds no evidence that the existence of credit insurance on a firm's debt influences the debt restructuring decision. Even after adjusting for capital structure effects, potential holdout problems among creditors and other factors, the effect of CDS contracts remains insignificant.

Nonetheless, we find support for several of our other hypotheses regarding firms' choice between private renegotiation and bankruptcy. Our results show that financial distress is more likely to be resolved privately when firms have higher going-concern values, as measured by their price-to-book value, and owe more debt to banks and private lenders. A private restructuring is less likely to succeed when more debt is owed to public lenders and trade creditors, when leverage is high and when there is higher information asymmetry between a firm and its creditors.

Our study also provides stock price evidence which suggests that the market treats successful private restructurings more favorably than bankruptcy. Cumulative abnormal stock returns for firms that complete an out-of-court restructuring are significantly higher than for the firms that file for Chapter 11 in our sample. This finding is consistent with the

notion that bankruptcy is generally more costly than private renegotiation. On average, stockholders therefore have an incentive to avoid bankruptcy and settle out of court.

The *ex-post* empirical approach that we have adopted in this paper to test the empty creditor hypothesis highlights the difficulty of drawing concrete conclusions about a market that is inherently non-transparent. Empty creditors may well be a problem, but the lack of public information and disclosure precludes observation and conclusive testing of the issue in practice. There is a current debate about moving CDS contracts to organized exchanges (Duffie and Zhu, 2009) that also encourages more transparency and greater disclosure requirements on CDS positions. At the very least, such action would allow the public to gauge creditors' incentives when a firm lands in financial distress. Bolton and Oehmke (2010), whose research we have drawn on in this paper, suggests disclosure before other more interventionalist measures such as stripping empty creditors of their voting rights or making restructurings a credit event. This view weighs the potential problems of CDS with their benefit as a commitment device that encourages lending and investment.

The issue is important because it is likely to influence regulatory action in the near future. Further research on the empty creditor issue is therefore warranted. An improvement to our own analysis could be made by incorporating trading data on the amounts of outstanding CDS on a firm's debt. Such data is becoming available through the records of the major OTC clearing houses such as The Depository Trust & Clearing Corporation (DTCC).

Another interesting extension could be to test some of the *ex ante* results predicted by Bolton and Oehmke's (2010) limited commitment model. One of the predictions of the model is that creditors' incentive to over-insure in equilibrium increases with the probability of a high cash flow in the last period of the model, especially if this probability is high compared to the verification cost. A practical implication of this statement could be that creditors of firms with high cash flow generating capabilities and relatively high earnings visibility will be more prone to over-insure. Testing if that is the case would offer new insight into the empty creditor hypothesis and would have the additional advantage of increasing the potential sample size. The reason is that we could then test for the empty creditor problem *ex ante,* and not be restricted by firms that have undergone restructurings *ex post.*

In practical terms, one could compare the amount of gross notional outstanding CDS contracts on a firm's debt, which is now available from DTCC on a weekly basis for the 1,000 largest reference entities, against some proxy for the cash-generating characteristics and associated verification cost of the firm (after adjusting for other factors). Further work could also be done to extend the model proposed by Bolton and Oehmke (2010). Natural extensions could be to determine the effect of different firm characteristics on creditors' choice of credit protection, including such variables as a firm's asset tangibility, risk profile and product market characteristics.

7. Appendices

Appendix A: Detailed company description

Out-of-court sample

COMPUSTAT NAME	First mention date	Last mention date	Type of restructuring	Asset size (USDm)	3-year Stock Return	CDS
Abraxas Petroleum Corp.	12/06/2000	12/07/2000	Exchange offer	322	-0.9023	No
Accredited Home Lenders Hldg.	13/03/2007	20/04/2007	Covenant waiver/amendment	11,349	-0.4162	No
Adaptec Inc.	04/09/1999	16/05/2000	Credit facility refinanced	109	-0.6696	No
Advocat Inc.	16/12/2003	22/01/2004	Exchange offer	1,103	-0.5001	No
AES Corp.	01/04/1999	24/11/1999	Refinancing and covenant waiver	121	-0.2903	No
Ambac Financial Group	05/01/2002	30/12/2003	Refinancing and maturity extension	36,736	-0.7214	Yes
Amcore Financial Inc.	20/11/2008	20/12/2008	Forbearance agreement	23,565	-0.6668	Yes
Apria Healthcare Group Inc.	26/09/2009	18/12/2009	Covenant waiver/amendment	5,060	-0.8880	No
Avanex Corp.	23/10/1998	30/03/1999	Covenant waiver/amendment and restructuring of credit facility	757	-0.5502	No
Avis Budget Group	02/05/2005	01/06/2005	Unkown	273	0.5685	No
Balanced Care Corp.	28/10/2008	26/05/2009	Exchange offer and maturity extension	12,474		Yes
Beazer Homes USA Inc.	16/02/2001	08/05/2001	Exchange offer and maturity extension	120	-0.7705	No
Blockbuster Inc.	07/07/2007	29/10/2007	Covenant waiver/amendment	4,559	-0.6023	Yes
Buca Inc.	03/03/2009	02/03/2010	Exchange offer	2,155	-0.7662	Yes
Calamp Corp.	19/11/2003	18/04/2005	Covenant waiver/amendment	217	-0.4800	No
Charming Shoppes Inc.	16/10/2002	15/11/2002	Maturity extension	57	-0.8591	No
Checkers Drive-In Restaurant	02/10/1995	05/12/1995	Refinancing and maturity extension of credit facility	841	-0.6531	No
Citizens Republic Bancorp	22/07/1996	25/11/1996	Maturity extension	167	-0.9243	No
CKE Restaurants Inc.	26/06/2009	26/07/2009	Exchange offer	13,086		No
Clean Harbors Inc.	20/01/2001	18/04/2001	Covenant waiver/amendment	1,214	-0.8895	No
Coeur D'Alene Mines Corp.	21/03/2003	14/08/2003	Covenant waiver/amendment	560	7.2987	No
Cogent Communications Group	29/06/2001	08/04/2002	Exchange offer	595	-0.2606	No
Comfort Systems USA Inc.	20/06/2003	20/07/2003	Exchange offer	408		No
Comstock Homebuilding Companies	18/11/2000	18/12/2000	Maturity extension	926	-0.8910	No
Comstock Homebuilding Companies	25/10/2006	29/12/2006	Forbearance agreement	259	-0.9530	No
Consumer Portfolio Services Inc.	10/03/2008	17/02/2010	Maturity extension	431		No
Credit Acceptance Corp.	05/11/1999	24/03/2000	Covenant waiver/amendment	432	-0.7182	No
Darling International Inc.	15/12/1997	31/07/1998	Covenant waiver/amendment and maturity extension	1,116	-0.6265	No
Delta Petroleum Corp.	19/11/1998	01/02/1999	Covenant waiver/amendment and maturity extension	313	-0.6566	No
Dixie Group Inc.	30/09/2009	30/10/2009	Covenant waiver/amendment	1,895	-0.8416	No
Dollar Thrifty Automotive Group	15/06/2001	20/11/2001	Covenant waiver/amendment and refinancing	423	-0.7077	No
Dynegy Inc.	30/09/2008	30/10/2008	Covenant waiver/amendment	3,891	-0.3682	No
Dynex Capital Inc.	03/04/2003	28/07/2003	Covenant waiver/amendment and maturity extension	20,030	-0.9740	Yes
El Paso Corp.	21/09/1999	20/05/2000	Covenant waiver/amendment	5,179		No
Fibernet Telecom Group Inc.	17/04/2003	17/05/2003	Refinancing and maturity extension of credit facility	46,224		Yes
Firstcity Financial Corp.	12/08/2002	31/10/2002	Exchange offer	137		No
Foster Wheeler AG	13/08/1999	23/05/2000	Covenant waiver/amendment	1,664	-0.5500	No
Gilat Sattelite Networks Ltd.	15/04/2002	16/03/2005	Covenant waiver/amendment, exhcange offer, and maturity extension	3,316	-0.4868	No
Headwaters Inc.	18/09/2002	06/03/2003	Exchange offer	859	-0.9417	No
Isle of Capri Casino Inc.	29/06/2009	29/07/2009	Covenant waiver/amendment and maturity extension	1,402	-0.3924	No
Key Tronic Corp.	15/03/1999	14/04/1999	Covenant waiver/amendment	676	1.3726	No
Lee Enterprises Inc.	21/12/2001	20/01/2002	Covenant waiver/amendment	74	-0.6076	No
Level 3 Communications Inc.	17/01/2009	20/02/2009	Refinancing and covenant waiver/amendment	2,016	-0.8599	No
Lodgenet Interactive Corp.	31/12/2008	22/06/2009	Exchange offer	9,638	-0.8736	Yes
Maguire Properties Inc.	12/08/2003	11/09/2003	Covenant waiver/amendment	298	-0.3219	No
Manugistics Group Inc.	18/06/2009	23/03/2010	Covenant waiver/amendment and maturity extension	5,199	-0.9650	No
McClatchy Co.	23/09/2004	23/10/2004	Covenant waiver/amendment and maturity extension	498	-0.5849	No
Meridian Resource Corp.	21/05/2009	27/01/2010	Exchange offer	3,522	-0.9811	Yes
Meristar Hospitatlity Corp.	16/04/2003	30/07/2003	Covenant waiver/amendment	456	-0.8531	No
Moduslink Global Solutions	22/09/2003	22/10/2003	Exchange offer	2,798	-0.6583	No
Moneygram International Inc.	30/10/2001	09/12/2001	Exchange offer	8,557	-0.5295	No
Nabi Biopharmaceuticals	31/01/2008	01/03/2008	Covenant waiver/amendment	7,935	-0.4347	No
Nautilus Inc.	30/03/1998	29/04/1998	Covenant waiver/amendment	226		No
Navarre Corp.	22/02/2008	23/03/2008	Forbearance agreement	391	-0.7443	No
Navisite Inc.	19/10/2005	18/11/2005	Covenant waiver/amendment	196	3.8773	No
NCI Building Systems Inc.	15/12/2000	14/01/2001	Covenant waiver/amendment	175		No
OM Group Inc.	10/09/2009	26/10/2009	Exchange offer	1,381	-0.6806	No
Party City Corp.	22/07/2004	21/08/2004	Covenant waiver/amendment	1,211	-0.5914	No
Perma-Fix Environmental Services	19/03/1999	29/11/1999	Covenant waiver/amendment	158	-0.7279	No
PMI Group Inc.	08/04/2008	08/05/2008	Covenant waiver/amendment	126	0.5061	No
Protection One Inc.	01/06/2009	01/07/2009	Covenant waiver/amendment	4,824	-0.9561	Yes
Qwest Communication International Inc.	15/11/2004	15/12/2004	Exchange offer	809	-0.8563	No
Radian Group Inc.	21/11/2002	30/12/2002	Exchange offer	73,781	-0.6048	Yes
Revlon Inc.	10/04/2008	10/05/2008	Covenant waiver/amendment	8,210	-0.7935	Yes
Revlon Inc.	16/12/2003	13/02/2004	Covenant waiver/amendment	889	-0.6014	No
John B. Sanfilippo & Son, Inc.	14/11/2008	09/11/2009	Exchange offer	892	-0.6889	No
Silverleaf Resorts Inc.	07/07/2007	06/08/2007	Covenant waiver/amendment	368	-0.4914	No
Sirius XM Radio Inc.	27/02/2001	02/05/2002	Exchange offer	468	-0.7409	No
Sirius XM Radio Inc.	07/03/2003	06/04/2003	Exchange offer	7,491	-0.9687	No
Sport Chalet Inc.	11/02/2009	28/03/2009	Exchange offer	1,341	-0.9766	No
Standard Pacific Corp.	02/03/2009	29/06/2009	Covenant waiver/amendment	151	-0.9814	No
Star Gas Partners	15/01/2008	30/06/2008	Exchange offer	3,401	-0.9107	Yes

COMPUSTAT NAME	First mention date	Last mention date	Type of restructuring	Asset size (USDm)	3-year Stock Return	CDS
Suncom Wireless Holdings Inc.	13/10/2004	05/12/2004	Covenant waiver/amendment	961	0.2199	No
Sunrise Senior Living Inc.	31/01/2007	08/03/2007	Exchange offer	1,655		Yes
Tecumseh Products Co.	29/07/2009	28/12/2009	Maturity extension	1,382	-0.9470	No
Tenet Healthcare Corp.	22/03/2007	10/05/2007	Covenant waiver/amendment	1,783	-0.6347	No
Transwitch Corp.	22/01/2009	03/11/2009	Exchange offer	8,174	-0.8416	Yes
TRC Cos. Inc.	16/05/2003	25/09/2003	Exchange offer	243	-0.8980	No
Unisys Corp.	13/01/2006	12/02/2006	Forbearance agreement/maturity extension	516	-0.1126	No
Ventas Inc.	30/04/2009	03/08/2009	Exchange offer	2,824	-0.8848	Yes
Westaff Inc.	01/11/1999	02/02/2000	Covenant waiver/amendment	960	-0.6264	No
Wyndham International Inc.	14/02/2008	18/02/2009	Forbearance agreement	141	-0.1618	No
Xerium Technologies Inc.	13/12/2001	25/01/2002	Covenant waiver/amendment	5,768	-0.7964	No
Xerox Corp.	11/11/2008	15/12/2009	Covenant waiver/amendment	891	-0.4064	No
YRC Worldwide Inc.	18/04/2002	01/08/2002	Refinancing and covenant waiver/amendment	27,689	-0.6002	Yes

In-court sample

COMPUSTAT NAME	First mention date	Bankruptcy date	Type of restructuring	Asset size (USDm)	3-year Stock Return	CDS
aaiPharma Inc.	17/03/2005	10/05/2005	Reported to be engaged in restructuring talks	339	-0.9274	Yes
Abitibibowater Inc.	10/03/2008	16/04/2009	Reported to be proposing exchange offer	10,319	-0.7962	No
ACT Manufacturing, Inc.	21/11/2001	21/12/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	1,068	-0.3251	Yes
Adelphia Communications Corp.	22/05/2002	25/06/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	21,499	0.7500	No
Allegiance Telecom Inc.	27/11/2002	14/05/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	1,775	0.4750	No
American Homestar Corp.	26/09/2000	11/01/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	362	-0.8822	No
American Pad & Paper Company	13/07/1998	10/01/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	638	-0.9474	No
Ames Department Stores, Inc. (2001)	13/09/2000	20/08/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	1,975		No
AMF Bowling, Inc.	15/09/2000	03/07/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	1,827	0.3047	No
Amwest Insurance Group Inc.	15/08/2000	24/07/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	242	-0.8741	No
Applied Magnetics Corporation	18/08/1999	07/01/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	300	-0.4867	No
APW Ltd.	31/03/2001	16/05/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	1,214	-0.7069	No
Asia Global Crossing, Ltd.	28/12/2001	17/11/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	3,633		No
Aurora Foods Inc.	27/02/2003	08/12/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	1,251		No
Bally Total Fitness Holding Corporation (2007)	12/04/2007	31/07/2007	Received waiver/amendment. Reported to be engaged in restructuring tal	397	-0.6434	No
Bethlehem Steel Corp	20/06/2001	15/10/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	5,467	-0.3118	No
Birmingham Steel Corp.	27/03/2002	03/06/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	647	-0.7778	No
BMC Industries Inc.	01/07/2003	23/06/2004	Received waiver/amendment. Reported to be engaged in restructuring tal	247	-0.8151	No
Breed Technologies, Inc.	31/03/1999	20/09/1999	Received waiver/amendment. Reported to be engaged in restructuring tal	1,650	-0.7240	No
Builders Transport Inc.	25/02/1998	21/05/1998	Received waiver/amendment. Reported to be engaged in restructuring tal	340	-0.3449	No
Building Materials Holding Corporation	04/02/2008	16/06/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	875	-0.8309	No
Champion Enterprises, Inc.	13/08/2009	15/11/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	645	-0.9336	No
Chart Industries Inc.	08/04/2003	08/07/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	279	-0.9445	No
Charter Communications, Inc	14/01/2009	27/03/2009	Reported to be engaged in restructuring talks	14,666	-0.8646	No
Chemtura Corporation	30/12/2008	18/03/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	4,416	-0.0488	Yes
CHS Electronics, Inc.	16/08/1999	04/04/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	3,572	-0.3664	Yes
CIT Group Inc.	01/10/2009	01/11/2009	Reported to be proposing exchange offer	80,449	0.0871	No
Citadel Broadcasting Corporation	05/06/2008	20/12/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	3,843	-0.9143	Yes
Collins & Aikman	17/04/2005	17/05/2005	Received waiver/amendment. Reported to be engaged in restructuring tal	3,191	-0.8491	No
Conseco, Inc.	09/08/2002	17/12/2002	Reported to be engaged in restructuring talks	61,392	-0.5559	Yes
Covad Communications	08/07/2001	07/08/2001	Reported to be proposing exchange offer	1,511	-0.7831	No
Covanta Energy Corp.	01/03/2002	01/04/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	3,186		No
Crown Vantage Inc.	14/02/2000	15/03/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	557	-0.6291	No
DaisyTek International Corp.	13/03/2003	07/05/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	414	-0.7922	No
Dan River Inc.	19/12/2003	31/03/2004	Received waiver/amendment. Reported to be engaged in restructuring tal	596	-0.3345	No
Dana Corporation	01/02/2006	03/03/2006	Received waiver/amendment. Reported to be engaged in restructuring tal	7,386	0.2277	No
Dayton Superior Corporation	08/01/2009	19/04/2009	Reported to be proposing exchange offer	300	-0.5595	Yes
DDI Corp.	11/04/2003	20/08/2003	Reported to be engaged in restructuring talks	221		No
Delta Air Lines, Inc.	10/03/2005	14/09/2005	Reported to be engaged in restructuring talks	21,801	-0.9933	No
Dura Automotive Systems, Inc.	30/09/2006	30/10/2006	Reported to be engaged in restructuring talks	2,075	-0.4418	Yes
DVI Inc.	16/07/2003	25/08/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	1,672	-0.7993	Yes
Encompass Services Corporation	01/10/2002	19/11/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	2,401	0.3544	No
Enron Corp.	02/11/2001	02/12/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	65,503		No
eToys, Inc.	26/01/2001	07/03/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	425	0.5183	Yes
Exide Technologies	05/01/2002	15/04/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	2,299		No
FairPoint Communications, Inc.	24/06/2009	26/10/2009	Reported to be proposing exchange offer	3,334	-1.0000	No
Family Golf Centers, Inc.	13/08/1999	04/05/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	572	-0.8264	No
Farmland Industries, Inc.	01/05/2002	31/05/2002	Reported to be engaged in restructuring talks	2,728	-0.3389	No
FLAG Telecom Holdings, Ltd	13/03/2002	12/04/2002	Reported to be proposing exchange offer	3,477		No
FLYi, Inc.	16/02/2005	07/11/2005	Received waiver/amendment. Reported to be engaged in restructuring tal	678		No
Foamex International, Inc. (2005)	17/08/2005	19/09/2005	Received waiver/amendment. Reported to be engaged in restructuring tal	646	-0.8543	No
FPA Medical Management, Inc.	10/06/1998	19/07/1998	Received waiver/amendment. Reported to be engaged in restructuring tal	831	0.2789	No
Fremont General Corporation	04/03/2008	18/06/2008	Reported to be engaged in restructuring talks	12,891	2.1042	No
Fruit of the Loom, Inc.	15/10/1999	29/12/1999	Received waiver/amendment. Reported to be engaged in restructuring tal	2,290	-0.3137	No
General Growth Properties, Inc.	09/12/2008	16/04/2009	Reported to be engaged in restructuring talks	29,557	-0.6279	No
General Motors Corporation	21/04/2009	01/06/2009	Reported to be proposing exchange offer	91,039	-0.9765	Yes
Genuity Inc.	25/10/2002	27/11/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	2,994	-0.8910	Yes
Global Crossing Ltd.	28/12/2001	28/01/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	30,185		No
Guilford Mills, Inc.	11/02/2002	13/03/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	551	-0.6354	No
Hayes Lemmerz International, Inc.	11/04/2009	11/05/2009	Reported to be engaged in restructuring talks	1,096	-0.9131	No
Hines Horticulture, Inc.	04/06/2007	20/08/2008	Received waiver/amendment. Reported to be engaged in restructuring tal	340	-0.9770	Yes
Huntsman Polymers Corp	30/11/2001	27/02/2002	Reported to be engaged in restructuring talks	1,138	-0.5541	No
ICG Communications, Inc.	29/09/2000	14/11/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	2,021		No
Imperial Sugar Company	14/12/2000	16/01/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	1,094	-0.2228	No
IMPSAT Fiber Networks, Inc.	11/03/2002	11/06/2002	Reported to be engaged in restructuring talks	719		No
Iridium LLC (and six subsidiaries)	29/03/1999	13/08/1999	Reported to be engaged in restructuring talks	3,739		No
JCC Holding Co.	23/08/2000	04/01/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	506		No
Kellstrom Industries, Inc.	06/04/2001	20/02/2002	Reported to be proposing exchange offer	573		No
Komag, Inc.	05/04/2001	24/08/2001	Reported to be proposing exchange offer	633	-0.9395	No
Laroche Industries Inc.	12/01/1999	03/05/2000	Reported to be proposing exchange offer	405	-0.9261	No
Lason, Inc.	02/06/2000	05/12/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	836		No
Lear Corporation	13/05/2009	07/07/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	6,873	-0.6207	No

COMPUSTAT NAME	First mention date	Bankruptcy date	Type of restructuring	Asset size (USDm)	3-year Stock Return	CDS
Lenox Group, Inc.	14/02/2007	23/11/2008	Received waiver/amendment. Reported to be engaged in restructuring tal	374	-0.9532	Yes
Loews Cineplex Entertainment Corp	26/08/2000	15/02/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	1,678		No
Magellan Health Services Inc.	01/11/2002	11/03/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	1,004	-0.9615	No
McLeodUSA Incorporated (2005)	17/03/2005	28/10/2005	Reported to be engaged in restructuring talks	1,026	-0.9133	No
McLeodUSA, Inc. (2002)	01/01/2002	31/01/2002	Reported to be proposing exchange offer	4,755	-0.7465	No
Metromedia Fiber Network, Inc.	01/04/2002	20/05/2002	Reported to be engaged in restructuring talks	6,252	-0.9916	No
Mirant Corp.	08/05/2003	14/07/2003	Reported to be proposing exchange offer	19,415	-0.9880	No
Monaco Coach Corporation	30/07/2008	05/03/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	564		Yes
Movie Gallery, Inc.	05/07/2007	16/10/2007	Received waiver/amendment. Reported to be engaged in restructuring tal	1,153	-0.3850	No
Network Plus Corp.	02/01/2002	05/02/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	405	-0.8050	Yes
New World Pasta Co.	14/08/2003	10/05/2004	Received waiver/amendment. Reported to be engaged in restructuring tal	426		No
Northwestern Steel & Wire Co.	24/01/2000	19/12/2000	Reported to be proposing exchange offer	318		No
NTELOS, Inc.	29/11/2002	04/03/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	1,197	-0.6905	No
Oglebay Norton Company	21/04/2003	23/02/2004	Received waiver/amendment. Reported to be engaged in restructuring tal	687		No
Orleans Homebuilders, Inc.	05/11/2009	01/03/2010	Received waiver/amendment. Reported to be engaged in restructuring tal	716	-0.7020	No
Outboard Marine Corporation	12/05/1999	22/12/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	1,082	-0.8009	No
Pacific Gas & Electric Co.	01/02/2001	06/04/2001	Reported to be engaged in restructuring talks	21,988	0.0667	No
Pacific Gateway Exchange, Inc.	16/05/2000	29/12/2000	Reported to be engaged in restructuring talks	375	-0.3762	Yes
Penn Traffic Co (2003)	31/10/2002	30/05/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	806	-0.6055	No
Philip Services Corp. (1999)	13/11/1998	25/06/1999	Reported to be engaged in restructuring talks	1,148	-0.2483	No
Pilgrims Pride Corporation	29/09/2008	01/12/2008	Received waiver/amendment. Reported to be engaged in restructuring tal	3,298	-0.9825	No
Pillowtex Corp. (2000)	09/11/1999	14/11/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	1,654	-0.8540	No
Pillowtex Corp. (2003)	28/03/2003	30/07/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	592	0.5070	No
Pliant Corporation (2006)	03/12/2005	03/01/2006	Reported to be proposing exchange offer	777		No
Polymer Group, Inc.	15/03/2002	11/05/2002	Reported to be proposing exchange offer	1,232		No
PSINet	19/03/2001	31/05/2001	Reported to be engaged in restructuring talks	2,577	-0.9604	No
R.H. Donnelley Corporation	16/04/2009	28/05/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	11,880	-0.9610	No
RCN Corporation	16/01/2004	27/05/2004	Reported to be engaged in restructuring talks	1,529	-0.9941	Yes
Redback Networks Inc.	07/07/2003	03/11/2003	Reported to be proposing exchange offer	661	-0.7813	No
Reliance Acceptance Group, Inc.	14/11/1997	09/02/1998	Received waiver/amendment. Reported to be engaged in restructuring tal	553	-0.9898	No
Remy International, Inc.	08/03/2007	08/10/2007	Reported to be engaged in restructuring talks	871	0.3677	No
Seitel Inc.	03/06/2002	06/06/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	661		No
Seven Seas Petroleum, Inc.	01/01/2002	20/12/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	307	1.1126	No
Six Flags, Inc.	18/04/2009	13/06/2009	Reported to be proposing exchange offer	3,031	-0.1609	No
SLI, Inc.	23/04/2002	09/09/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	873	-0.9443	Yes
Solutia, Inc.	16/10/2003	17/12/2003	Reported to be engaged in restructuring talks	3,342	-0.7933	No
SpectraSite Holdings, Inc.	16/10/2002	15/11/2002	Reported to be engaged in restructuring talks	3,202	-0.7096	Yes
Spectrum Brands, Inc.	12/12/2008	03/02/2009	Reported to be engaged in restructuring talks	2,247	-0.5784	No
Station Casinos, Inc.	03/02/2009	28/07/2009	Reported to be proposing exchange offer	5,831	-0.8333	Yes
Team Financial, Inc.	08/09/2008	05/04/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	825	0.0964	Yes
Teligent Inc	21/04/2001	21/05/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	1,209	0.0342	No
Thornburg Mortgage, Inc.	20/08/2008	01/05/2009	Reported to be proposing exchange offer	36,272	-0.9407	No
Transmeridian Exploration Incorporated	23/09/2008	20/03/2009	Reported to be proposing exchange offer	406	-0.6545	No
Trend-Lines, Inc.	12/06/2000	11/08/2000	Received waiver/amendment. Reported to be engaged in restructuring tal	209	-0.5763	No
Trenwick Group Ltd.	23/02/2003	20/08/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	5,278	-0.7727	No
Trico Marine Services	27/04/2004	21/12/2004	Reported to be engaged in restructuring talks	585	-0.9702	No
Tronox Incorporated	28/10/2008	12/01/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	1,723	-0.7288	No
Trump Entertainment Resorts, Inc. (2009)	19/12/2008	17/02/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	2,231	-0.3154	Yes
UAL Corporation (United Airlines)	14/10/2002	09/12/2002	Reported to be engaged in restructuring talks	25,197	-0.7737	No
Vineyard National Bancorp	02/09/2008	21/07/2009	Received waiver/amendment. Reported to be engaged in restructuring tal	2,483	-0.8085	Yes
Visteon Corporation	30/05/2008	28/05/2009	Reported to be proposing exchange offer	7,205	-0.6543	No
Vlasic Foods International, Inc.	11/02/2000	29/01/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	665	-0.3287	Yes
Warnaco Group Inc.	12/05/2001	11/06/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	2,343		No
Waste Systems International, Inc.	05/07/2000	11/01/2001	Received waiver/amendment. Reported to be engaged in restructuring tal	255	-0.9353	No
WCI Communities, Inc.	08/12/2007	04/08/2008	Reported to be proposing exchange offer	3,832	-1.0000	No
WestPoint Stevens Inc. (2003)	16/04/2003	01/06/2003	Received waiver/amendment. Reported to be engaged in restructuring tal	1,297	-0.2941	Yes
Williams Communications Group, Inc.	04/03/2002	22/04/2002	Reported to be engaged in restructuring talks	5,992	-0.9045	No
Worldcom, Inc.	09/05/2002	21/07/2002	Received waiver/amendment. Reported to be engaged in restructuring tal	103,914	-0.9138	No
XO Communications, Inc.	04/10/2001	17/06/2002	Reported to be engaged in restructuring talks	7,930	-0.8216	No
Zenith Electronics Corp.	10/08/1998	23/08/1999	Reported to be engaged in restructuring talks	528	-0.9807	No

Appendix B: Possible empty creditor cases

Company	Year	Summary	Outcome
Marconi	2001-2002	Marconi was initially unable to renegotiate with a consortium of banks, some of which had bought credit protection. Ultimately a debt-for-equity swap was approved, which essentially wiped out equity holders.	Out-of-court restructuring
Mirant	2003	Unable to work out a deal with its creditors, Mirant Corporation, an energy company based in Atlanta, was forced to file for Chapter 11. The bankruptcy judge appointed a committee representing the interests of equity holders, indicating that there was a reasonable chance that the reorganization value would be high enough to give equity holders a positive claim after paying off all creditors.	Chapter 11
Tower Automotive	2004	A number of hedge funds refused to make concessions on exiting loans to enable new loans that would have improved Tower's cash position. Supposedly the hedge funds had shorted Tower's stock rather than having entered into a CDS position, to similar effect.	Chapter 11
Six Flags	2009	Filed for Chapter 11 after failing to reach a deal with its creditors.	Chapter 11
Lyondell Basell	2009	Filed for Chapter 11 after failing to reach a deal with its creditors.	Chapter 11
General Growth Properties	2009	Filed for Chapter 11 after failing to reach a deal with its creditors.	Chapter 11
Abitibi Bowater	2009	Filed for Chapter 11 after failing to reach a deal with its creditors.	Chapter 11
Harrah's Entertainment	2009	Harrah's barely managed to renegotiate its debt.	Out-of-court restructuring
Unisys	2009	After two failed exchange offers, the IT provider Unisys had to offer creditors bonds worth more than par to reschedule its 2010 debt.	Out-of-court restructuring
GM	2009	Filed for Chapter 11 after failing to reach a deal with its creditors.	Chapter 11
Chrysler	2009	Filed for Chapter 11 after failing to reach a deal with its creditors.	Chapter 11
YRC Wordwide	2009-2010	The trucking company YRC only managed to renegotiate its debt at the last minute, when the Teamsters union threatened to protest in front of the offices of hedge funds which blocked YRC's debt-for-equity offer.	Out-of-court restructuring

Source: Bolton and Oehmke (2010)

Appendix C: Stock performance measures

	86 succsessful restructurings				132 unsuccsessful restructurings				Wilcoxon rank-sum test (p-value of z test)		One-tailed t-test
	Mean	Median	Min.	Max.	Mean	Median	Min.	Max.	Mean	Median	Mean
Prior 3-year accumulated common stock return											
(i) Unadjusted returns (%)	-45.9%	-67.5%	-98.1%	729.9%	-55.1%	-74.6%	-100.0%	210.4%	0.7255	0.3360	0.2270
(ii) Abnormal returns (%)	-56.9%	-90.1%	-100.0%	478.6%	-85.4%	-97.6%	-100.0%	66.2%	0.0001 ***	0.0010 ***	0.0010 ***
Prior 2-year accumulated common stock return											
(i) Unadjusted returns (%)	-41.9%	-41.9%	-41.9%	-41.9%	-55.2%	-55.2%	-55.2%	-55.2%	0.6228	0.7740	0.1053
(ii) Abnormal returns (%)	-39.6%	-86.4%	-100.0%	428.7%	-79.8%	-95.4%	-100.0%	169.6%	0.0001 ***	0.0000 ***	0.0003 ***
Prior 1-year accumulated common stock return											
(i) Unadjusted returns (%)	-46.4%	-46.4%	-46.4%	-46.4%	-51.6%	-51.6%	-51.6%	-51.6%	0.6073	0.6710	0.1469
(ii) Abnormal returns (%)	8.7%	-63.7%	-99.0%	2463.9%	-70.8%	-90.3%	-100.0%	169.1%	0.0000 ***	0.0000 ***	0.0038 ***
Estimated beta (β)											
3 to 5 years prior	0.98	0.86	-0.19	2.94	1.02	0.82	-0.01	5.41	0.4305	0.8830	0.3282
1 to 5 years prior	1.11	1.00	-0.12	3.10	1.07	1.02	-0.38	3.10	0.7481	0.7770	0.6498
Yearly stock return volatility											
3 to 5 years prior	45.4%	44.8%	4.2%	112.0%	51.0%	46.9%	15.1%	158.5%	0.1719	0.3690	0.0555 *
1 to 5 years prior	51.3%	48.4%	15.8%	121.6%	57.6%	54.3%	19.5%	124.0%	0.0455 **	0.0250 **	0.0261 **
1 year prior	78.1%	67.2%	23.3%	201.5%	87.6%	80.8%	20.6%	246.6%	0.1028	0.0280 **	0.0503 *
2 years prior	70.4%	64.0%	20.7%	148.4%	77.3%	75.6%	6.8%	176.7%	0.1225	0.1790	0.0613 *
3 years prior	65.2%	60.0%	19.2%	131.3%	71.9%	69.9%	6.3%	145.7%	0.0618 *	0.0140 **	0.0431 **
4 years prior	62.4%	58.4%	21.3%	131.3%	69.1%	66.5%	21.9%	131.3%	0.0391 **	0.0050 ***	0.0285 **
5 years prior	60.9%	57.5%	21.8%	131.3%	67.1%	66.2%	22.1%	130.5%	0.0496 **	0.0050 ***	0.0388 **
6 years prior	60.4%	56.5%	21.8%	131.3%	65.2%	65.3%	22.8%	130.5%	0.0581 *	0.0250 **	0.0584 *

(* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$)

Source: The Center for Research in Security Prices (CRSP)

Appendix D: Two-stage instrumental variable estimation

	Reduced-form models										Structural model	
	Liabilities/Assets		Public/Liabilities		Accounts./Liabilities		#Private/Liab.		P/B EV		Out-of-court	
	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value	dF/dx	p-value
Industrials	0.224	(0.147)	-0.124	(0.787)	-0.031	(0.282)	-0.215	(0.859)	0.074	(0.892)		
Consumer Discretionary	0.138	(0.637)	-0.142	(0.698)	0.004	(0.753)	-0.828	(0.718)	0.396	(0.700)		
Information Technology	-0.124	(0.500)	0.170	(0.796)	0.076	(0.869)	2.102	(0.148)	0.504	(0.439)		
Age	-0.002	(0.940)	0.000	(0.944)	0.000	(0.414)	-0.008	(0.705)	-0.040	(0.000) ***		
Total capital (2 years)	0.000	(0.910)	0.000	(0.066) *	0.000	(0.012) **	0.000	(0.521)	0.000	(0.004) ***		
Leverage (2 years)	0.273	(0.011) **	0.186	(0.245)	-0.053	0.000 ***	-1.247	(0.137)	0.807	(0.033) **		
Year	-0.007	(0.657)	0.004	0.000	0.004	0.000	-0.026	(0.822)	-0.041	(0.431)	0.077	(0.181)
Liabilities/Assets											-0.049	(0.976)
Public/Liabilities											0.103	(0.948)
Accountspay./Liabilities											2.473	(0.762)
Numberofprivate./Liabilities											0.442	(0.315)
P/B EV (2-year average)											0.393	(0.086)
Constant	13.97	(0.639)	-7.64	(0.678)	-7.25	(0.744)	54.49	(0.816)	84.51	(0.422)		
N	170		170		170		170		170		170	
R^2	0.0719		0.1595		0.0738		0.0399		0.1996			
F	1.79	(0.092) *	4.39	(0.000) ***	1.84	(0.082) *	0.96	(0.462)	5.77	(0.000) ***		

(* p < 0.10, ** p < 0.05, *** p < 0.01)

Wald test of exogeneity, $\chi^2(5) = 2.44$ (p-value 0.7849)

Overidentification test, $\chi^2(1) = 0.108$ (p-value 0.7424)

Two-stage instrumental variable (IV) regressions where each of the potentially endogenous variables from the structural model (Model 4 in Table 12) is estimated in separate reduced-form models using a selection of instrument variables and exogenous variables from the original model. As instruments we have used sector dummies for the sectors Industrials, Consumer Discretionary, and Information Technology, classified by the two first digits in the firms' GICS code obtained from the Compustat database; age of the firm, defined as time since IPO or major merger obtained from the LoPucki's Bankruptcy Database and various other news sources; total capital, defined as book value of common stock, preferred equity, and long-term debt, two years prior to the first mention date from the Compustat database; as well as leverage, defined as the book value of long-term debt over total capital, two years prior to the first mention date from the Compustat database.

Source: The Center for Research in Security Prices (CRSP), EDGAR (SEC) Database, Lynn M. LoPucki Bankruptcy Research Database, Standard & Poor's Compustat Database, Thomson Reuters Datastream.

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