The Ownership and Trading of Debt Claims in Chapter 11 Restructurings

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What is the ownership structure of bankrupt debt claims? How does the ownership evolve though bankruptcy? And how does debt ownership influence Chapter 11 outcomes? To answer these questions, we construct a data set that identifies the entire capital structure for 136 companies filing for U.S. Chapter 11 bankruptcy protection between 1998 and 2009 and that covers over 71,000 different investors. We categorize the investors in the capital structure of bankrupt firms according to their institutional type and track them from the initial filing until the vote on the plan of reorganization. We document several novel facts about the role of different institutional investors, the impact of debt ownership concentration, and the role of trading in bankruptcy. We find that trading during the case leads to higher concentration of ownership, particularly among debt claims that are eligible to vote on the bankruptcy plan of reorganization. Active investors, including hedge funds, are the largest net buyers of claims in bankruptcy. While initial ownership concentration is important for coordination of a prearranged bankruptcy filing, it is consolidation of ownership during bankruptcy—and specifically consolidation of ownership of voting classes—that has an impact on the speed of restructuring, the probability of liquidation, and class-level as well as overall recovery rates.

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JEL classification: G23; G30; G33

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I. Introduction

Potential bankruptcy costs are widely recognized in corporate finance as one of the key determinants of the choice between debt and equity financing. However, efforts to study these costs have been hampered in the past by data limitations, particularly when it comes to observing how creditors influence the outcome of the restructuring. Furthermore, growing anecdotal evidence suggests that financial innovations, and in particular the development of an active secondary market for the trading of bankrupt claims, has dramatically transformed the debt ownership structure of bankrupt firms. Using novel data covering a large set of bankruptcies over the past ten years, we study the overall ownership structure of defaulted firms, how debt ownership evolves through bankruptcy as a result of claims trading and, ultimately, how debt ownership structure influences Chapter 11 outcomes.

We collect a comprehensive set of investor identities via two "snapshots" of holdings recorded during the Chapter 11 proceedings of 136 debtor firms that filed for bankruptcy protection between 1998 and 2009. The snapshots—taken at the filing of the debtor's schedules of assets and liabilities (a complete list of claimholders at the beginning of bankruptcy) and at the tabulation of votes on the debtor's plan of reorganization (a complete list of claimholders eligible to vote at the end of bankruptcy)—cover claims filed by 71,358 different investors.[1] For a large subset of bankruptcy claims, we also observe trades during the Chapter 11 case, which enables us to track changes in claims ownership between the start of the bankruptcy and voting on the plan of reorganization. We observe trades in bilateral claims (e.g., trade creditor claims, leases, tax claims), as these transfers are required to be registered with the bankruptcy court; trading of claims that are administered by agents or trustees, such as syndicated loans or public bonds, are tracked directly by the administrators and are not publically available.

Using several data sources, we identify each investor's institutional type. Our institutional typology differentiates thirteen groups of financial and non-financial claim holders affected by

[1] Note that the term "bankruptcy claim" is a broader concept than "security," as it includes *any* of the firms' liabilities/right-to-payment. In what follows, we will use indistinctively the terms "claim holders" and "creditors".

bankruptcy. In presenting our results, we focus on four key institutional types: (i) banks, (ii) custodians or trustees (typically banks reporting bond and other securities holdings on behalf of private investors), (iii) non-financial corporations, and (iv) active investors. The latter category includes asset management firms, hedge funds, and private equity affiliated funds.

The level of detail in the data that we put together enables us to overcome some basic measurement problems. Specifically, we are able to directly compute ownership concentration. This significantly improves on previous studies that have relied primarily on the presence of different types of debt to proxy for debt ownership concentration and complexity. This is also the first empirical study to provide insight on claims trading *in* bankruptcy and to show that trading has an important impact on ownership and, subsequently, on bankruptcy outcomes. Growth in claims trading started in the early 1990s, and has not gone unnoticed.[2] Gilson (1995), among other scholars, argues that claims trading is now an integral part of the Chapter 11 reorganization. Indeed, Baird and Rasmussen (2010) postulate that the changing composition of creditors, and the influence of these creditors on bankruptcy outcomes, is driven primarily by the rise of the distressed debt secondary market. However, as noted by Levitin (2010), the existing evidence is only anecdotal.[3]

The results of our paper can be summarized as follows: First, active investors hold a relatively small fraction of debt claims during bankruptcy. At the onset of bankruptcy, active investors hold on average 9.7% of all claims of a bankrupt firm. These investors increase their holdings by over 50% during the case, owning roughly 15% of the claims by the time votes are tabulated on the plan of reorganization. On average, banks (22.1%) and non-financial corporations (23.8%) own the largest fraction of debt claims at the start of a Chapter 11 case, and it is these investors that continue to hold the majority of claims at the time the plan is voted upon. However purchases of claims in bankruptcy by active investors

[2] Bankruptcy Rule 3001(e) provides procedural requirements governing claims trading. In 1991 this rule was amended to make clear that it is *not* the court's role to determine the validity of the transfer, unless there is an objection by the transferor. It is often argued that the reduction in court's oversight on claims trading facilitated the development of this market.

[3] "The debate over claims trading (in Chapter 11) operates on a limited evidentiary base. Arguments about claims trading are based on theory, common sense, and anecdote, but not data." (Levitin, 2010.)

are of strategic importance, as these investors primarily acquire voting claims and have a strong influence on the concentration in debt ownership during the bankruptcy case. Active investors are net buyers of bilateral claims, accounting for nearly 70% of all claims purchases and close to 0% of all sales of voting claims. Furthermore, buys by asset managers, in particular, are positively and significantly related to increases in concentration of claim ownership at the time of the vote on the plan of reorganization. In addition, purchases of claims in bankruptcy are an important vehicle for the entry of new creditors in bankruptcy, nearly 70% of which are active investors.

Second, we find that more trading during the case leads to a higher concentration of debt ownership at the end of bankruptcy. A one standard deviation increase in voting claims trading results in a 0.45 standard deviation increase in the overall level of creditor concentration, measured using a Herfindahl-Hirschman Index (HHI). Consistent with a strategic motive for claims trading, most of the claims transfers in bankruptcy take place within classes of creditors that are ultimately eligible to vote on the plan of reorganization: a transferred claim is more than 2.5 times more likely to be a voting claim than a non-transferred claim. But simply observing a strong relationship between claims trading and creditor concentration does not establish causality since traders could be attracted to capital structures that are easier to concentrate. To overcome this endogeneity problem , we use the closeness of a bankruptcy filing to the end of the fiscal year and the share of total claims owned by non-financial corporations as two instruments for claims trading activity (Section III.B explains our reasoning behind adopting these two variables). Using the instruments, we show that the positive relation between trading and concentration persists, both in terms of the level of debt concentration at the time of plan vote, and in terms of changes in holdings over the course of the bankruptcy case. The relation between trading and ownership concentration at the time of the vote on the plan of reorganization is an important point, as it affects our understating of negotiations that follow default. Existing economic research largely abstracts from the possibility that claims trading can alter creditor structure.[4]

[4] One notable exception is Bond and Eraslan (2010).

Third, the concentration of creditors across the capital structure matters for restructuring outcomes. We use the finding that ownership is affected by trading in bankruptcy to verify that the relationship is causal. Our results indicate that the likelihood of observing a prearranged bankruptcy increases with the concentration of the capital structure measured at the outset of the bankruptcy case. Subsequently, the bankruptcy process moves much quicker than in cases not filed as a prearranged process.[5] But a concentrated voting class at the time of voting on the reorganization plan also improves the speed at which a *non*-prearranged restructuring occurs, and increases the likelihood that the firm is sold as a going-concern during the bankruptcy process, as opposed to being liquidated piecemeal. Using our claims trading instruments, we show that improvements in restructuring time and increases in going-concern sales are caused, in part, by trading that concentrates the capital structure.

A shorter time in bankruptcy might not necessarily lead to the best overall outcome. Indeed, we find that while high creditor concentration appears to improve the speed with which a restructuring occurs, it is also associated with lower overall recovery rates to creditors in the bankruptcy case. We explore a variety of potential explanations for this finding, including a selection argument that active investors concentrate their holdings in firms with lower ex-ante values, that more concentrated senior creditors push for quick restructurings at the expense of less concentrated junior creditors, and that "fulcrum" security holders—claimants that receive the controlling equity stake at bankruptcy exit—strategically undervalue the equity in the restructuring plan. None of these explanations appear to be driving the result. Thus, our findings seem to imply that investors in concentrated voting classes bargain in a way that leads to private benefits for their voting class, while lowering the overall valuations of the restructured firm at exit. Consistent with this claim, we show that higher *class-level* ownership concentration at the time of voting results in higher recovery rates for that class. Overall, our findings

[5] Although this result is intuitive, strictly speaking, we cannot establish a causal link between ownership concentration and prearranged filing because our identification is based on trading *in* bankruptcy, whereas existence of a prearranged reorganization plan is something that is already set at the bankruptcy filing.

support the view expressed by the bankruptcy judge Robert Gerber of the Southern District of New York, who characterizes distressed debt traders as:

> …not necessarily bad… [but] have their own agendas, which not infrequently consist of simply maximizing returns… without a broader regard for spending the time and effort necessary to stabilize the business, and/or maximize its value for the good of all.[6]

Our paper contributes to a large literature relating capital structure to financial distress. Bolton and Scharfstein (1996) derive a model that shows that bargaining in debt restructurings may be inefficient when distressed firms have many dispersed creditors. Our findings are largely consistent with their conclusion and even can be thought of as a direct test of their model. However, Bolton and Scharfstein (1996) abstract from the possibility that investors could trade to a more concentrated capital structure prior to bargaining, a point that we show is important in actual distressed negotiations.[7] On the empirical side, Gilson (1990) and Gilson, John, and Lang (1990) examine restructurings of bank debt during the period 1978-1987 and show that the presence of large bank claims often makes restructuring easier and that banks often end up with a substantial share of equity in the reorganized firm. Asquith, Gertner and Scharfstein (1994), Brown, James, and Mooradian (1993), and James (1995, 1996) extend this work by showing that the effect of bank debt on restructuring depends on the financial condition of the firm and the presence of public debt. As mentioned earlier, our paper significantly improves on the measurement of ownership structure by tracking claim ownership through bankruptcy and directly measuring its concentration, and allows us to examine directly the impact of this concentration on restructuring outcomes.

More recent studies have focused on the role of strategic investors in distressed debt. Bharath, Panchapegesan, and Werner (2007) and Ayotte and Morrison (2009), show that the speed and efficiency of Chapter 11 restructurings increased significantly from the 1980s through the early 2000s, a period that

[6] See Letter to Advisory Committee on Bankruptcy Rules, RE: Fed R Bankr. P. 2019, dated January 9, 2009, United States Bankruptcy Court, Southern District of New York, pp. 2-3.

[7] To be precise, Bolton and Scharfstein (1996) study how coordination problems in bankruptcy might influence ex-ante debt ownership structures. We build on this basic intuition by looking at variation in ownership at bankruptcy exit as a result of claims trading during the case.

coincides with both an increase in the sophistication of Chapter 11 players and the development of distressed debt trading markets. But neither of these studies observes the identities of the creditors and the extent to which investors affect the Chapter 11 process and outcome. Our paper also relates to Hotchkiss and Mooradian (1997), who examine the role of active investors (defined from a list of 75 distressed debt investors) in distressed companies, and Jiang, Li, and Wang (2009), who track hedge fund participation in firms that file for Chapter 11. These papers find evidence consistent with increases in the efficiency of Chapter 11 outcomes when strategic financial investors are involved. Our findings complement these studies by showing that active investors increase their ownership strategically though bankruptcy. However, we focus on a much broader set of investors—virtually the entire capital structure of the distressed firms—and show that while more concentrated capital structures speed the restructuring process, it can also lead to lower recovery rates for creditors as a whole.

The rest of the paper proceeds as follows. Section II describes the data. Section III presents the distribution of institutional debt ownership across the bankrupt firms in our sample. Section IV analyses the observed trading activity in the bankruptcy cases, and its connection to the concentration of claims at voting for the reorganization plan. Section V analyses effects of ownership concentration on bankruptcy outcomes and section VI concludes.

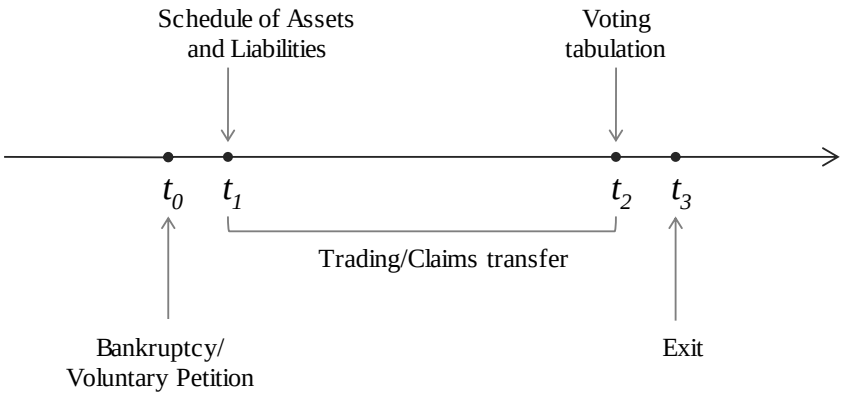
II. Data

A. Ownership of bankrupt claims

To understand the structure and evolution of the ownership of bankrupt claims, we need a complete set of creditors trading and holding claims against a representative sample of U.S. corporations filing for Chapter 11 bankruptcy protection. Because the bulk of the trading and ownership of Chapter 11 claims are in unregistered instruments traded over-the-counter, no one reliable source exists for observing the identity of the claimants during the bankruptcy process. Even before bankruptcy, Securities and Exchange Commission (SEC) registered debt securities, such as publicly traded bonds, report on the

identities of investors in only limited circumstances.[8] To overcome these obstacles, we rely on a sample of "snapshots" of creditor holdings that are reported at two points during the bankruptcy process: (1) at the filing of the schedules of assets and liabilities, shortly after the bankruptcy case begins, and (2) at the point that votes from claimants are tabulated for purposes of accepting or rejecting the bankrupt firm's plan of reorganization. Figure 1 provides a timeline representation of when these snapshots are recorded.

Figure 1
Bankruptcy timeline



Data for this study were made available by the four leading providers of restructuring and insolvency administrative services: BMC Group, EPIQ Bankruptcy Solutions, Donlin Recano & Company and Kurtzman Carson Consultants (KCC). These professional service firms are retained by the bankrupt company to record and manage the claimant databases during the course of the bankruptcy case. Each of these firms provided us with electronic versions of the schedules of liabilities, supplemented with information from the client "claims register," and records of vote tabulations. These firms also provided information on the trading of claims that are filed in court as a record of the transaction between parties holding bilateral claims. We describe each of these data sources in more detail below. While we received our data privately in an easily readable electronic format, all of the data are also available publically in

[8] Unlike public equity holdings, which require holdings disclosures by all insiders and owners of more than 5% of outstanding shares, public bond holders are typically not required to disclose their holdings or trades. The exceptions to this rule are the bondholdings of insurers, which must be disclosed to the National Association of Insurance Commissioners, pension funds and the bondholdings of registered mutual funds, which must be disclosed to the SEC.

flat-text or scanned-text format through the U.S. Public Access to Court Electronic Records (PACER) system of bankruptcy filings, the disclosure of which is regulated by the Federal Rules of Bankruptcy Procedure.[9]

A.1. Snapshot 1: Schedule of Assets and Liabilities and Credit Register (t_1)

A Chapter 11 case begins with the filing of a petition in the federal bankruptcy court in the bankruptcy district in which the firm is either headquartered, incorporated, or in which the firm does a significant amount of business. (Large firms often file in the Southern District of New York in Manhattan or Delaware bankruptcy courts). Shortly after filing the petition, the debtor is required to file its schedules of assets and liabilities, which—as the name suggests—contain a detailed description of the bankrupt company's assets as well as a list of all creditors, together with the amount and nature of their claims. Once the schedules are filed and therefore made public, any claimants to the case that are omitted from the schedules can separately request that their claims be recognized through a central claims register, maintained by the restructuring and insolvency administration firms on behalf of their bankrupt client. Together, the schedules and credit register serve as a record of each asserted claim, including the amount of the claim, type of claim, and the name and address of the claimholder. The schedules and register give us the first snapshot of creditors immediately following the bankruptcy. For ease of exposition, we denote the time in the bankruptcy process referring to the filing of the schedules as t_1.

[9] All documents disclosed in a bankruptcy filing—including Schedule of Assets and Liabilities, and voting tabulations—are public information and can be accessed on-line using PACER This makes PACER an immensely rich source of information. However, the documents are not classified in any way and instead are stored as separate PDF files numbered according to how and when they appear in the court docket. As a result, there are thousands of scanned documents per case, and there is no other way of finding the relevant information, but by individually reviewing each one of these files. For example, to give a sense of how the list of files could grow very rapidly, each filing of proof of claim would be entered as a separate document, and so would be the respective court decision. Chang and Schoar (2006) are able to use computerized text search classification algorithms to code a number bankruptcy characteristics by searching for certain key words and phrases in the docket of each case on PACER. The docket is easily searchable and provides short descriptions of each filing. For our analysis, which relies on identification of individual creditors and detailed bankruptcy outcomes, we are not able to implement similar techniques.

The schedule, supplemented with the register, contains a comprehensive list of *all* claims as of the start of the bankruptcy process. Information on each claim is limited to the name of the creditor, the amount of the claim, and whether the claim is administrative, priority, secured, or unsecured.[10]

A.2. Snapshot 2: Plan vote tabulations (t_2)

An important part of a bankruptcy restructuring is the plan of reorganization, which details how a bankrupt firm plans to restructure its operations and capital structure to make it a viable entity going forward. More specifically, the plan contains estimates of the enterprise value of the company or the expected proceeds from the sale of the firm, and how the company plans to distribute the value to the existing claimholders. The distribution of value usually comes in one of three forms—cash, new debt, or new equity—and is distributed roughly according to the absolute priority rule (APR), although claimants and the debtor have the discretion to bargain away from this distribution within some limits.[11] In order for this plan to be confirmed by the bankruptcy judge without a "cram-down" (a forceful confirmation over the objections of the junior classes), the plan must be approved by all claimant classes that are eligible to vote for the plan. Eligible classes include all "impaired" claimants—those not receiving 100% of their principal and interest immediately following exit—that also receive some nonzero distribution under the plan.

Voting for the plan takes place through a balloting process managed by the restructuring and insolvency administrators, including the four firms that provided data for this project. Our second snapshot comes through the record of the votes of all claimants eligible to vote, sorted within each voting class. The tabulations include the identity of the voting claimant, the number of claims being voted, the

[10] There are often duplicate, overlapping, illegitimate claims filed in the register by different parties to the case. For instance, a creditor may assert the same claim against a parent and subsidiary, or even against multiple subsidiaries that are consolidated under the same case filing. Alternatively, claims are asserted that later prove to be unjustified. Throughout our analysis, we identify and eliminate, to the greatest extent possible, all duplicate, overlapping, and illegitimate claims.

[11] The distribution must be "fair and equitable" in the eyes of the court. Specifically, the distribution cannot pay a claimant class less than they would receive in a hypothetical liquidation, nor can it pay a subordinated class a higher recovery rate than a class that is senior. Deviations from absolute priority rule (APR) within these bounds are quite common (Franks and Torous, 1989); in our sample 50 percent of cases deviate from APR.

amount of the claim, and the vote (approve, reject, or abstain).[12] We denote the time in each case when votes are tabulated as t_2.

From a data quality perspective, the voting tabulation snapshot is superior to the snapshot from the schedule of assets and liabilities and claims register in two important ways. First, voting tabulations are by necessity very clean datasets because only creditors certified eligible are allowed to vote, and no duplicate claims can be entered. Second, from the voting tabulations we can glean information on the type of securities held in each voting class based on the description given in the "disclosure statement," which is a background document filed along with the plan of reorganization.

Since not all claimant classes get to vote on a plan, only a subset of claimants is observable at t_2; Figure 2 gives a simple illustration of what that means. In general, two groups of claimants are not allowed to vote on the plan and, therefore, are not observable at t_2: those that are unimpaired (i.e., they are due under the plan to receive a distribution in full satisfaction of their claims) and those impaired claimants expected to receive zero recovery under the plan. Unimpaired classes are typically the most senior classes and classes in which the amount of claims is very small; these classes are deemed automatically to accept the plan.[13] On the other hand, any class that will receive nothing under the plan, typically the most junior claimants that are completely out of the money with respect to the estimated value of the reorganized company, is deemed automatically to reject the plan and is not entitled to vote. Because the set of observable creditors at t_1 and t_2 is not the same, we avoid direct comparisons between the two snapshots.

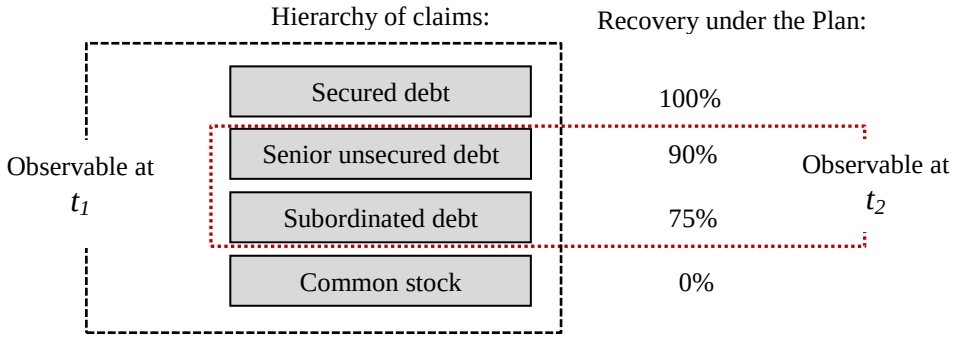
Acquiring voting claims can have large strategic value to investors wishing to approve a plan that provides a roadmap of future payouts or that distributes new equity ownership in the firm. There are also

[12] Several plans for reorganization of the failed company can be submitted. With each plan, the court must approve the disclosure statement before a vote is cast. If the vote fails, the plan can be crammed down, but often it is converted to the Chapter 7 liquidation. So, for each case there is only one vote and one point in time when the votes are tabulated.

[13] Often, senior secured classes will be deemed impaired and get a vote even though they are expected to receive a 100% recovery. They are deemed impaired when they may not receive their distribution immediately following the exit, and instead they may receive new debt claims with different terms than their original debt.

strategic incentives to acquire claims to block a plan since it only takes a one-third ownership stake in one voting class to have the plan blocked, or to force a cram-down.[14]

Figure 2
Example of data availability at t_1 and t_2



A.3. Claims transfers

In addition to the data observed in these two snapshots, we also observe the trading of claims for a subset of the claimants in our sample. The subset is all bilateral claims; that is, claims which are unique to one creditor and that are not part of a registered security, debt issuance, or loan. All transfers of bilateral claims, often referred to as "assignments," must be registered with the court (Rule 3001e of the Federal Rules of Bankruptcy Procedure) and recorded by the claims administrators. Bilateral claims include all trade credit, rejected lease claims, tax claims, tort claims, and a myriad of other claims against the bankrupt firm. We do not observe trades involving claims that are administered by agents or trustees, such as syndicated loans or public bonds, because courts allow the administrators to track keep track of these ownership changes on behalf of the court (see Levitin (2010) for more details on Rule 3001e).

We use the transfer data to draw connections between claims trading in bankruptcy and changes in the ownership and concentration between t_1 and t_2. Because trading in loan claims and bonds is not observable, we make the assumption that trading in loans and bonds is correlated with the observed

[14] For a given class to approve the Plan, it must have a "yes" vote from 1/2 in number and 2/3 in amount of the voting claimants in that class. A Plan can be approved by the judge when all voting classes, or nearly all, vote in favor of confirmation. If a Plan fails to be confirmed, the judge can "cram-down" a Plan as long as at least one voting class approves of the Plan.

trading in bilateral claims. This assumption likely holds because all claims within a class are treated exactly the same from the perspective of the plan of reorganization, regardless of whether they are bilateral or not. Thus general interest in a firm's bilateral claims should signal interest in other claims of the same priority in the capital structure, since both types of claims receive the same recovery and have the same creditor rights. Importantly, bilateral claims are typically general unsecured claims that lie in the middle of the capital structure—"in the money" but impaired claims (i.e., voting class)—so we expect to see a fair amount of trading in these claims. At the same time, the over-the-counter trading that we observe could be less active than trading in loans and bonds, due to the disaggregated nature of the bilateral claims trading market. Thus, we believe the volume of observed claims trading in a given firm likely serves as a lower bound on the volume of unobserved claims trading in loans and bonds.

We should point out that in some cases, courts could restrict trading of claims in bankruptcy; in particular, this could be the case when the debtor seeks to protect its net operating losses (NOLs). Under Section 382 of the Internal Revenue Code, a firm's ability to use its NOLs for tax deductions can be severely restricted when it experiences a change in ownership. We search the PACER docket for each of 136 bankruptcies in our sample to see whether trading restrictions were authorized by the court and find only 10 such cases. Exclusion of these cases from the analysis does not affect our conclusions.

There is some variation in how the credit registers, voting tabulations, and claims transfers data were provided to us by the different restructuring and insolvency administrative firms. One important difference is that only BMC Group (43 bankruptcy cases) provides data identification information that links the claimants at register, in claims transfers, and at voting tabulation into one single dataset. For this reason, we can use the BMC cases to unambiguously identify whether transferred claims were ultimately allowed to vote on the plan of reorganization, and determine to what extent trading actually impacted the ownership concentration of bankruptcy claims. The data provided by the other three administrative firms also contains information on claims transfers, but does not allow us to link this information to the voting tabulation, and thus we cannot determine whether a traded claim was eventually allowed to vote. Because of this, for some of the analysis on claims trading we focus only on the subset of cases administrated by

BMC Group. Further details on the format of the data provided by each of the claim administrators are provided in Appendix I.

B. Identifying and matching creditor types

A total of 1,461,967 claims were filed in the 136 bankruptcies in our study. The original data only contains the names of the creditors. Before assigning creditors to an institutional type, we reduce the data to a manageable size by excluding all claims of less than $50,000, most of which are held by individuals or are trade and tax claims. This exclusion reduces the number of claims to 122,530. While this might appear to be a drastic reduction on an equally-weighted basis, on a value-weighted basis only 2.4% of claims are dropped from the sample. The sample is further reduced by eliminating all withdrawn, disallowed, and duplicate claims, resulting in a final database of 79,527 claims, which are held (either at t_1 or t_2) by 71,358 unique creditors. Overall, out of the 71,358 unique creditors, we are able to classify 96.8% of the creditors' names, or 98.3% of the total value of claims.

Our basic process for classifying observed claimholders according to institutional type is based on name matching via descriptions provided by Standard and Poor's Capital IQ database, as well as other data sources. Based on this match, we create a parent identifier and assign a parent institutional type to the creditor record. At the parent level, we identify thirteen institutional types. In presenting our results, we focus on four key institutional types: (i) banks, (ii) trustees, (iii) non-financial corporations, and (iv) active investors. Other institutional types include insurance and real estate companies, other financials (e.g., small financial advisors), government, individuals, and subsidiaries or intra-company claims.

Among banks we include commercial banks, investment banks, and banks identified as universal banks, along with any subsidiary institutions that are owned wholly within a bank or financial holding company structure. These classifications are achieved using information from Capital IQ's database on parent subsidiary relationships. The trustees category captures custodians and trustees of public bonds, which are typically large banks reporting bond and other securities holdings on behalf of private investors. We identify these cases via the institution's name (e.g. the name is entered as "Bank of New

York as trustee") as well as by reading bankruptcy case disclosure statements, which often give information on the amount of public bonds and the identity of the custodian. Individual bondholders are often able to hide behind their custodial relationships throughout the case and are unknown to the bankrupt firm, other investors, or even the original indenture trustee. Thus, for the purposes of the paper, "trustees" should be interpreted as consolidated unknown bondholders. Active investors include asset management firms, hedge funds and private equity affiliated funds. Our asset management category contains a broad set of investment management firms, with 83% of the claims on value-weighted basis held by general asset managers (including mutual funds), 16% of claims held by pension funds and roughly 1% held by structured products. To identify hedge funds, in addition to Capital IQ, we use the BarclayHedge database, which contains over 14,000 hedge fund names. Claimholders listed in the BarclayHedge database or described in Capital IQ as asset management firms catering to "high-wealth individuals", "pooled investors" or "endowments" are classified as hedge funds. We use Capital IQ to identify private equity affiliated funds.

C. Bankruptcy and financial data

In our analysis, we relate the identity and concentration of ownership in the bankrupt firms to characteristics of the 136 Chapter 11 restructurings. We collect data on the restructuring characteristics via two primary sources: The Deal Pipeline's Bankruptcy Insider archive of Chapter 11 restructurings and from the bankruptcy case disclosure statements filed in conjunction with plans of reorganization. In some cases, we also rely on searches of news articles and SEC filings (among the subset of public firms) for information relevant to the case. For financial information on the firms, we use Deal Pipeline for asset and liabilities at the time of filing, Compustat for additional information available on publicly traded firms, SDC for number of employees, and CapitalIQ for information on private firms. Table I provides a summary of the Chapter 11 restructurings (Panel A) and the financial characteristics of the firms (Panel B). The final sample covers the period 1998 through August 2009, when we received the last transfer of data from the restructuring and insolvency administrators.

The time pattern of bankruptcies in our sample, shown in Panel A of Table I, is fairly consistent with the unconditional distribution of bankruptcies in the U.S., although our sample probably under-represents the population of large bankruptcies in the first half of the sample period.[15] Our sample has broad geographical coverage, with 40% of cases filed in Delaware, 23% filed in Southern District of New York, which are the two most prominent courts for large Chapter 11 filings, and the remaining 37% filed in 28 separate courts across the U.S. Consistent with Bharath, Panchapegesan, and Werner (2007) who also look at the recent period, firms in our sample exit relatively quickly from Chapter 11, in just over a year on average.

We calculate firm-level recovery rates two ways: (1) by dividing the estimated enterprise value (in the case of a reorganization) or the total sale proceeds (in the case of a 363 sale or liquidation) by the value of liabilities reported at filing, and (2) by calculating the weighted average recovery rate of the claim classes reported in the bankruptcy case disclosure statement, where the weights correspond to the pre-filing face value of the claims in that class. Both measures produce a similar distribution that shows average and median recovery rates to be around 50% of the original claim values, with standard deviations also of the same order of magnitude.

Roughly 20% of the observed bankruptcies in our sample are filed as prearranged filings. In a prearranged bankruptcy, prior to the filing, the debtor negotiates a plan of reorganization with its creditors and prepares much of the paperwork necessary for the process. In many cases, votes on the plan may even be collected before filing as well. Prearranged bankruptcies thus allow financially distressed firms to spend a very short amount of time in bankruptcy, but they require the debtor to be able to easily negotiate with its creditors without the assistance of the bankruptcy court. Just under half (47%) of our sample firms exit via a traditional reorganization, the remainder are either sold whole to a financial buyer (10%)

[15] For instance, during the period 1998-2003 our sample contains about 10% of the number of large bankruptcies tracked by UCLA law professor Lynn Lopucki (http://lopucki.law.ucla.edu/), but 64% of the Lopucki number from 2004-2009. Despite the early-period underrepresentation, the cross-sectional characteristics of our sample as reported in Table I are very similar to the Lopucki sample. The lighter sample in the earlier period is most likely due to the fact that the claims administration business did not begin to catch hold until the early 2000s, prior to which time bankrupt firms managed claims administration services in-house.

or a strategic buyer (13%) via a 363 sale, or liquidated piecemeal (32%). Across reorganizations and going-concern sales, financial investors are the dominating owner of bankrupt firms at exit, accounting for about two-thirds of control transfers. Among reorganizations, the fulcrum class of voting claims—the class of claimants that receives the controlling interest in equity at bankruptcy exit—is most often the class holding senior lender claims (29%), or the class of bondholders and noteholders (24%). But controlling equity also goes to general unsecured creditors a fair amount of time (19%), as well as the original equity holders (16%).

Table I, Panel B gives further information on the pre-bankruptcy characteristics of the firms in our sample. The mean pre-bankruptcy asset size is over $1.9 billion. However, there is large variation: 32% of firms have assets below $100 million, roughly 40% of firms have assets between $100 million and $1 billion, and 24% of firms have assets above $1 billion. It is possible that ownership concentration and the speed of reorganization could have very different meanings for small and large firms. To address this issue, we control for the logarithm of firm's pre-bankruptcy assets throughout the analysis.

[TABLE I]

III. Distribution of claims ownership

Table II reports the distribution of claims ownership across institutional types and across the capital structure of the bankrupt firms. The first six columns of Panel A provide summary information on institutional type ownership at the filing of Schedule of Assets and Liabilities (t_1). The first thing to note from the table is the large presence of banks and non-financial corporations in the capital structure of the bankrupt firms. Banks account for 22.1% (median of 13.7%) of the ownership of Chapter 11 claims and hold a claim in nearly 90% of the cases. (Conditional on at least one bank holding claims at bankruptcy, banks account for 22.1% / 88.7% = 24.9% of the ownership of Chapter 11 claims.)

Non-financial corporations account for another 23.8% (median of 16.7%) of all claims and are present in nearly all cases. A large portion of claims held by non-financial corporations are in the form of trade credit and related claims for services and products purchased by the bankrupt firm. Overall this

figure maps well with findings by Rajan and Zingales (1995), who show that trade credit represents about 22.8% of liabilities of private U.S. firms, and Compustat figures, which show that the average Compustat firm in 2010 had accounts payable of 32.1% of liabilities.

In contrast to banks and non-financial corporations, active investors hold a relatively small share of the claims of Chapter 11 firms. At the time of the filing of the schedules and construction of the claims register, hedge funds account for only 0.4% of claims and private equity affiliated funds hold only 2.4% of the claims (1.6% and 8.3% conditional on the cases where these investors are present). Both institutional types appear in less than 30% of the cases in the sample. The distribution of hedge funds ownership is highly skewed, but even for the five cases with the largest hedge fund ownership at the filing for bankruptcy, the average holding at the moment of bankruptcy is 9.8%.[16] Asset management companies hold 6.9% of all claims and are more present across the bankruptcy cases, with holdings in about 65% of the sample firms. Overall, roughly 76% of firms filing for Chapter 11 have an active investor holding some of the claims throughout the bankruptcy process. The within institutional-type concentration of claims ownership, as measured by HHI, indicates that active investors tend to hold more concentrated shares of Chapter 11 claims (average concentration index of 0.76) than most of the other creditors.

Although the share of claims held by active investors, and particularly hedge funds, appears to be modest when a firm files for bankruptcy, these investors have significantly higher involvement at the stage at which claimants vote on the plan of reorganization (t_2). It is important to keep in mind that the distribution of claims ownership at the onset of the case is not directly comparable to the observed distribution at vote tabulation since at t_2 we only observe claims that are eligible to vote (impaired claims

[16] Jiang, Li, and Wang (2010) find that close to 90% of Chapter 11 cases has publicly observable involvement by hedge funds. Two issues could be creating the large discrepancy in observed involvement of hedge-fund investors between their and our study. First, they define hedge fund involvement to include any ownership of equity in the firm prior to the bankruptcy filing and involvement in providing debtor-in-possession (DIP) financing during the case. Second, the Jiang, Li, and Wang (2010) definition of a hedge fund is broader than our own, and likely includes firms that we classify as bank (including proprietary trading desks at large banks), asset management, or private equity affiliated funds.

receiving a distribution greater than zero). So, differences in numbers between t_1 and t_2 could be attributed to differences of ownership distribution in voting classes as compared to non-voting classes, as well as to changes in ownership via claims trading.[17] However, it is clear that trading in bankruptcy plays some role, since 17 more cases (out of 136) have involvement of hedge funds at the voting stage. We examine directly the role of trading on concentration in the next section.

Overall, each type of active investor holds significantly larger shares of the voting claims than claims at the onset of the case, with hedge funds and private equity funds more than doubling their claims ownership to hold 2.3% and 3.5%, respectively, of all claims that are tabulated at t_2. For the five cases with the largest hedge fund ownership, the average share at the time of voting is 33% of all claims. The average holding of all active investors is close to 15% of all claims at tabulation, compared with about 10% of all claims at the filing of the schedules and claim register. However, to the degree that hedge fund investors assert influence over the case, they typically do so using a relatively small share of the overall holdings of Chapter 11 claims.

Panel B of Table II reports the distribution of claims held by each institutional type *within* a claim type, and Panel C reports the distribution of claim-holdings by institutional type *across* claim types. At the time of the schedules and claims register, claims are relatively coarsely divided into secured claims, unsecured claims, and other claims (including priority, employee and tax claims). At the time of the plan vote, we can see greater detail on the types of claims held by each institutional type category. Most of the class names at the second snapshot are self-explanatory, but the class of "General unsecured" claims is a catch-all class that can contain trade claims, unsecured bonds and notes, as well as a variety of other unsecured claims when these claims are not identified separately for purposes of voting.

[17] For example, the average holding of non-financial corporations is 24% at t_1 and 26% at t_2. A direct comparison of these numbers would suggest that corporations slightly increase their holdings in bankruptcy. But such conclusion would be wrong; as we will show, corporations are actually the largest net sellers of claims in bankruptcy. Although claims held by corporations are primarily non-voting (i.e., the value of claims—numerator—does not change much between two points in time), the numbers are not comparable because the denominators for t_1 and t_2 are different.

The results indicate that, at the filing for bankruptcy, all claimants hold the largest proportion of their claims as unsecured claims. Because senior loan claims are often secured with collateral, a substantial proportion of bank holdings are in the form of secured claims. In fact, the majority of secured claims are held by banks (37.5%), followed by non-financial corporations (23.3%). Corporations also hold the largest share of unsecured claims (35.9%). At the plan vote, banks and active investors all hold roughly about the same proportions of their claims as general unsecured claims, loans, and notes, with splits across the three categories of about 45%, 40%, and 10%, respectively. This distribution highlights the fact that banks and active investors have an important presence across a variety of claim categories. In contrast, non-financial corporations hold most of their claims in General unsecured claims—the class that often contains trade and tort claims. Banks are the largest holders of loans (35.2%) and senior notes (40.1%). Active investors together hold a large proportion of loan claims (21.5%) and a non-trivial proportion of the Notes (8.5%) and General unsecured (8.8%) classes. Non-financial corporations hold the largest proportion of general unsecured (40.5%), and trade (58.5%) claims.

Equity is a voting class only when pre-bankruptcy equity holders are allotted some nonzero distribution under the plan of reorganization, i.e. in the cases in which the bankrupt firm remains solvent so that equity holders are in the money. Voting equity claims are held predominantly by non-financial corporations (44.7%). More notable is the finding that active investors shy away from this class, with asset managers holding 4% of the equity claims and hedge and private equity affiliated funds holding zero.

[TABLE II]

One thing that we cannot observe from the claims data is the extent to which claimholders play important roles in the Chapter 11 process outside of acquiring, holding, and voting the claims themselves. One therefore could be concerned that the fate of the Chapter 11 restructuring is swayed by strategic players that are not claimholders and therefore stand outside of our sample. In Table III, we evaluate this statement by looking at the frequency with which investors in our claims data also act as players in relevant financing and control events that occur during the Chapter 11 case, including: providing debtor-

in-possession (DIP) financing at the start of the case, providing debt financing to the firm as it emerges from bankruptcy, providing equity financing (via direct capital injections or through rights offerings) at bankruptcy exit, and acquiring the company via "Section 363 Sales" during the bankruptcy process.

We find that claimant involvement in financing and control events indicates that claimholders are playing an active or strategic role in the bankruptcy, rather than passively awaiting a distribution. Table III reports the frequency of claimholder participation in events at the bankruptcy level, for claimholders observed both at the filing of Schedules (t_1) and at vote tabulation (t_2). The panel shows claimholder involvement in a significant fraction of financing and investment events. Claimants identified at t_1 provide DIP financing in approximately 60% of the cases that use DIP financing and supply exit financing in about half of all cases that provide exit financing, either in the form of debt or equity. By the time plan votes are tabulated at t_2, claimants identified in the tabulation data provide equity financing at exit in 70% of the cases. In contrast, claimholders are not often involved in acquisitions through 363 sales; t_1 claimholders are acquirers in about 12% of all sales, while t_2 investors are involved in about 3% of sales. The low incidence of Chapter 11 acquisitions by claimants shows that investors interested in buying Chapter 11 companies outright do not typically take toehold positions in the claims structure prior to bidding on the firm.

IV. Claims trading during the Chapter 11 restructuring

While changes in holdings between the snapshots at times t_1 and t_2 yield some insight into the trading that occurs during the case, the fact that we only observe the subset of claimants that are eligible to vote at t_2 makes it difficult to attribute observed shifts in the distribution to actual trading-oriented changes in ownership. So, in this section, we directly examine patterns in claims trading using observations of transfers of bilateral claims.

A. Overview of claims trading

Table IV summarizes patterns in claims trading across institutional types. Panel A reports the proportion of total claims traded (value-weighted) that are bought and sold by each institutional type and

the net percentage buys for that group, reported first as a percentage of all buyers and sellers, and then on a mean basis across the sample firms. The final two columns show the proportion of claims purchased by each institutional type when we divide buyers by whether they are existing claimants or new entrants. The first thing to note is that asset management firms and hedge funds, and to a lesser extent private equity affiliated funds, are large net buyers of claims, banks are active on both the buy and sell side of the trading (but are slight net sellers), and non-financial corporations are large net sellers, as are insurance firms (unreported) and custodian banks. (This latter finding is consistent with the fact that among the set of bilateral claims that we observe being traded, many are corporate-held trade claims and insurance claims.) Taken together, active investors generate nearly a third of all claims purchases, sell almost no claims, and are responsible for nearly all net buys. Thus, the results in Panel A are generally supportive of the findings in Table II that active investors take on a much larger role in the capital structure through acquisitions of claims during the case. Also consistent with Table II, the final columns of Panel A show that many active investors use claims trading to enter the capital structure of bankrupt firms. That is, these investors are not necessarily consolidating prior investments in these firms, but instead often become creditors for the first time during the bankruptcy process. In particular, active investors account for 69.4% of all new creditors. Banks, on the other hand, make up 51.9% existing creditors who purchase claims, but only 2.8% of new claimants.[18]

Panel B of Table IV digs down into the types of claims sold during the bankruptcy by focusing on the sales of claims in the 36 bankruptcies administered by BMC Group, which are the observations for which there is an extensive accounting of the Chapter 11 claims from the time they are entered in the Schedules or claims register through to the time of the vote tabulation. This detailed record-keeping allows us to track whether traded claims are eventually allowed to vote on the plan of reorganization.

[18] Table IV also shows that corporations account for 12.9% of new creditors. About 30% of this number is due to three creditors which were classified as corporations by our algorithm: Liquidity Solutions, Newstart Factors, and Stark Event Trading. Liquidity Solutions is a firm that provides a trading platform for distressed debt claims, and is thus not the true end-owner of these claims (but we do not observe who is). The other two firms do not appear in standard data sources (e.g. Capital IQ) nor do they have websites, leaving us with little to no information to determine the nature of their business. `

Panel B shows that claims bought by banks, asset management firms, and hedge funds are concentrated in the classes that eventually vote for the plan. Meanwhile, most of the claims sold by banks are non-voting claims. The Panel C statistics suggest that purchases of Chapter 11 claims by banks, asset management firms, and hedge funds are strategic in the sense that they concentrate on claims that will allow them to influence the voting on the Chapter 11 plan. More generally, we find that a disproportionally large amount of traded claims are for voting purposes. Based on the BMC sample, 29% of all registered claims are eligible to vote (5% weighted by the size of the claim). But among claims that are transferred, 36% are voting claims (16% weighted by size of the claim), showing that voting claims represent a much higher percentage of transferred claims than of registered claims in general. A traded claim is about 38% more likely to be a voting claim by number, and more than two and a half times more likely to be a voting claim when weighted by size.[19]

Panel C of Table IV contains matrices in which each row and column references an institutional type. The top half of Panel C reports the distribution of claims sales from a given institutional type (rows) *to* banks, trustees, non-financial corporations, and active investors. The bottom half of the panel reports the distribution of buys by a given institutional type (rows) *from* banks, trustees, non-financial corporations, and active investors. The general patterns that emerge from Panel C are consistent with the findings in Panel A: (i) much of the selling of claims during Chapter 11 are by banks and non-financial corporations, and (ii) much of the buying of Chapter 11 claims is by banks, asset management companies, and hedge funds.

B. The relation between claims trading and creditor concentration

Gertner and Scharfstein (1991) argue that a major impediment to efficient reorganizations is the inability for dispersed creditors to coordinate bargaining among themselves and with the managers of the bankrupt firm. The underlying assumption is that the ex-ante capital structure of the distressed firm is

[19] $\frac{Pr(\text{Traded}|\text{Voting})}{Pr(\text{Traded}|\text{Non-voting})} = \frac{16\%*(1-5\%)}{(1-16\%)*5\%} = 3.6$.

fixed, thus, coordination within Chapter 11 can improve efficient bargaining. Likewise, Bolton and Scharfstein (1996) argue that complex capital structures can deter efficient ex-post renegotiation of defaulted contracts, which in turn influences the structure of the ex-ante contract and capital structure of the borrowing firm. However, these papers abstract from the possibility that the ownership structure of debt can be changed through claims trading.

We want to test whether trading has an important influence on the concentration of claims ownership at the time of voting on the plan of reorganization, and ultimately, on the outcome of bankruptcy. There is a clear positive relation between trade activity and consolidation of ownership, especially for asset management firms. In particular, we find that the correlation between the share of all voting claims which are traded and creditor concentration (measured by the HHI) at t_2 is 0.4, while the correlation between trading in voting claims and the change in concentration from t_1 to t_2 is 0.3. These relationships are significant at the 5% and 10% levels, respectively. Purchases by asset managers in particular are associated with high levels of creditor concentration at t_2, with a one standard deviation increase in asset manager buys being associated with a 15% increase in creditor concentration from the mean.[20]

However, observed claims transfers could be endogenously related to debt ownership concentration through mechanisms that also affect restructuring outcomes. For instance, trading activity could be higher in cases in which the capital structures are simple, which in turn leads to a quick resolution of bankruptcy. To address this issue, we use two instruments that influence trading activity but are likely to be independent of the expected bankruptcy outcomes: closeness of the bankruptcy filing to the end of the fiscal year, and the share of total claims owned by non-financial corporations.

The first variable picks up the non-linearity of the tax effect of selling a bankruptcy claim at a loss relative to its face value. Several factors are likely to influence the decision of a claimholder to stay in the bankruptcy process, one of which is the ability to offset losses from claim sales against taxable

[20] Based on an unreported regression which controls for basic firm characteristics as well as trading by other institutional types.

income. The present value of such tax deductions should be highest for cases that are filed closest to the end of the claimholder's fiscal or tax year. Because fiscal year-ends occur at the end of the calendar year for many U.S. companies, we expect that more creditors will be willing to sell their claims in cases that file closer to December than earlier in the calendar year. Late year filings allow creditors to maximize the present value of tax-deductible losses on the sale of their claims. Note, however, that the timing of the Chapter 11 filings themselves is unlikely to be influenced by the claimholder's tax considerations; i.e., the timing of the filing is exogenous to the tax benefits from trading. The exogeneity is important because it also disconnects the motive to trade at the end of the year from trading that would be influenced by the complexity of the capital structure or the expected outcome of the restructuring.

To confirm the intuition that the timing of claims trading is uncorrelated with filing frequencies, in Figure 3 we plot the mean and median amount of claims traded as a fraction of all registered claims by the month in which a company files for bankruptcy. The figure also reports the distribution of monthly bankruptcy filings. It is clear that there is a significant increase in trading among the filings that take place at the end of the year. On average, 8.9% and 8.1% of all registered claims are sold for filings that take place in December and November, respectively, compared to 1.9% average for the other months. Yet there is no clear calendar pattern in the number of filings in any given month. In our sample, 12 filings fall in December and 11 filings fall in November compared to an average number of filings in other months of 11.3 (median of 11.5). Thus, to isolate variation in trading that can be attributed to the non-linearity of tax benefits, we use a dummy equal to one if the bankruptcy filing took place in December and 0 otherwise. (Using a dummy equal to one for both November and December renders similar results.)

The second arguably exogenous source of cross-case variation in trading volume comes from the fraction of claims owned by non-financial corporations at the moment of filing for bankruptcy. As pointed out earlier, a large fraction of these claims are likely to be trade claims and there are several reasons to believe that the structure of trade claims is unlikely to be correlated with expected bankruptcy outcomes. In particular, accounts payable are likely to be formed as a result of long term relationships in the supply

chain.[21] (Industry is likely to be important in explaining reliance on trade credit, but we will control for industry effects in the analysis.) The market for trade claims is likely to be highly illiquid and costly to trade in outside of bankruptcy. Indeed, no centralized information source exists on trade claims until the filing of the schedules and the creation of a claims register during bankruptcy.[22] So, even when the bankruptcy is anticipated, it is unlikely that one can change the concentration of trade credit prior to the bankruptcy filing.[23] This stands in contrast to claims held by financial institutions, which are actively traded during bankruptcy, but also likely to be traded prior to the filing in anticipation of the bankruptcy. Also, as documented earlier, trade claims are economically important from a trading perspective because they represent a large part of the filing firms' ownership structure, they tend to be concentrated in unsecured/voting claims, and because corporations are the largest net sellers of claims in bankruptcy. In the Appendix II, we verify that trade claims are more likely to be sold than other types of debt claims in a multivariate setting.[24]

Table V explores the relation between bilateral claims trading and the level of creditor concentration. We include several control variables that we believe are likely to affect expected

[21] Peterson and Rajan (1997) find evidence that firms rely on trade credit when they have limited access to other sources of capital. In particular, growth companies obtain more trade credit. The rationale is that suppliers might be better able to understand firm's future prospects than a bank, and are thus willing to lend to a currently unprofitable company, even when a bank may not be willing to do so. This type of heterogeneity in trade-claim structure would still be exogenous to the anticipated bankruptcy outcomes. Fraction of claims owned by non-financial corporation at the moment of filing for bankruptcy would not be a valid instrument if financial institutions cut firm's access to capital at the first signs of distress while suppliers continue to extend trade credit. This however goes against the intuition in Petersen and Rajan (1997).

[22] According to practitioners, even in bankruptcy, the market for trade claims to sometimes be arcane. For example, it is not uncommon for a buyer to mail checks to potential sellers for the amount of their claims, stipulating that if the check is cashed this represent a legal transfer of claims to the buyer. Large claims and especially claims held by financial institutions are likely to be traded in a centralized way.

[23] A firm can cash its receivables pre-bankruptcy using factoring. However, to avoid adverse selection, factoring requires a sale of a reasonably diversified pool of receivables. I.e., the decision to use factoring affects a large fraction of receivables held by the firms and it is unlikely to be based on the distress of an individual trade partner.

[24] As reported in the Appendix II, we also explore the relation between likelihood of a claim being transacted and the claim's size. Our findings indicate that, compared to medium sized claims, both large and small claims are more likely to be traded in bankruptcy. The economic effect, however, is significantly larger for smaller claims. This is consistent with our prior as we would expect that in these cases costs of waiting until the end of bankruptcy are substantial as compared to the total payoff. Compared to an unconditional probability of a mid-size claims being traded (4.7%), small claims are three times more likely to be to be traded, whereas large claims are nearly two times more likely to be traded.

bankruptcy outcomes; this same set of controls is used throughout the rest of the analysis. The variables include:

- The logarithm of asset size, based on the amounts reported by firms in their original Chapter 11 petitions. (Asset data are available for 133 out of 136 cases.) Our results are also robust to exclusion of largest or smallest firms.
- An indicator variable equal to one if the firm had positive EBITDA prior to filing and zero otherwise. As shown in Table I, only limited information is available for pre-bankruptcy EBITDA. To account for this, we control for the level effect for those firms that have EBITDA data available.
- Dummy variable equal to one when a firm files for bankruptcy during a recession, as defined by the National Bureau of Economic Research (NBER). Controlling for economic downturns is important because the bankruptcy experience is likely vastly different for firms that file during a recession. For instance, the caseload is likely to be much heavier during recessions, giving judges and lawyers less time to devote to each case. Also, negotiations between creditors likely differ because outside options are worse during these times or because it is more difficult to obtain in-bankruptcy financing. It is also possible that firms filing for bankruptcy in a recession are intrinsically different from firms that default in normal times.
- Each regression also includes industry fixed effects, for which we aggregate firms into mining and construction; manufacturing; services; transportation, communication, and utilities; wholesale and retail trade; finance, insurance, and real estate.[25]

[25] We also verify that all of the results reported in this paper—including the effect of trade on ownership and the effect of ownership on the bankruptcy outcomes—are robust to a set of alternative controls and filters (unreported). Specifically we do not find any difference for the cases filed in Delaware and Southern New York as compared to other court districts. We also we do not find that our results are driven by cases filed in 2008 and 2009 or by cases filed after 2005 amendments to the U.S. bankruptcy law. Regarding this last point, some practitioners had argued that 2005 changes might have increased the frequency of prearranged bankruptcies; so, when looking at bankruptcy outcomes we will explicitly control for prearranged bankruptcies;

Table V presents both ordinary least squares (OLS) and two stage least squares (2SLS) estimates of the impact of claims trading on the concentration of creditors. We measure the level of creditor concentration at the time of voter tabulation using a dollar-weighted HHI. Change in creditor concentration is the difference between HHI computed at the voter tabulation (conditional on being in a class that eventually votes) and HHI computed at the time of the schedules and register. The sample is a cross-section of Chapter 11 filings. We observe whether traded claims are eligible to vote only for the BMC cases, hence the sample is significantly reduced when we look at trading only in voting claims. Across the regressions, the results show that there is a positive and significant relation between claims trading and both the level of creditor concentration at the end of the case and the change in creditor concentration over the course of the case. The estimates imply that a one standard deviation increase in voting claims trading results in a 0.45 standard deviation increase in the overall level of creditor concentration, and a 0.41 standard deviation increase in the change in concentration between the register and tabulation. Further, a one standard deviation increase in overall claims trading results in a 0.59 standard deviation increase in the change in concentration between the register and tabulation. The OLS results are economically weaker but are largely consistent with the 2SLS estimates.

Table V also reports results of first-stage instrumental variable regressions for trading activity. The left hand side variable is total traded amount scaled by total claims outstanding. Consistent with our premise, the table shows a positive and significant relation between each of the instrumental variables and trade intensity. Using unadjusted standard errors, the *F*-statistic for joint significance in both samples is in excess of 10 with *p*-values close to zero. Following Stock, Wright, and Yogo (2002), we can rule out weak instruments. Also, and perhaps more convincingly, our results are robust to estimation using limited information maximum likelihood (LIML), which is more robust to weak instruments than two-stage least squares.

[TABLE V]

V. The relation between claims ownership and Chapter 11 outcomes

In this section we move to analyzing the relation between the concentration of creditor ownership on several variables related to the evolution and outcome of the Chapter 11 restructuring. These variables are: (i) a dummy equal to 1 if the bankruptcy filing was prearranged, and zero otherwise; (ii) the number of months the firm remains in bankruptcy; (iii) a set of dummy variables indicating whether a firm exits Chapter 11 through a traditional reorganization, via a 363 sale to a strategic or financial buyer, or through a piecemeal liquidation; and (iv) the overall recovery rate. As mentioned earlier, the recovery rates are calculated based either on forward-looking estimates of enterprise value for the exiting firms in the case of reorganizations, or total cash proceeds collected from a sale in the case of 363 sale or liquidation. Panel A of Table VI reports regressions using the concentration of claims ownership at the filing of the Schedules of Assets and Liabilities near the outset of the Chapter 11 restructuring (t_1), while Panels B and C (OLS and 2SLS results) use the concentration of ownership at the tabulation of votes for the Plan of reorganization (t_2). The results are a cross-sectional comparison of firms; the number of sample firms in the regressions is slightly reduced from 136 cases because of missing outcome data for some cases. Panel A shows that the pre-bankruptcy concentration of creditors—as proxied by the concentration of claims ownership at the time of the schedules and claims register—is an important determinant of observing a prearranged bankruptcy. A one standard deviation increase in concentration (0.21) increases the likelihood of observing prearranged bankruptcy by 9.8 percentage points, an over fifty percent increase, compared to the unconditional probability of 18%. Perhaps not surprisingly, the work-out time for prearranged filings is nearly 8 months, or more than half the time, shorter than in non-prearranged bankruptcies.

Because a prearranged bankruptcy is an event that occurs near t_1, it is only included in Panel A. However, in unreported results we confirm that concentration of ownership at vote tabulation is not associated with the likelihood of observing a prearranged bankruptcy. This finding has interesting implications because it shows that it is the concentration in the "tails" of the capital structure—the most senior creditors are often unimpaired and the most junior creditors are often out-of-the money and receive

zero distribution—that is important to determining whether a prearranged filing occurs, even though the "tail" creditors are likely to have less influence on the restructuring at the time of the vote on the reorganization. In other words, concentration at the most senior and junior credit classes improves the likelihood of observing a filing in which much of the restructuring details have been fleshed out prior to the court filing.

Although ownership concentration at the time of filing for Chapter 11 does not appear to have impact on the type of the outcome or recovery rate, that is not the case for the ownership concentration at the time of voting on the plan. Consistent with the idea formulated by Bolton and Scharfstein (1996) that a higher concentration of creditors in the capital structure lowers coordination costs, we find in Panel B of Table VI that a higher concentration among claimants eligible to vote reduces the time the firm spends in bankruptcy, independent of the prearranged filings effect. A one standard deviation increase in the concentration of voting claimants reduces the time in bankruptcy by roughly one month, a 7.1% reduction from the mean stay in bankruptcy of 14 months. In addition to reducing the amount of time spent in bankruptcy, concentration of voting claimants also appears to be related to the decision between liquidating the bankrupt firm or selling it wholesale to a financial or strategic buyer. We estimate that a debtor with a one-standard-deviation higher level of creditor concentration among voting claimants is 7.3 percentage points more likely to be sold than the average debtor.

In Panel C of Table VI we use the methodology outlined earlier to instrument trading intensity of voting claims, which we then use to proxy for the concentration of ownership at time t_2. As described earlier, claims trading in bankruptcy both consolidates claim ownership and allows new investors to enter the capital structure of the debtor. As the set of creditors and their relative bargaining power change as a result of this trading, the final outcome of the bankruptcy could change. Throughout, we control for the initial (t_1) claims concentration in order to focus on the effect of claims trading alone. Using this methodology, a one standard deviation increase in trading activity decreases the probability of being liquidated by 9.7 percentage points, a 30.8% decline from the unconditional likelihood of liquidation. The effect of concentration on the probability of a sale to a strategic or financial buyer is no longer statistically

significant, but it is of a similar economic magnitude: a one standard deviation increase in trading activity results in a 6.7 percentage point increase in the likelihood of a sale.

Concentration of claimants at t_2 also matters for overall recovery rates. Surprisingly, the effect of concentration among voting creditors on the overall firm value is negative and statistically significant. This result is robust to the instrumental variable approach reported in Table VI, Panel C. To the extent that our instruments are exogenous to recovery rates, the results suggests that claims trading, and subsequent increases in creditor concentration, lead to lower creditor recovery rates. At a first glance, this finding is surprising given that higher levels of concentration should lower ex-post costs of coordination, which should in turn, lead to higher recovery rates. However, what this seems to amount to is that investors in concentrated voting classes bargain in a way that leads to private benefits for their voting class, while lowering the overall valuations of the restructured firm at exit.

[TABLE VI]

We consider several alternative explanations for the finding that higher creditor concentration results in lower overall recoveries. Specifically, we look at whether claims traders concentrate their holdings in firms that are more severely distressed with low expected recoveries. One rationale for sophisticated investors to focus on such companies would be that deep-discounted debt claims have more upside potential. If this were the case, then the low expected recovery rates we observe could merely reflect lower ex-ante values, and the recovery rates in firms with high levels of concentration could actually be large relative to their pre-filing values. However, the results using the instrumented claims trading amount should not be susceptible to this form of endogeneity. Also, when we control for pre-filing estimated recoveries using observable bond prices of bankrupt firms, our result persists.

We also consider whether more concentrated senior creditors push for quick but not necessarily overall efficient outcomes at the expense of disperse junior creditors. We find that senior and secured voting classes are only slightly more concentrated than unsecured, junior classes; the difference is not statistically significant. Moreover, when we control for the concentration of senior creditors in our

regressions, the variable has no impact on the original result, suggesting that concentrated senior creditors do not explain the lower recovery rates.

Finally, we examine whether the low recovery rates can be explained by the high concentration of holdings in claims in the fulcrum class, the class of claims that receive the bulk of new equity in restructured firms. Investors in the fulcrum class may have incentives to accept a recovery rate that undervalues their position if in return they obtain larger amounts of new equity in the restructured firm. More broadly, Gilson, Hotchkiss, and Ruback (2000) show that senior creditors have a bias towards lower valuations in restructurings, because the lower valuation "squeezes out" more junior claimants, rendering a larger claim for senior creditors in the restructured firm. In particular, investors in the fulcrum class may have incentives to accept a lower *estimated* recovery rate if in return they obtain larger amounts of new equity in the restructured firm. (Note that the value of claims is fixed, so understated recovery rates would lead to larger allocations toward more senior classes.) However, when we add the concentration within the fulcrum class of securities to our regressions, the large negative relation between claims concentration and overall recovery rate persists.

Our results suggest that bargaining by the concentrated voting classes reduces overall valuations of the restructured firm. However, it might be the case that concentration of individual classes renders higher recovery rates to that specific class. In other words, concentrated creditors could bargain to gain a larger piece of a smaller pie, thereby benefiting themselves but reducing overall value.

To examine more closely the extent to which concentration influences strategic plays on the valuation of the firm, and therefore expected recovery rates, in Table VII we explore recovery rates disaggregated at the voting-class level. Put differently, we measure the relation between recovery rates received by an individual voting creditor class and the concentration of ownership within the class. All the regressions are value-weighted by class so that small classes do not have a large bearing on the results. We use two alternative ways of computing weights. First we weight each class total value of claims divided by overall value of voting claims. However, using only voting claims as a denominator could miss claims that do not vote on the plan, but nonetheless could be large and have influence on the

outcomes of negotiations. Thus, we also report the results using each class total value scaled by total assets (a proxy for the total firm value). Because recovery rates generally follow absolute priority, it is important to control for the relative seniority of each voting class. We do so by including a dummy for administrative and priority claims (most senior voting class) and secured classes. We also include a dummy for fulcrum class (class that receives the controlling equity stake of the firm), as this class typically has special importance in negotiations.[26] We use the disclosure statement filed with the bankruptcy court to collect information on the expected recovery rate, relative seniority, and type of distribution received (cash, new debt, or new equity) for each class. This enables us to identify the so-called "fulcrum" classes—the class receiving the majority of new equity in the reorganized firm.

Results in Table VII indicate that higher concentration within a voting class has a *positive* impact on a class-level recovery rates. The impact is economically meaningful: a one standard deviation increase in voting class concentration increases class-level recovery rates by 13 percentage points. Consistent with absolute priority, administrative and priority class receives the highest recovery rate, with secured classes being next in line. We are specifically interested in understanding the role of high concentration of holdings in claims in the fulcrum class. Because investors in the fulcrum security become the new owners of a reorganizing firm upon exit, strategic plays for the fulcrum class has important implications for the outcome of the reorganization. Consistent with the idea that fulcrum class owners push for lower recovery rates in order to squeeze out more junior classes, we find that more concentrated fulcrum classes receive significantly lower assessed recovery rates. Increasing the concentration of the fulcrum class by one standard deviation decreases recovery rates by 20.1 percentage points on net, a 36.4% reduction from the mean recovery received by fulcrum classes. This is consistent with Gilson, Hotchkiss, and Ruback (2000); however concentration of the fulcrum class does not explain the overall negative relation between creditor concentration and the total recovery rate.

[26] The identity of the fulcrum class depends on the overall valuation of the firm relative to the total value of outstanding claims. Thus, the fulcrum dummy does not identify seniority in any way, as in some cases senior secured claimants constitute the fulcrum class, while in others it could be the original equity holders.

[TABLE VII]

In Table VIII we extend our results by focusing on the institutional type of the creditors. We include only one institutional type at a time in the regression and for compactness of presentation only report coefficients of interest, so, for example, in Panel A, each reported estimate corresponds to a different regression. In Panel A, the explanatory variable of interest is the percentage share of total claims held by a given institutional type. In Panel B, in addition to the share of claims we look at the concentration of the holdings *within* an institutional type grouping using the HHI. If for a given bankruptcy an institutional type is missing, HHI is not well defined (i.e., unlike share, it cannot be set to zero); as a result, the number of observations in Panel B drops. Results in Panel A and B also can be thought of as extensive and intensive margins of concentration, measuring the influence of concentration across a group of investors within a given institutional type versus concentration of particular investor holdings within a type.

Panel A in Table VIII indicates that the share of active investors at the beginning of the case, and in particular the share of hedge funds holdings has a positive and significant impact on the likelihood of observing a prearranged bankruptcy. To a lesser degree, the share held by banks also has a positive impact on the likelihood of observing a prearranged bankruptcy. From Table II Panel C, we know that almost all hedge fund holdings and over fifty percent of the claims handled by banks are concentrated in unsecured claims. This suggests that the presence of a large junior class dominated by hedge funds is important for the prearranged bankruptcy. The concentration of ownership within the hedge fund group, however, does not have an impact on likelihood of observing a prearranged filing. This is consistent with anecdotal evidence on coordination among multiple hedge funds investing in distressed firms.[27] When the share of claims holdings by hedge funds is large, concentration of ownership within hedge funds

[27] For example see Ivashina and Scharfstein ("Restructuring CIT Group" Harvard Business School Case), who show that in the CIT restructuring, coordination among a group of six hedge funds holding strategic junior positions in the capital structure (i.e., low concentration within hedge fund holdings) was the determinant force behind forming pre-prearranged bankruptcy plan.

decreases the likelihood of a liquidation and increases the likelihood of a sale. For example, for a firm at the 90th percentile of hedge fund claims ownership (2.3%), a one standard deviation increase in the concentration of hedge fund ownership results in a 9.5 percentage point decrease in the likelihood of liquidation, and a 4.4 percentage point increase in the likelihood of a sale.

It does not appear, however, that active investors (taken together or individually) are the driving force behind lower recovery rates. If anything, Table VIII indicates that a large share of bank claimants at both t_1 and t_2 leads to lower recovery rates. A one standard deviation increase in the share of bank claim ownership is associated with a 9.2 percentage point reduction in firm-level recovery rates using estimates from t_1, or a 7.3 percentage point reduction in recovery rates using t_2 estimates.

A large presence of non-financial creditors is associated with a decreased likelihood of a prearranged bankruptcy and with longer stays in bankruptcy. Non-financial creditors are relatively dispersed and are also likely to be both less financially sophisticated and less active in the bankruptcy process. Because of this, negotiation with this group is likely to be difficult, making pre-bankruptcy deals less likely and the duration of the bankruptcy process longer. The economic magnitude of these effects is large: a one standard deviation increase in the share of non-financial creditors is associated with a 10.8 percentage point reduction in the probability of a prearranged bankruptcy and an extra 1.3 months in Chapter 11. Results in Panel B suggest that these effects are mostly driven by the extensive margin: higher concentration within the non-financial creditors has relatively small effects on the likelihood of a prearranged bankruptcy and the length of time in bankruptcy.

[TABLE VIII]

VI. Conclusions

This paper answers three questions: What is the ownership structure of bankrupt debt claims? How does the ownership evolve though bankruptcy? And how does ownership influence the Chapter 11 outcomes?

To conduct this study we put together a comprehensive dataset covering *all* creditors holding Chapter 11 claims for 136 U.S. bankruptcies between 1998 and 2009. The data tracks creditors through two snapshots taken at the filing of the debtor's Schedule of Assets and Liabilities and the tabulation of votes on the debtor's Plan of reorganization. Overall, we cover claims filed by 71,358 different investors which we categorize according to their institutional type. For a large subset of bankruptcy claims, we also observe trades in bilateral claims during the Chapter 11. This enables us to document several novel facts as well as establish a link between bankruptcy outcomes and ownership structure, by exploring the role of trading in bankruptcy. This is the first paper to document the role of different institutional types in trading in bankruptcy as well as trading impact on bankruptcy outcomes.

We find that, at the onset of bankruptcy, active investors—asset management firms, hedge funds, and private equity affiliated funds—own a relatively small portion of the debt claims of a bankrupt firm as compared to banks and non-financial corporations. Yet, by the time that claimants vote on the Plan of reorganization, active investors (by far, the largest net buyers of claims in bankruptcy) more than double their representation in the firm's capital structure. Furthermore, in bankruptcy, active investors primarily acquire voting claims. Purchasing trade claims in bankruptcy is an important vehicle for the entry of new creditors in bankruptcy, most of which are active investors.

We establish that trading in bankruptcy has a significant impact on the increases in concentration of claim ownership at the time of the vote on the plan of reorganization. This is an important point as it affects our understanding of negotiations that follow default, which in the existing literature is treated as static. We use exogenous variation in trading in bankruptcy coming from discontinuity in taxes and trade claim structure to assure that the relation is indeed causal. Finally, using trade as an important source of variation in ownership, we find that the concentration of voting creditors across the capital structure reduces the speed of restructuring, increases the probability of liquidation, increases class-level recovery rates and decreases overall recovery rates.

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FIGURE 3
CLAIM TRADING BY MONTH

The figure shows mean and median of share of claims traded in bankruptcy for all firms that file in a given month. The bars correspond to number of filings in a given month.

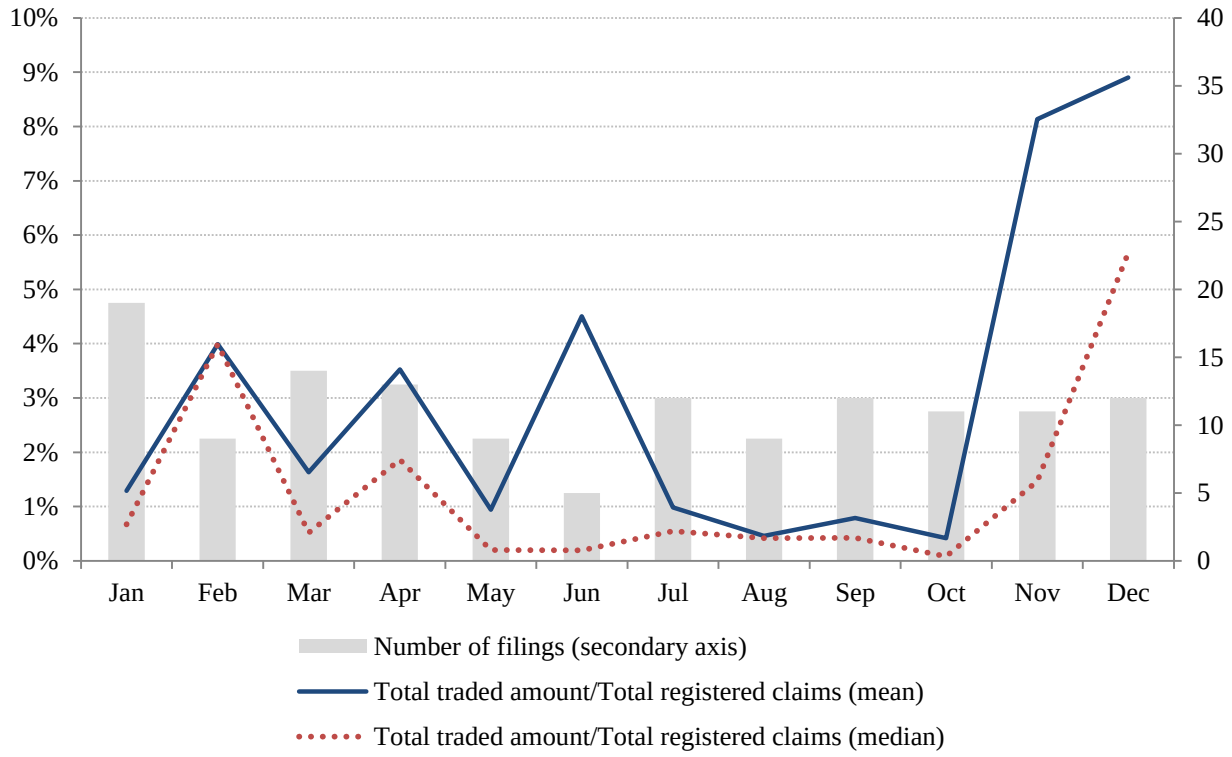

TABLE I

DESCRIPTION OF FIRMS FILING FOR CHAPTER 11 BANKRUPTCY

This table summarizes the characteristics of the 136 firms in our sample that file for Chapter 11 bankruptcy protection. Panel A reports summary statistics on filing, evolution, and outcome of the bankruptcies, based on data collected from the *Deal Pipeline* and Chapter 11 disclosure statements. Panel B reports financial characteristics of the sample firms prior to filing for bankruptcy, based on data collected from *Deal Pipeline*, Capital IQ, SDC, and Compustat.

Panel A: Bankruptcy characteristics (136 filings)

Filing year	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Obs.	1	1	8	13	17	10	16	19	12	32	7
	0.7%	0.7%	5.9%	9.6%	12.5%	7.4%	11.8%	14.0%	8.8%	23.5%	5.1%

Filing court	% Obs.	Filing type	% Obs.
Delaware	40.4%	Non-specific Ch. 11	78.4%
Southern District NY	22.1%	Prearranged Ch. 11	18.7%
Other	37.5%	Tort-related Ch. 11	3.0%

	Median	Mean	Std Dev
Time in bankruptcy (days)	377	439.5	309.0
Overall recovery rate			
Value at exit/Liabilities at filing	50.8%	54.0%	51.1%
Weighted average claim recoveries	51.9%	52.9%	31.1%

Restructuring outcome:		Claimant group with controlling equity interest at exit, the fulcrum class (reorganizations only):	
Reorganized	45.2%	DIP Lenders	8.6%
Sold to a financial buyer	9.7%	Prepetition Lenders	29.3%
Sold to a strategic buyer	12.7%	Notes/Bondholders	24.1%
Liquidated piecemeal	32.1%	General Unsecured	19.0%
Identity of owner at exit:		Subordinated Debt	3.5%
Financial	64.8%	Equity	15.5%
Strategic	35.2%		

Panel B: Pre-bankruptcy firm characteristics

	Source	Obs.	Mean	Std. Dev.	Median
Total assets (million $US)	Deal Pipeline	133	$1,915.2	$4,844.7	$250.4
Revenue (million $US)	Compustat	64	$3,858.7	$13,018.4	$705.2
Employees	SDC	71	6,731	11,780	1,994
Cash (million $US)	Capital IQ	66	$233.1	$574.4	$27.5
Pre-bankruptcy EBITDA (million $US)	Deal Pipeline	59	$170.4	$615.9	$20.7
Total liabilities (million $US)	Deal Pipeline	133	$1,805.4	$4,299.6	$372.1
Total liabilities/Total assets	Deal Pipeline	132	3.52	18.2	1.07
Total liabilities/Total assets (no outliers)	Deal Pipeline	130	1.52	1.49	1.06
Total debt (million $US)	Capital IQ	66	$1,895.1	$3,686.6	$393.4
% Bank debt	Capital IQ	51	46.54%	31.27%	39.91%
% Secured debt	Capital IQ	55	59.16%	37.89%	59.05%
% Long term debt	Capital IQ	51	66.38%	35.42%	84.13%

TABLE II
DISTRIBUTION OF CLAIM OWNERSHIP BY INSTITUTIONAL TYPE

This table reports the distribution of Chapter 11 claim ownership sorted by the institutional type of the claimholder at two points in time: The filing of the Schedule of Assets and Liabilities (t_1) and at the tabulation of votes on a Plan of Reorganization (t_2). We measure institutional type at the parent level. All numbers are value-weighted. The level of creditor concentration is measured using a dollar-weighted Herfindahl-Hirschman index, with a maximum of one. Panel A reports the distribution of ownership across the sample of 136 debtor firms, where absent institutional type receives a zero weight in the calculation. Panel B shows how ownership by different institutional types varies *within* a given type of credit claim (secured, unsecured, etc.). Panel C reports how ownership by a given institutional type is distributed *across* identified types of credit in the capital structure.

Panel A: General distribution by institutional type

	At filing of Schedule of Assets and Liabilities (t_1), all creditors						At votes tabulation (t_2), voting creditors only					
Creditor institutional type:	Cases involving ownership of given institutional type (%)	Mean (%)	Std. Dev. (%)	Median (%)	95th %	Concentration (0 to 1)	Cases involving ownership of given institutional type (%)	Mean (%)	Std. Dev. (%)	Median (%)	95th %	Concentration (0 to 1)
Banks	88.72	22.08	24.91	13.71	76.50	0.67	72.41	21.70	27.29	10.73	82.86	0.56
Trustees (bonds)	44.36	11.85	21.86	0.00	62.57	0.83	34.48	4.22	12.34	0.00	28.09	0.83
Corporations	96.99	23.83	23.16	16.71	74.18	0.27	95.69	26.06	26.02	19.99	90.56	0.43
Active investors:	76.22	9.68	21.14	0.45	69.32		76.72	14.94	23.43	2.82	81.21	
Asset managers	64.66	6.93	17.84	0.13	47.00	0.71	62.93	9.10	17.66	0.86	47.65	0.66
Hedge funds	26.32	0.43	2.28	0.00	1.69	0.75	38.79	2.31	9.08	0.00	11.19	0.75
PE-affiliated funds	28.57	2.36	12.16	0.00	9.72	0.83	30.17	3.52	14.06	0.00	24.53	0.88
Sub-total:	--	67.48	--	--	--	--	--	66.91	--	--	--	--
	The following investor categories are dropped from the later tables; complete set of descriptive tables is available on-line.											
Other financial creditors:												
Insurance	63.91	1.93	8.72	0.04	5.64	0.73	34.48	1.89	7.87	0.00	10.87	0.75
Real estate	54.14	0.86	2.60	0.00	5.31	0.62	25.86	0.80	2.95	0.00	5.27	0.78
Other financial	42.11	1.54	6.24	0.00	8.59	0.75	22.41	1.78	10.07	0.00	5.70	0.91
Potentially financial	94.74	3.56	6.89	1.09	16.57	0.32	87.07	7.52	11.58	1.91	32.29	0.46
Other non-financial creditors:												
Government	87.22	5.52	11.26	1.43	18.98	0.54	39.66	4.36	14.81	0.00	39.24	0.80
Person	93.23	11.41	18.75	3.48	60.24	0.32	82.76	12.19	22.46	2.39	73.52	0.44
Intra-company	33.08	4.14	9.85	0.00	23.26	0.79	11.21	2.19	9.82	0.00	20.04	0.80
Unknown	89.47	3.57	8.35	0.55	24.03	0.47	65.52	2.36	6.41	0.09	12.33	0.59
Total:	--	100	--	--	--	--	--	100	--	--	--	--

TABLE II – *continued*

Panel B: Distribution of creditors within credit class

Creditor institutional type:	At filing of Schedule of Assets and Liabilities (t_1), all creditors				At votes tabulation (t_2), voting creditors only								
	Secured	Unsecured	Other	Total:	General unsecured	Loans	Notes	Employee/ Pension	Tort	Trade claims	Equity	Other	Total:
Banks	37.52	8.84	3.96	--	13.70	35.22	40.10	0.00	0.00	15.37	13.45	4.55	--
Trustees (bonds)	6.80	9.56	2.26	--	2.07	1.06	7.66	0.00	3.40	0.03	10.86	0.00	--
Corporations	23.34	35.92	22.31	--	40.49	18.88	15.31	4.92	32.01	58.47	44.74	18.17	--
Active investors:													
Asset managers	3.71	4.69	2.43	--	5.79	13.00	3.77	12.50	0.22	0.28	4.08	0.00	--
Hedge funds	1.61	1.21	0.35	--	1.10	3.71	1.29	0.00	0.00	1.73	0.00	1.58	--
PE-affiliated funds	0.63	0.40	0.11	--	1.89	4.76	3.44	0.00	0.00	0.00	0.00	2.57	--
Total:	73.61	60.62	31.42		65.04	76.63	71.57	17.42	35.63	75.88	73.13	26.87	

Panel C: Creditors' ownership by credit class

Banks	44.14	52.38	3.49	100	42.33	39.12	15.67	0.00	0.00	0.61	1.07	1.19	100
Trustees (bonds)	20.63	73.22	6.16	100	38.43	29.62	24.26	0.00	2.50	2.50	2.69	0.00	100
Corporations	10.53	83.75	5.71	100	68.43	13.56	8.21	0.67	3.88	3.35	1.67	0.24	100
Active investors:													
Asset managers	18.71	75.84	5.45	100	47.36	37.55	9.86	1.37	1.37	0.62	1.87	0.00	100
Hedge funds	9.06	90.35	0.59	100	45.12	41.22	10.75	0.00	0.00	2.25	0.00	0.66	100
PE-affiliated funds	11.99	82.13	5.88	100	56.34	37.17	2.86	0.00	0.00	2.86	0.00	0.78	100

TABLE III

LINKS BETWEEN CLAIMHOLDERS AND CHAPTER 11 FINANCING AND CONTROL EVENTS

This table reports the frequency of claimholders' participation in strategic events. We record the identities and holdings of Chapter 11 claimholders at two points in time: the filing of the Schedule of Assets and Liabilities (t_1), and the tabulation of votes on the Plan of reorganization (t_2). Note that we observe at t_2 only those claimholders that are eligible to vote, which is a subset of the claimants observed at t_1. Financing events include debtor-in-possession (DIP) financing, new debt and equity financing at bankruptcy exit. Control events include acquisitions via "Section 363 Sales," and ownership of controlling equity interests at bankruptcy exit.

Event:	Total number of events	Proportion of events including a claimant	
		At filing of Schedule of Assets and Liabilities (t_1), all creditors	At votes tabulation (t_2), voting creditors only
DIP loan	95	58.9%	34.7%
Exit financing (debt)	37	51.4%	45.9%
Exit financing (equity)	10	50.0%	70.0%
Acquirer in 363 Sale	34	11.8%	2.9%

TABLE IV
ANALYSIS OF CLAIMS TRADING IN BANKRUPTCY

The focus of this table is on the transfer of bilateral creditor claims observed *after* the bankruptcy filing but before the voting on the Plan of reorganization. In Panel A, the first three columns report the institutional type of buyers and sellers as a percentage of all transfers (value-weighted). To compute these numbers we condition the sample on those cases in which we have record of at least one transfer. In the "who sells" and "who buys" analysis, the mean corresponds to the unconditional mean, that is, we use zeros if there is no sell or buy information for a given type. For example, if in the typical case $100 of claims were traded, we would expect $9.34 of those to be sold by banks, and $60.64 sold by corporations. Conditional means (conditional on a given institutional type engaging in trading) can be easily computed using percentage of cases with seller/buyer of a given type. Panel B separates trades by institutional types into claims that are eventually used to vote on a plan, and those claims that are non-voting. This panel uses a subset of 36 bankruptcies for which we observe trading and can unambiguously link claims between the register and voting tabulations. Panel C is set up as a matrix in which each row and column references an institutional type. The top half of Panel C reports the distribution of claims sales from a given institutional type to other institutional types, while the bottom half reports the distribution of buys by a given institutional type from other institutional types. All figures are value-weighted.

Panel A: Claims trading by institutional type

Creditor institutional type:	% of all sellers	% of all buyers	% of all net buyers	Who sells:			Who buys:			% purchased by *existing* creditors of type	% purchased by *new* creditors of type
				% of cases with seller of type	Mean (%)	Std.Dev. (%)	% of cases with buyer of type	Mean (%)	Std.Dev. (%)		
Banks	42.80	40.48	-2.32	25.35	9.34	24.91	21.13	8.86	25.37	51.93	2.78
Trustees (bonds)	7.22	1.79	-5.43	4.23	0.94	7.41	8.45	2.23	10.95	1.58	3.01
Corporations	33.86	6.47	-27.38	85.92	60.64	38.58	52.11	15.39	29.62	5.18	12.86
Active investors:											
Asset managers	1.04	17.28	16.24	14.08	3.07	16.52	39.44	13.01	27.93	8.92	54.18
Hedge funds	0.19	14.72	14.53	11.27	0.87	4.95	56.34	25.84	33.09	5.62	2.05
PE-affiliated funds	0.00	4.70	4.70	0.00	0.00	0.00	36.62	13.44	27.70	15.84	13.19
Total:	85.11	85.44	0.34	--	74.86	--	--	78.77	--	89.07	88.07

Panel B: Claims trading by class (BMC cases only)

Creditor institutional type:	Non-voting claims:			Voting claims:		
	% of all sellers	% of all buyers	% of all net buyers	% of all sellers	% of all buyers	% of all net buyers
Banks	7.75	9.51	1.76	0.00	19.14	19.14
Trustees (bonds)	0.97	0.78	-0.18	0.00	0.00	0.00
Corporations	66.87	10.19	-56.68	70.80	1.35	-69.45
Active investors:						
Asset managers	0.47	26.62	26.15	0.00	29.89	29.89
Hedge funds	0.18	26.92	26.74	0.33	39.13	38.80
PE-affiliated funds	0.00	0.45	0.45	0.00	0.33	0.33
Total:	76.24	74.47	-1.76	71.13	89.84	18.71

TABLE IV– *continued*

Panel C: Claims trading between institutions

	Banks	Trustees (bonds)	Corporations	Active investors:		
				Asset managers	Hedge funds	PE funds
	From whom do institutions buy their claims?					
Sellers:						
Banks	51.42	10.05	57.11	37.74	34.5	74.9
Trustees (bonds)	1.51	34.4	1.15	16.57	12.64	5.92
Corporations	21.02	40.63	36.2	37.81	47.35	16.16
Active investors:						
Asset managers	1.75	1.41	1.87	0.11	0.37	0.04
Hedge funds	0.1	0	0.09	0.13	0.11	0
PE-affiliated funds	0	0	0	0	0	0
Other creditors:						
Insurance	19.06	0	0	4.32	1.51	0.01
Real estate	0.02	0.15	0.24	0.43	0.4	0.09
Other financial	0.1	0	0.07	0	0.19	0
Potentially financial	1.12	13.37	1.44	0.99	1.16	0.2
Government	0.23	0	0.64	0.25	0.04	0.01
Person	3.49	0	0.85	1.04	1.47	2.61
Intra-company	0	0	0	0	0	0
Unknown	0.17	0	0.33	0.6	0.25	0.07
Total:	100	100	100	100	100	100
	To whom do institutions sell their claims?					
Buyers:						
Banks	48.63	8.51	25.13	67.72	22.47	0
Trustees (bonds)	0.42	8.56	2.15	2.42	0	0
Corporations	8.62	1.03	6.91	11.56	3.27	0
Active investors:						
Asset managers	15.24	39.74	19.3	1.82	12.56	0
Hedge funds	11.87	25.81	20.59	5.28	9.01	0
PE-affiliated funds	8.26	3.88	2.25	0.17	0	0
Insurance	0	7.24	0.11	0	0	0
Real estate	0	0	0.08	0	0	0
Other financial	0.62	0	0.59	10.97	3.17	0
Potentially financial	0.12	3.17	1.87	0.07	4.62	0
Government	0	1.03	0	0	0	0
Person	0.01	1.03	0.49	0	0	0
Intra-company	2.63	0	14.26	0	0	0
Unknown	3.58	0	6.26	0	44.91	0
Total:	100	100	100	100	100	100

TABLE V

THE EFFECT OF CLAIMS TRADING ON CREDITOR CONCENTRATION

This table explores the relation between trading of claims in bankruptcy and changes in the level of creditor concentration during a Chapter 11 case. Panel A presents regular OLS and 2SLS estimates of the impact of claims trading on the concentration of creditors. Panel B presents results of the corresponding first stage regressions. Total amount traded in bankruptcy scaled by total amount of claims outstanding at register is instrumented using two variables: *Filed in December*, a dummy equal to 1 if the filing took place in the month of December and 0 otherwise, and *Share of claims owned by corporation*. In Panel A, we measure the level of creditor concentration at the time of voter tabulation using a dollar-weighted Herfindahl-Hirschman index (HHI), with a maximum of one. Change in creditor concentration is the difference between HHI computed at the voter tabulation and HHI computed at the filing of the Schedule of Assets and Liabilities and Register. We can only observe if a traded claim are voting claims for a subset of 36 cases. Assets are measured in millions and were compiled from each firms' Chapter 11 petition. Positive EBITDA is a dummy variable indicating if the firm had positive EBITDA prior to filing. Only limited information is available for pre-bankruptcy EBITDA. To account for this, we control for the level effect for those firms that have EBITDA data available. Economic recession is a dummy equal to 1 if the firm files for bankruptcy during a recession period, as defined by National Bureau of Economic Research. All models are estimated using linear least squares. Standard errors are clustered by industry and reported in parenthesis. ***, ** and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Panel A: Claims trading by class

	Creditor concentration at voting tabulation (t_2)		Change in creditor concentration ($t_2 - t_1$)			
	OLS	2SLS	OLS	2SLS	OLS	2SLS
Total traded amount/Total claims:						
Voting claims	1.597***	2.230***	1.296***	1.849***	--	--
	(0.362)	(0.691)	(0.269)	(0.531)		
All claims	--	--	--	--	0.492*	3.139*
					(0.280)	(1.648)
Ln(Assets)	-0.013	-0.007	-0.003	0.002	-0.037***	-0.040***
	(0.025)	(0.022)	(0.015)	(0.014)	(0.013)	(0.014)
EBITDA data available	0.327	0.348**	0.567***	0.586***	0.269**	0.301**
	(0.198)	(0.169)	(0.185)	(0.159)	(0.108)	(0.127)
Positive EBITDA	-0.430**	-0.450**	-0.627***	-0.645***	-0.185*	-0.175
	(0.207)	(0.178)	(0.195)	(0.168)	(0.110)	(0.123)
Economic recession	0.043	0.051	0.095	0.102	-0.190**	-0.148*
	(0.087)	(0.071)	(0.077)	(0.064)	(0.073)	(0.077)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	36	36	36	36	98	98

TABLE V – *continued*

Panel B: First stage (for 2SLS)

Dependent variable:	Total traded amount/Total claims amount:	
	Voting claims	All claims
Instruments:		
Filed in December	0.169**	0.047
	(0.081)	(0.053)
Share of claims owned by corporation	0.039	0.082**
	(0.028)	(0.035)
Ln(Assets)	-0.005	0.004
	(0.004)	(0.003)
EBITDA data available	-0.026	-0.011
	(0.016)	(0.021)
Positive EBITDA	0.016	-0.001
	(0.012)	(0.019)
Economic recession	0.010	-0.009
	(0.023)	(0.012)
Industry fixed effects	Yes	Yes
F-stat (robust standard errors)	3.37	3.02
p-value	(0.051)	(0.054)
F-stat (non-robust standard errors)	21.91	10.23
p-value	(0.000)	(0.000)
Observations	36	98
R-squared	0.69	0.28

TABLE VI
CREDITOR CONCENTRATION AND BANKRUPTCY OUTCOME

This table examines the relation between the concentration of creditors in a bankrupt firm and variables measuring the outcome of the bankruptcy. Concentration is measured as the dollar-weighted Herfindahl-Hirschman index of shares held by creditor claimants. Panel A measures creditor concentration following the onset of bankruptcy, based on holdings reported in the Ch. 11 Schedule of Assets and Liabilities and follow-on credit register (t_1). Panel B calculates creditor concentration based on holdings of impaired creditors that vote on the bankrupt firms' Plan of Reorganization (t_2). Panel C presents instrumental variables estimates of the impact of claims trading on various bankruptcy outcomes; the concentration of ownership at time t_2 is proxied by trading intensity; as established earlier, higher trading leads to higher ownership concentration. Also, trading intensity used in Panel C has been instrumented using methodology outlined in Table V. Assets are measured in millions and were compiled from each firms' Chapter 11 petition. Positive EBITDA is a dummy variable indicating if the firm had positive EBITDA prior to filing. Only limited information is available for pre-bankruptcy EBITDA. To account for this, we control for the level effect for those firms that have EBITDA data available. Economic recession is a dummy equal to 1 if the firm files for bankruptcy during a recession period, as defined by National Bureau of Economic Research. All models are estimated using linear least squares. Standard errors are clustered by industry and reported in parenthesis. ***, ** and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Panel A: Creditor concentration at filing of Schedule of Assets and Liabilities (t_1), all creditors

Dependent variable:	Prearranged bankruptcy	Time in bankruptcy (months)	Outcome:			Recovery rate
			Reorganization	Sale	Liquidation	
Creditor concentration	0.467*	-3.550	0.182	0.025	-0.170	-0.337
	(0.228)	(3.272)	(0.151)	(0.177)	(0.219)	(0.187)
Prearranged bankruptcy	--	-8.036***	0.151	0.147	-0.284***	0.017
		(1.036)	(0.076)	(0.084)	(0.055)	(0.064)
Ln(Assets)	-0.001	0.986***	0.068**	-0.031	-0.031	-0.037
	(0.018)	(0.231)	(0.019)	(0.020)	(0.026)	(0.023)
EBITDA data available	0.029	-2.584	-0.181	0.083	0.101	-0.111*
	(0.068)	(1.890)	(0.095)	(0.095)	(0.077)	(0.050)
Positive EBITDA	0.028	0.790	0.322**	-0.136	-0.217	0.294***
	(0.106)	(1.541)	(0.098)	(0.143)	(0.161)	(0.059)
Economic recession	0.090	-4.892**	0.199*	-0.243***	0.024	-0.088*
	(0.153)	(1.858)	(0.097)	(0.050)	(0.102)	(0.036)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	119	115	119	119	119	108
R-squared	0.10	0.35	0.22	0.12	0.14	0.07

TABLE VI – *continued*

Panel B: Creditor concentration at voting tabulation (t_2), voting creditors only

Dependent variable:	Time in bankruptcy (months)	Outcome:			Recovery rate
		Reorganization	Sale	Liquidation	
Creditor concentration	-3.770*	-0.202	0.279**	-0.107	-0.493***
	(1.787)	(0.160)	(0.106)	(0.147)	(0.092)
Prearranged bankruptcy	-8.687***	0.202*	0.110	-0.291**	-0.091***
	(1.292)	(0.093)	(0.169)	(0.110)	(0.022)
Ln(Assets)	0.741*	0.049**	-0.024	-0.031	-0.045*
	(0.344)	(0.014)	(0.019)	(0.024)	(0.022)
EBITDA data available	-3.705	-0.233	0.216	0.027	-0.050
	(1.863)	(0.120)	(0.140)	(0.142)	(0.091)
Positive EBITDA	0.950	0.317*	-0.263	-0.088	0.223***
	(1.414)	(0.134)	(0.233)	(0.240)	(0.032)
Economic recession	-4.343	0.142	-0.133	-0.044	-0.114*
	(2.479)	(0.099)	(0.096)	(0.096)	(0.048)
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	108	111	111	111	104
R-squared	0.31	0.16	0.12	0.11	0.11

Panel C: Claims trading among voting classes (2SLS)

Dependent variable:	Time in bankruptcy (months)	Outcome:			Recovery rate
		Reorganization	Sale	Liquidation	
Total amount traded/Total claims:					
Voting claims	-33.556	0.011	1.262	-1.833**	-3.507**
	(23.631)	(1.173)	(1.295)	(0.850)	(1.580)
Creditor concentration (t_1)	5.761	0.152	0.024	-0.230	-0.537
	(6.276)	(0.382)	(0.383)	(0.354)	(0.666)
Prearranged bankruptcy	-17.082***	0.381*	0.384*	-0.658***	-0.129
	(3.131)	(0.209)	(0.211)	(0.155)	(0.164)
Ln(Assets)	1.074	0.118***	-0.046	-0.083*	-0.134
	(1.056)	(0.040)	(0.030)	(0.048)	(0.086)
EBITDA data available	3.708	-0.665***	0.115	0.427*	-0.679**
	(6.517)	(0.212)	(0.243)	(0.238)	(0.298)
Positive EBITDA	-5.931	0.655***	-0.211	-0.404	1.204**
	(7.109)	(0.226)	(0.253)	(0.254)	(0.555)
Economic recession	5.241*	-0.326	-0.376*	0.295	-0.173
	(2.884)	(0.246)	(0.208)	(0.263)	(0.227)
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	34	36	36	36	36
R-squared	0.48	0.44	0.47	0.41	0.24

TABLE VII

CREDITOR CONCENTRATION AND RECOVERY RATES AT THE VOTING-CLASS LEVEL

The focus of this table is to look at the class level recovery rates. Each observation now corresponds to a voting class; each bankruptcy has more than one class of claimants. In addition to the reported variables, each regression includes benchmark control variables defined in Table VI. For compactness of reporting, we omit other control variables. All models are estimated using linear least squares. Standard errors are clustered by bankruptcy and reported in parenthesis. ***, ** and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	Weight: Class amount / Total firm assets		Weight: Class amount / Total voting claims	
Class-level concentration	0.355***	0.416***	0.186	0.268*
	(0.128)	(0.136)	(0.127)	(0.139)
Administrative/Priority class	0.509**	0.217	0.568***	0.363
	(0.194)	(0.302)	(0.177)	(0.265)
Secured class	0.506***	0.496***	0.492***	0.449***
	(0.085)	(0.081)	(0.078)	(0.085)
Fulcrum class	--	0.821***	--	0.689***
		(0.125)		(0.133)
Fulcrum class*Class concentration	--	-1.115***	--	-1.033***
		(0.294)		(0.285)
Benchmark controls	Yes	Yes	Yes	Yes
Observations	404	404	404	404
R-squared	0.83	0.86	0.69	0.76

TABLE VIII

CREDITOR CONCENTRATION BY INSTITUTIONAL TYPE AND BANKRUPTCY OUTCOME

This table extends the results in Table VI by focusing on the identity of the claimholders by institutional type. Each reported number corresponds to the coefficient in a regression of a bankruptcy outcome on a measure of concentration of interest. *Active investors* include asset management firms, hedge funds, and private equity affiliated funds. The institutional type is defined at the parent level. We include one institutional type at a time (i.e., in Panel A, each number corresponds to a different regression); the correlation in concentration across institutional types is economically and statistically weak. In Panel A, the explanatory variable of interest is the percentage share of the total claims held by a given institutional type. In Panel B, in addition to the share of claims we look at the concentration of the holdings, as measured by Herfindahl-Hirschman index (HHI) *within* an institutional type. The interaction term between the two measures is meant to capture cases where a given institutional type is a large creditor and the holdings are concentrated among a few investors. If for a given bankruptcy an institutional type is missing, HHI is not well defined (i.e., unlike share, it cannot be set to zero); as a result, the number of observations in Panel B varies. In addition to the reported variables, each regression includes benchmark control variables defined in Table VI. For compactness of reporting, we omit other control variables and standard errors. Each panel reports two sets of results: (i) creditors' concentration as computed at the file of the Schedule of Assets and Liabilities, and (ii) creditors' concentration as computed at the voting tabulation. Voting tabulation only includes voting (impaired) classes. All models are estimated using linear least squares. ***, ** and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

Panel A: Explanatory variable –share (%) of the total claims by institutional type

	At filing of Schedule of Assets and Liabilities (t_1), all creditors						At voting tabulation (t_2), voting creditors only				
Dependent variables:	Prearranged bankruptcy	Time in bankruptcy	Outcome: Reorganization	Outcome: Sale	Outcome: Liquidation	Recovery rate	Time in bankruptcy	Outcome: Reorganization	Outcome: Sale	Outcome: Liquidation	Recovery rate
Banks	0.32*	-5.37	0.21	0.06	-0.23	-0.38**	-7.48**	0.24	0.05	-0.25	-0.28***
Trustees (bonds)	0.25	-7.59*	0.28	0.04	-0.28*	-0.17	-4.41	0.72***	-0.55**	-0.15	0.22
Active investors (all)	0.23**	-2.30	0.15	0.11	-0.19	-0.01	0.10	0.40**	-0.23*	-0.13	-0.17
Asset managers	-0.12	-0.26	0.38*	-0.13	-0.18	0.04	-0.73	0.41*	-0.41***	0.03	-0.13
Hedge funds	4.63**	-19.75	0.76*	1.32	-2.04	-0.30	10.74*	0.83***	-0.34**	-0.47*	-0.12
PE-affiliated funds	0.66***	-4.90***	-0.32**	0.49***	-0.11	-0.08	-3.59	0.10	0.12*	-0.18	-0.21
Non-financials	-0.36***	6.87**	-0.27**	-0.09	0.27	0.34**	3.78	-0.41***	0.18	0.18*	0.04
Observations	119	115	119	119	119	107	108	111	111	111	103

TABLE VIII – *continued*

Panel B: Explanatory variable –share (%) of the total claims and concentration by institutional type

	At filing of Schedule of Assets and Liabilities (t_1), all creditors							At voting tabulation (t_2), voting creditors only					
Dependent variables:	Obs.	Prearranged bankruptcy	Time in bankruptcy	Outcome: Reorganization	Outcome: Sale	Outcome: Liquidation	Recovery rate	Obs.	Time in bankruptcy	Outcome: Reorganization	Outcome: Sale	Outcome: Liquidation	Recovery rate
Banks:													
Share	106	0.66	-20.95**	0.58	0.17	-0.44	-0.19	80	-4.83	-0.21	0.14	0.21	-0.59**
Concentration		0.25	-3.72	0.20	-0.15	0.12	0.32		-2.88	-0.27	0.08	0.23	-0.36
Share*Concentration		-0.35	18.54	-0.47	-0.08	0.19	-0.35		-3.11	0.54	0.02	-0.69	0.68*
Trustees (bonds):													
Share	56	1.43	-1.14	0.26	0.22	-0.49	0.35	39	-15.83**	0.13	-0.48*	0.10	0.65
Concentration		0.06	-3.61	-0.05	0.17	-0.12	0.06		0.49	-0.65	-0.01	0.51	0.32
Share*Concentration		-1.60	-11.99	-0.00	-0.09	0.09	-0.43		25.66	0.11	0.30	0.03	-0.49
Active investors (all)													
Share	89	-0.33	-5.81	0.91	-0.67***	-0.30	0.69	86	-10.32	0.57	-0.82	0.49	-0.62
Concentration		-0.18	1.89	-0.33**	-0.04	0.31	-0.28		-4.20	-0.46	-0.06	0.59**	-0.28
Share*Concentration		0.69	1.80	-0.78	0.89***	0.07	-0.81		12.74	-0.32	0.66	-0.57*	0.64
Asset managers:													
Share	74	-0.26	-3.80	0.37	-0.54	0.14	1.13	70	-6.09	0.15	-0.90	1.04**	-0.79
Concentration		-0.07	0.65	-0.60***	0.00	0.63*	-0.27		0.59	-0.59***	-0.03	0.67**	-0.21
Share*Concentration		0.18	1.88	0.16	0.51	-0.54	-1.48*		11.11	0.06	0.41	-0.77*	0.71
Hedge funds:													
Share	33	5.38	-10.05	2.70	-6.12*	2.11*	1.28	43	-33.74	-1.22	2.50	-1.77	2.95
Concentration		-0.09	-1.96	-0.11	-0.41	0.43*	-0.11		-4.14	-0.80***	0.19***	0.46**	0.09
Share*Concentration		0.80	-23.94	-5.22	11.55**	-5.12***	0.30		46.67	1.92	-2.63	1.22	-2.85
PE-affiliated funds													
Share	35	4.03	-405.89	-137.67***	21.67	116.00***	47.94***	33	-179.05***	5.89	-5.56	-0.33	-5.47***
Concentration		0.47*	-18.15	0.17	0.82	-0.99**	0.65***		-17.15	0.40	-0.32	-0.08	-0.79**
Share*Concentration		-3.16	402.51	137.26***	-21.07	-116.20***	-47.96***		165.56**	-6.21*	5.81	0.40	5.46***
Non-financials													
Share	117	-0.42**	6.29	-0.48*	0.08	0.33	0.70*	108	4.67	-0.68**	0.12	0.50*	0.50
Concentration		-0.13	-4.06	-0.33	0.54	-0.19	0.34		-4.63	-0.49	0.15	0.34*	0.11
Share*Concentration		0.45	-3.13	0.86	-0.70	-0.28	-1.36		-2.31	0.57	0.21	-0.80	-1.09**

APPENDIX I
Details of data received from claims administrators

Data for the study were made available by four leading providers of restructuring and insolvency administrative services: BMC Group, EPIQ Bankruptcy Solutions, Donlin Recano & Company, and Kurtzman Carson Consultants (KCC). These firms made available to us an electronic version of the claims register, voting tabulations, and claims transfers for each bankruptcy. The information from each administrator was largely the same and compiling it together is unlikely to bias our results. However, the format of the data varies for each provider. Below we illustrate details of the different data formats and how we identify if a given claim was allowed to vote, if it was transferred in bankruptcy, and if a given claimholder was a trustee for public bond-holders.

BMC Group (43 bankruptcy cases; 36 cases with complete register and tabulation data)

For each bankruptcy case, BMC Group provided data that contained information from the credit register (t_1), voting tabulations (t_2) and transfers in one consolidated dataset. There are two BMC cases for which no register data was received, and five cases with no tabulation data. So we can unambiguously track each claim from t_1 to t_2 for 36 cases. The following is a simple example of what the data actually looks like:

Creditor	Amount	Claim type	Transferee	Voting plan class	Amount accepting	Amount rejecting	Amount abstaining
Fleet National Bank	$150,000	Secured					
Nelson, Arthur	$58,000	Unsecured	Sierra Liquidity Fund	5	$58,000		
The Bank of New York as trustee	$1,600,000	Unsecured		5	$980,000	$600,000	$20,000

In this example, Fleet National's claim was not transferred nor was it allowed to vote. Arthur Nelson's claim of $58,000 was sold to Sierra Liquidity Fund. This claim was allowed to vote on the plan of reorganization as part of voting class 5. We use information from the disclosure statement filed with the court to determine what types of claims constitute this voting class (e.g., general unsecured claims).

The Bank of New York claim illustrates a case in which the bank is acting as a custodian. We identify these cases by searching in the creditor name for the terms "trustee" and "custodian" (or abbreviations of these). In addition, we identified trustees of public bond issues by examining the disclosure statements which typically outline the basic pre-petition capital structure of the debtor. Also note that since this claim represents multiple public bonds, portions of the claim can accept, reject, and abstain from voting, depending on how each bondholder reported his vote to the Bank of New York.

Donlin Recano & Company (10 bankruptcy cases)

Simlar to BMC Group, Donlin Recano provided data in a single dataset for each case. However, Donlin Recano only provided information on claims that were permitted to vote (i.e., in our example, Donlin Recano records would be missing Fleet National Bank).

EPIQ Bankruptcy Solutions (52 bankruptcy cases)

The data provided by EPIQ came in two datasets, the claims register and the voting tabulation. Claim trading was tracked within the register as in the following example:

Creditor	Amount	Claim type
Fleet National Bank	$150,000	Secured
Nelson, Arthur fully transferred to: Sierra Liquidity Fund	$58,000	Unsecured
The Bank of New York as trustee	$1,600,000	Unsecured

To determine whether a claim was traded, we searched for the term "transferred" in the creditor name and/or address. Based on the search results we created a record of buyers and sellers. This record is additionally cross-checked with the information in the voting-tabulation file as the transferred claims only show the name of the claim buyer. Using the same example, a voting tabulation from EPIQ would look like:

Creditor	Amount	Voting plan class	Amount accepting	Amount rejecting	Amount abstaining
Sierra Liquidity Fund	$58,000	5	$58,000		
The Bank of New York as trustee	$1,600,000	5	$980,000	$600,000	$20,000

From this example, we also see that Fleet National Bank's claim does not appear in the voting tabulations. This enables us to conclude that Fleet's claim was not allowed to vote. There is no unique identifier that would allow us to merge the tabulation to the credit register. We merge the two sets together by creditor name and claim amount. This procedure however is not without caveats because creditor names are not always consistent between the two datasets, claim amounts can change somewhat (e.g. due to accrued interest, or portions of claims that are disallowed), and the presence of multiple claims held by the same creditor of the same amount.

Kurtzman Carson Consultants (31 bankruptcy cases)

KCC provided us with three datasets for each case identifying claims at register, voter tabulation, and a list of transferred claims. The claims register and voter tabulations look very similar to those provided by EPIQ, except that the claims register contains no information on whether a claim was transferred, since this information is kept in the third dataset. Again there is no unique identifier that allows us to match the three datasets together, and inconsistencies in names and amounts could potentially introduce an error in matching.

APPENDIX II

WHAT DETERMINES THAT A CLAIM IS TRADED?

This table presents a set of probit regressions analyzing the likelihood that a given claim is traded. The dependent variable is equal to 1 if the claim was sold and 0 otherwise. Claim size is sorted in terciles. *Small claim* corresponds to claims in the bottom size-tercile (claims between $50 and $100 thousand) and *Large claim* corresponds to the top size-tercile (claims above $300 thousand). Throughout the analysis we exclude claims below $50 thousand. Reported coefficients are marginal effects; 0.1 stand for 10% percentage point change in the dependent variable. *Active investors* include asset management firms, hedge funds, and private equity affiliated funds. Omitted category (other creditors) is all claims owned by: custodian banks, potentially financial, insurance, real estate, other financial, government, intra-company, and unknown. The institutional type is defined at the parent level. The analysis is at the claim level; i.e., there are multiple claims per bankruptcy. All regressions include industry fixed effects. Standard errors are clustered by bankruptcy. *** , ** and * indicate statistical significance at 1%, 5%, and 10% level, respectively.

	All claims administrators		BMC claims only	
Small claim	0.097*	0.166**	0.140**	0.222**
	(0.074)	(0.109)	(0.108)	(0.150)
Large claim	0.043***	0.048**	0.037*	0.037**
	(0.021)	(0.026)	(0.025)	(0.022)
Portion of claim that is secured	0.005	0.006	-0.029	-0.027
	(0.040)	(0.039)	(0.068)	(0.065)
Portion of claim that is unsecured	0.131***	0.128***	0.127**	0.121**
	(0.071)	(0.068)	(0.085)	(0.080)
Owned by:				
Corporations	0.028**	0.094***	0.023	0.124***
	(0.013)	(0.053)	(0.017)	(0.084)
Banks	0.238***	0.265***	-0.009	0.007
	(0.071)	(0.082)	(0.026)	(0.032)
Active investors	0.262***	0.277***	0.012	0.024
	(0.099)	(0.103)	(0.031)	(0.037)
Persons	0.066	0.045	0.067	0.042
	(0.081)	(0.067)	(0.093)	(0.076)
Owned by corporation * Small claim	--	-0.082**	--	-0.098**
		(0.034)		(0.050)
Owned by corporation * Large claim	--	-0.015	--	-0.015
		(0.015)		(0.016)
Observations	78,933	78,933	44,758	44,758
Pseudo *R*-squared	0.10	0.12	0.12	0.15