Do rights offerings reduce bargaining complexity in Chapter 11?*

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Abstract

This paper investigates the role of rights offerings in U.S. Chapter 11 reorganizations as a new market-based mechanism for mitigating bargaining frictions. Using hand-collected data, I document three novel facts: (i) in the past decade, rights offerings financed 47% of bankruptcies, (ii) they are typically proposed and underwritten by hedge funds or private equity firms, and (iii) their occurrence is highly correlated with stock market performance. In an instrumental variable setting, I find that compared with other sources of financing, rights offerings lead to higher recovery rates, shorter time spent in Chapter 11, and lower bankruptcy refiling rates. They also allow firms to access new capital without resorting to asset liquidations, which are value-reducing. My findings suggest that by alleviating key bargaining frictions in large and complex bankruptcy cases, rights offerings may improve the efficiency of resource allocation in the economy.

1 Introduction

A fundamental objective of bankruptcy procedures is to preserve and distribute the value of the reorganized firm among its existing claimants (Hart (1995)). A central challenge faced by the courts in U.S. Chapter 11 bankruptcy procedures is predicting the value of the reorganized firm. The presence of asymmetric information and agency conflicts between different creditor classes amplifies this challenge (Gilson, Hotchkiss, and Ruback (2000)). In recent work, Demiroglu, Franks, and Lewis (2022) find large errors in court-determined valuations of the reorganized firm and that these misvaluations lead to significant wealth transfers between different claimants. These large valuation errors also raise significant concerns regarding the efficiency of the Chapter 11 process. For instance, the overvaluation of a firm in bankruptcy could result in its inefficient continuation, whereas undervaluing the firm might lead to its inefficient liquidation. These decisions have important implications for the efficiency of asset allocation in the economy.[1] Furthermore, valuation disputes often prolong the length and costs of the Chapter 11 process (Ayotte and Morrison (2018), Dou, Taylor, Wang, and Wang (2021)). These inefficiencies in the bankruptcy process increase the costs associated with financial distress. High costs of financial distress might have broader implications on the pricing of debt, the optimal choice of leverage, and the ability of firms to finance profitable projects in the economy.

The theoretical literature has suggested improving reorganization outcomes through the distribution of option-like securities to creditors as a way of bargaining around these inefficiencies (Bebchuk (1988, 2002), and Aghion, Hart, and Moore (1992)).[2] However, empirical evidence on this front is lacking. My paper fills this gap by investigating a new market-based mechanism for simplifying the bargaining complexity in bankruptcy: rights offerings in the Chapter 11 plan. Rights offerings allow firms to raise new capital by offering a class of creditors (or equity holders) the right to purchase equity in the reorganized firm. The money raised in the rights offerings is used to pay off the senior claimants, thereby simplifying the bargaining process. Moreover, rights offerings allow junior claimants to objectively signal their beliefs about a particular valuation of the reorganized firm.

I document three facts using novel hand-collected data on the universe of large publicly listed firms' Chapter 11 bankruptcy filings from 2003–2020. First, rights offerings have been used in 25% of bankruptcies by number and in 37% of bankruptcies by asset size to inject roughly $42 billion of fresh capital into these bankrupt firms. Second, larger bankruptcy cases, with higher numbers of creditors and more fragmented creditor classes, are more likely to use rights offerings to finance their exits from bankruptcy. Third, I document that rights offerings are

[1] Several papers document that agency conflicts in the bankruptcy process lead to inefficient continuation of unprofitable firms, and thereby prevent the redeployment of their assets to other users (Baird (1986), Franks and Torous (1989), Gertner and Scharfstein (1991), Hotchkiss (1995), Weiss and Wruck (1998), Ivashina, Iverson, and Smith (2016)). More recent literature has also documented evidence on inefficient liquidations that have led to the inefficient allocation of assets in bankruptcy (Antill (2022), Bernstein, Colonnelli, and Iverson (2019), Bernstein, Colonnelli, Giroud, and Iverson (2019)).

[2] Recent empirical literature has also pointed this out, particularly Demiroglu, Franks, and Lewis (2022) who discuss that using rights offerings might serve as a mechanism to resolve valuation disputes between creditors. However, none of the papers have empirically tested these claims.

generally proposed and underwritten by hedge funds or private equity firms that own unsecured debt in the firm.[3] The increased use of rights offerings can partly be attributed to the increasing participation of hedge funds, private equity firms, and other sophisticated lenders in the bankruptcy process (Jiang, Li, and Wang (2012), Buccola (2022)). I find that three months after emerging from Chapter 11, these rights offerings realized roughly 50% average stock market returns for their participants. These returns are in line with estimates from other empirical studies that quantify the returns on investment of large mature private equity firms (see Kaplan and Schoar (2005), Acharya, Gottschalg, Hahn, and Kehoe (2013)).

Using an instrumental variable (IV) approach that exploits plausibly exogenous stock market fluctuations, I document a significant link between bankruptcy outcomes and the decision to raise financing via rights offerings. Rights offerings increase total creditor recoveries by roughly 31% and are associated with a higher likelihood of payments to old (pre-petition) shareholders. Using a rights offering in bankruptcy also reduces the likelihood of the firm refiling for bankruptcy. Post-emergence, the new equity securities of the firms financed by rights offerings significantly outperform those of other firms emerging from bankruptcy by about 30%. This outperformance appears to be driven by positive earning surprises in firms using rights offerings. Taken together, these findings suggest that rights offerings lead to an overall increase in the value of the reorganized firm.

My paper also explores the channels through which rights offerings create value. First, I document that the decision to use a rights offering decreases bankruptcy duration by about 3 months, suggesting that these offerings are an effective tool for achieving consensus and resolving conflicts of interest between different creditor classes. Their use improves the transparency of the valuation process, as is evident from the finding that rights offerings lower the incidence of unintended wealth transfers (or absolute priority deviations) between different claimants by 35%. Second, by purchasing a slice of equity in the reorganized firm through the rights offering, hedge funds and private equity firms tend to establish significant control rights in the new firm. This equity stake provides high-powered incentives for the hedge funds to improve the overall performance of the reorganized firm. On average, hedge funds purchase 43% of the reorganized firm's equity and appoint 40% of the board members in the reorganized firm. Third, I document evidence that financing via rights offering replaces costly asset liquidations (see Antill (2022)) in the firms emerging as going concerns.[4]

I describe how rights offerings work in the real-world setting by extending the framework proposed by Bebchuk (1988). The key economic friction that rights offerings help ameliorate is that property rights are not well-defined in bankruptcy. Even when the priority ordering of different classes of claimants is clearly laid out, the conflicts of interest between different claimants obscure the valuation of the reorganized firm. Assigning the property rights

[3] To ensure that the reorganized firms' capital requirements are met, these rights offerings are always underwritten by a subset of rights offering participants, who commit to *backstop* the deal and fund the rights offering in case the offering is not fully subscribed.

[4] Antill (2022) documents that Section 363 asset sales in bankruptcy destroy firm value and significantly reduce creditor recovery rates. A Section 363 sale is an expedited asset sale process that allows managers of a bankrupt firm to sell assets in Chapter 11. This sale only requires the approval of the bankruptcy judge and does not require any formal voting or consent by creditors.

on the reorganization pie is challenging without a reasonable estimate of the reorganized firm's value. Bebchuk's proposal delineates how option-like securities, akin to rights offerings, can act as a market response to these conflicts of interests between different claimants. I add to this framework by including the participation of hedge funds and/or private equity firms as backstop parties. These sophisticated investors often purchase some debt from junior (or unsecured) creditors in the distressed firm (Lim (2015)). By underwriting the rights offering, these sophisticated investors ensure enough cash is raised to pay off the senior creditors. Therefore, as one of the major residual claimants in the new equity of the reorganized firm, these sophisticated investors exercise significant control rights and exert effort to turn around the distressed firm. In the presence of asymmetric information regarding the skills of different claimants, rights offerings act as a mechanism that allows control to be transferred to highly skilled investors who can maximize the reorganized firm's value. My findings regarding the significant involvement of these investors in the reorganized firm provide empirical evidence for the theoretical models of contingent allocation of control rights (see for e.g., Aghion and Bolton (1992), Dewatripont and Tirole (1994)).

Estimating the effects of rights offerings on bankruptcy outcomes is challenging due to an inherent selection bias in the creditors' and firm's choice of financing. For instance, if rights offerings are financing higher quality distressed firms, then the better bankruptcy outcomes could be driven by (unobservable) quality and not rights offerings. Alternatively, if rights offerings are being used in more complex Chapter 11 cases, then the (unobservable) case complexity may subsume any improvements in bankruptcy outcomes, and one might not observe any positive impact of using rights offerings.

I rely on an IV strategy to overcome these challenges. The empirical analysis uses S&P 500 fluctuations over the two months period prior to emerging from bankruptcy as an instrument for rights offering, relying on the sensitivity of rights offering to market movements during the "book-building" window.[5] The relevance of the instrument is linked to the limits to arbitrage theory, which predicts that market fluctuations impact whether arbitrageurs like hedge funds are able to provide capital and eliminate mispricing in the financial markets (see Shleifer and Vishny (1997) and Gromb and Vayanos (2002)). As hedge funds and private equity firms generally propose and underwrite rights offerings, the capital constraints faced by these investors affect the probability of a rights offering. Market fluctuations during the book-building window have also been used as an instrument in other settings; for instance, Bernstein (2015) and Borisov, Ellul, and Sevilir (2021) use it to instrument for IPO completion, and Guenzel (2023) uses it to instrument for varying acquisition costs during M&A deals. I find that a one-standard-deviation increase in S&P market fluctuations during the book-building window in Chapter 11 increases the probability of a rights offering by 7%. In my analysis, the effects of rights offerings are identified from differences in bankruptcy outcomes between similar firms in the same industry that file for bankruptcy in the same year and the same court but experience different market fluctuations during the book-building window.

[5]The rights offering proposal is enclosed within the disclosure statement or reorganization plan filed by the firm prior to its emergence from bankruptcy. The "book-building" period is defined as the two-month period prior to the filing of this reorganization plan.

Using the IV approach, I document that the decision to raise financing via rights offerings significantly improves bankruptcy outcomes. Compared with other sources of financing, rights offerings are associated with higher recovery rates, shorter time spent in Chapter 11, and lower bankruptcy refiling rates. A comparison between the OLS and IV results indicates that the OLS coefficients underestimate the causal impact of using rights offerings on bankruptcy outcomes. This suggests that more complex bankruptcy cases, where creditor recoveries traditionally tend to be lower, are switching to rights offering financing to simplify the bargaining frictions inherent in Chapter 11. I am finding that rights offerings are more likely to be used when firms have a large number of creditors and more fragmented creditor classes.[6] Further, the firms using rights offerings have a larger pre-filing asset base and a lower amount of secured debt in their capital structure. These findings indicate that firms with more complex capital structures use rights offerings to overcome the bargaining complexity in Chapter 11.

The instrument most likely satisfies the exclusion restriction condition; that is, the S&P returns during the book-building phase are related to the bankruptcy outcomes only through the rights offering choice. All the specifications include year-of-filing fixed effects to overcome the potential concern that different types of firms file for bankruptcy during different market cycles. Further, randomization tests confirm that within the same year of filing, S&P fluctuations during the book-building period are uncorrelated with a broad range of firm and bankruptcy characteristics. To exclude the possibility that the instrument affects bankruptcy outcomes through other channels, I conduct several placebo tests. First, I test whether S&P fluctuations *outside* the book-building period predict bankruptcy outcomes. I show that in contrast to the S&P returns during the book-building period; the S&P returns outside the book-building window are not correlated with bankruptcy outcomes. Second, to overcome the concern that high market returns during bankruptcy might result in higher firm valuations and drive better bankruptcy outcomes, all my specifications control for the total S&P returns from the date of filing to the date of emergence from bankruptcy.[7] Third, I repeat all my tests on the subsample of firms that were not liquidated and find that rights offerings improve outcomes within the set of reorganized firms. These tests suppress the channel that S&P returns might be affecting recovery rates through the reorganization or liquidation decision. My results are consistent with the notion that S&P fluctuations are likely to affect bankruptcy outcomes only through their impact on firms' bankruptcy financing choices.

As firms being financed with rights offerings emerge from bankruptcy with lower ex-post leverage in their capital structure, I find that using rights offerings reduces the likelihood of recidivism in these firms. Several papers document high rates of recidivism in firms emerging from Chapter 11 (Hotchkiss (1995), Gilson (1997), Roe (1983), and Altman (2013)), which might reflect the continuation bias of the Chapter 11 process (Hotchkiss (1995), Altman (2013)). Alternatively, Gilson (1997) suggests that firms emerging from financial distress have

[6] 77% of firms that use rights offering in bankruptcy have more than 1,000 creditors, and 47% of firms using rights offerings have more than 5,000 creditors. In the sample of firms that do not use a rights offering, 65% have more than 1,000 creditors, and 38% have more than 5,000 creditors.

[7] In my analysis, I also use the average price to earnings ratio (P/E) of the S&P *during* the book building period as an alternate measure of overall market overvaluation. I show that the P/E ratio of the S&P is not correlated with bankruptcy outcomes.

abnormally high leverage ratios compared with their industry peers and are therefore forced to refile for bankruptcy in subsequent years. Consistent with Gilson's hypothesis, the lower recidivism of firms using rights offerings might be explained by the fact that these firms emerge from bankruptcy with lower ex-post leverage in their capital structure. The average post-emergence leverage ratio of firms being financed by rights offering is 44%, compared with 56% for firms that are not financed by rights offerings. There is also a notable shift in board composition of the firms that arranged financing via rights offering, with on average 84% of the board of directors being replaced upon emergence from bankruptcy.[8] Moreover, 40% of the newly elected board members are directly associated with the hedge fund underwriting the rights offering. I also find that firms that were financed by a rights offering have a higher probability of being acquired post-emergence, compared with other bankrupt firms that were not financed via rights offerings. This indicates that firms using rights offerings experience a shift in their corporate governance and are restructured differently post-emergence.

My paper uses the IV approach to estimate the local average treatment effects (LATE) of using rights offerings on bankruptcy outcomes. This estimate measures the causal effect of using rights offerings on *compliers* or *switchers*, that is, bankruptcy cases in which the S&P market fluctuations during the book-building period are the deciding factor for whether financing via rights offering takes place or not. It might be a potential concern that these *local* estimates do not generalize to cases other than the switchers. I attempt to overcome the concerns of instrument validity and generalizability of results using two approaches. First, I present the average improvements in bankruptcy outcomes for firms that use a rights offering. The endogenous OLS estimates indicate that rights offerings significantly increase recovery rates. As larger and more complex bankruptcy cases tend to be resolved via rights offerings, I argue that these OLS estimates understate the causal impact of using rights offerings. Second, I structurally estimate a simplified model of rights offerings to compute the average increase in recovery rates for cases that have access to rights offerings. The structural estimates indicate that access to rights offerings increases average creditor recovery rates by 30%, compared with a counterfactual world without rights offerings. Through these additional tests, my paper attempts to alleviate the concerns regarding instrument validity and generalizability of the IV estimates.

Related Literature. The paper contributes to several strands of literature. I document a novel trend in bankruptcy resolution and provide empirical evidence on the impact of distributing the rights to purchase securities to creditors during bankruptcy reorganizations. My paper empirically tests and finds support for the predictions in theoretical models on efficient bankruptcy design. Theoretical models by Bebchuk (1988, 2002), Aghion, Hart, and Moore (1992), and Hart, Drago, Lopez-de Silanes, and Moore (1997) suggest that the distribution of option-like securities to creditors can improve the efficiency of the bankruptcy process. Rights offerings are an example

[8] For bankrupt firms that did not engage in rights offerings, around 75% of the board of directors were replaced.

of such option-like securities, and my paper finds that their use tends to improve bankruptcy outcomes.[9] Further, Roe (1983) proposes that bankruptcy outcomes could be improved by relying on market-based mechanisms, and raising exit financing via rights offering is an example of such mechanisms working in practice.

My work also relates to the literature on creditor bargaining frictions in bankruptcy, providing evidence that resolving these frictions via rights offerings helps reduce delays and increases recovery rates. Several papers have documented that asymmetric information and conflicts of interest between senior and junior creditors create extensive frictions that distort court valuations and lead to excess delays in the reorganization process (Gilson, Hotchkiss, and Ruback (2000), Baird and Bernstein (2005), Demiroglu, Franks, and Lewis (2022)). In recent work, Dou, Taylor, Wang, and Wang (2021) document that these bargaining frictions lead to a 73% increase in the duration of Chapter 11 court cases.

Rights offerings allow firms in bankruptcy to access exit financing without resorting to asset liquidations or secured financing. I find that bankrupt firms financed by rights offerings do not sell any of their assets in Section 363 sales, and rights offerings displace these sales in the firms that emerge from Chapter 11 as going concerns. An extensive literature has focused on traditional sources of arranging bankruptcy financing, for example, asset sales and debtor-in-possession (DIP) financing. LoPucki and Doherty (2007) document that managerial agency conflicts in bankruptcy lead to wasteful asset sales. Eckbo, Li, and Wang (2021) report that DIP loans in bankruptcy are exceptionally expensive, and in more than 60% of cases, the junior creditors heavily contest the DIP loan terms.[10] By expanding the space of available exit financing options, rights offerings are particularly valuable when traditional sources of financing are limited and/or excessively costly.

My paper also contributes to the literature that explores the role of hedge funds, governance, and capital structure in shaping post-bankruptcy firm outcomes (Jiang, Li, and Wang (2012)).[11] My finding that firms engaging in rights offerings experience a shift in their corporate governance is consistent with hedge funds playing a significant role during and post-bankruptcy in the reorganized firms. My paper relates to the corporate governance literature that documents changes in board composition for firms that default on their debts (Gilson (1990), Kaplan and Minton (1994), Ferreira, Ferreira, and Mariano (2018)). My paper analyzes a new form of exit financing in bankruptcy and documents that financing via rights offerings increases creditor recovery rates and avoids inefficient liquidations and Section 363 sales (see also, Acharya, Bharath, and Srinivasan (2007), Bris, Welch, and Zhu (2006), Ivashina, Iverson, and Smith (2016)).

[9] In related work, Corbae and D'Erasmo (2021) test the Aghion, Hart, and Moore (1992) proposal as a counterfactual in their structural model of bankruptcy choice and estimate that implementing the proposal improves creditor recoveries and lowers overall costs of borrowing in the economy.

[10] In recent work, Antill (2022) finds that Section 363 asset sales in bankruptcy significantly reduce creditor recoveries (see also, Gilson, Hotchkiss, and Osborn (2016) and Waldock (2020)). Ayotte and Ellias (2022) document that the liquidation bias of over-secured DIP lenders often results in inefficient asset sales at the expense of junior claimants.

[11] In contemporaneous work, Buccola (2022) documents trends in the changing ownership structure of distressed firms and finds that in recent years, private equity sponsors have emerged as the predominant owners of distressed firms. Using evidence from the credit default swap market, Danis and Gamba (2023) also document evidence of hedge fund activism in the restructuring of distressed firms.

The rest of the paper is organized as follows. Section 2 delineates the institutional details and basic framework around the rights offering process, and other more traditional forms of bankruptcy financing. In section 3, I describe the data and summary statistics. Section 4 presents the empirical methodology, while section 5 discusses the main results. Section 6 concludes the paper.

2 Institutional Details and Framework

2.1 Rights offerings in Chapter 11

In a rights offering, a firm in bankruptcy arranges for new capital by offering a class of creditors (or equity holders) the rights to purchase securities in the post-emergence firm through the Chapter 11 plan. Typically the offering is of equity securities, but in some cases convertible debt securities are also offered. These securities are usually offered at a discount to the (assumed) valuation of the reorganized debtor. As the new equity securities are typically sold at a discount to their assumed plan value, the bankruptcy claimants have an incentive to participate in the offering so as to avoid dilution, provided they believe that the assumed valuation of the reorganized firm is correct. That is, the claimants will decide whether to participate in the offering, and purchase the securities only if they believe that the rights offering price indeed reflects a discount to the value of the reorganized entity.[12] To ensure that the reorganized firms' capital requirements are met, rights offerings in Chapter 11 are almost always underwritten by a subset of rights offering participants, who commit to *backstop* by funding the rights offering in case it is not fully subscribed. In return for underwriting the offering, these participants receive a backstop commitment premium that often ranges from 3% to 10% of the total offering size.

In addition to providing financing to the debtor, rights offerings in bankruptcy allow claimants to objectively demonstrate their beliefs in a particular valuation of the reorganized firm. They are thus a powerful tool for achieving consensus and resolving valuation disputes amongst different creditor classes by providing junior claimants with the means to "put their money where their mouth is." The practice of rights offering gives junior claimants an opportunity to purchase new equity or debt securities in the reorganized firm at a discount to the plan value, within a deleveraged capital structure. Aside from increasing creditor recoveries, it gives participants the ability to shape post-emergence corporate governance approaches for the firm. Further, the backstop opportunity can be used to shift recoveries in favor of the parties that are willing to underwrite the rights offering. In some large bankruptcies, debtors complement a rights offering by also using private placements, which involve the direct issuance of equity securities to a certain class of creditors who have already agreed to participate in the offering

[12] The class of creditors or equity security holders solicited for participation in the rights offering is generally offered the right to purchase its pro rata share (i.e., the same percentage that its current holdings represent) of the equity available under the offering.

(prior to its placement). This is further illustrated in an example below, detailing Peabody Energy Corporation's financing process during its bankruptcy.

To clarify the process of rights offering, I describe the case of Peabody Energy Corporation's Chapter 11 bankruptcy. Peabody, one of the world's largest private-sector coal companies, filed for Chapter 11 bankruptcy on April 13, 2016, with assets totalling $11 billion at the time of its filing. Disagreements among Peabody and many of its creditors during the bankruptcy proceedings were mediated by Peabody proposing to raise $1.5 billion in exit financing from certain unsecured noteholders and second lien noteholders. The proposal involved financing $750 million through a rights offering of the new Peabody common stock, at 45% discount to the plan equity value (of $3.105 billion). All holders of allowed second lien notes claims and a class of unsecured creditors received rights to purchase these rights offering shares. An additional $750 million in financing was obtained through the private placement of new preferred stock exclusively to certain hedge funds who were unsecured noteholders in the firm (at 35% discount to the plan equity value).[13] These private placement investors also agreed to backstop the $750 million rights offering, and in exchange were paid an 8% backstop fee ($60 million) and 2.5% monthly ticking fee (until the plan effective date). The final plan and disclosure statement was filed on January 27, 2017, and it was supported by 95% of unsecured creditors. On March 17, 2017, the court confirmed the plan and Peabody emerged from bankruptcy. The proceeds of $1.5 billion from the rights offering and equity private placement were used to fund the plan recoveries. Three months after emerging from bankruptcy (on June 15, 2017), the total market value of Peabody calculated from its stock price was $2.357 billion, implying a 38% return to the rights-offering participants on their investment.[14]

Peabody succeeded in arranging its exit financing from a group of unsecured creditors and second lien noteholders. However, given the huge discount and high backstop premium associated with the rights offering financing, an ad hoc committee of convertible bondholders strenuously objected to the terms of the exit financing during the bankruptcy proceedings. The members of this ad hoc committee, representing approximately 3% of the debtors' total funded debt, argued that an excessive value of the reorganized firm was being transferred to the hedge funds who had agreed to participate in the private placement (i.e. the backstop investors). The bankruptcy judge rejected these objections, stating that "the consideration offered under the private placement aided the debtors in attaining tremendous consensus around the plan."[15] More generally in other cases, while objections to rights offerings are not uncommon, bankruptcy courts have broadly demonstrated a reluctance to undo the product of

[13] This $750 million private placement investment came from the following hedge funds: Aurelius Capital Management, Contrarian Capital Management, Discovery Capital Management, Elliot Management Corporation, Panning Capital Management, and Point State Capital.

[14] The rights-offering participants purchased a 44% equity stake in Peabody for $750 million. The market value of this stake three months after Peabody's emergence from bankruptcy is $1,037 million ($= 0.44 \times 2357$). This implies a return on investment of $(1037 - 750)/750 = 38\%$.

[15] Further, the judge stated that it would "[l]et the creditor body vote and tell me that the expenses are too high, the valuation is not right ...." Given that Peabody's plan had the support of 95% of unsecured creditors, the court was ultimately convinced that the debtors' process was driven by the need to close a transaction quickly.

consensus-building exercises by the debtors and other key stakeholders in the restructuring process (Husnick and Mazza (2020)).

In Figure 1, I plot the fraction of Chapter 11 firms arranging financing via rights offering. There is an increasing trend of debtors using rights offerings to finance their emergence from bankruptcies. The last decade has witnessed rights offerings being used in 29% of bankruptcies by number, and in 47% of bankruptcies by asset size. Over the period 2003–2020, investors have injected at least $42 billion in large bankrupt companies via rights offerings. There is a slight downward trend in firms using Section 363 (§363) asset sales to finance bankruptcies, suggesting that rights offerings might be substituting for asset liquidations. I briefly summarize the details of other more traditional forms of bankruptcy financing later in this section. The average timeline for arranging financing via rights offering is illustrated in Figure 2. Firms in Chapter 11 propose rights offerings in the disclosure statement of the plan of reorganization prior to their emergence from bankruptcy. The book-building period spans the two-months prior to the plan filing. During this period, the firm, backstop parties, and other participants deliberate on the choice of the rights offering.[16] About a month after filing the plan, the firm emerges from bankruptcy after the plan has been approved by the judge.

2.2 Basic framework of rights offering

In this subsection, I discuss a framework that sheds light on the key frictions that rights offerings help ameliorate. I start by describing the theoretical framework of Bebchuk (1988) and Aghion et al. (1992). Bebchuk (1988) proposes that all the existing debt of the firm is canceled when the firm files for bankruptcy. The new ownership structure of the firm is homogenized to an all-equity firm, and reorganization rights (RRs) to this firm are created. The idea is to allocate all the new equity (or RRs) to senior creditors and give junior claimants the option to buy back this equity from the senior creditors.

Consider a simple example of a firm that files for bankruptcy, owing its secured (senior) creditors $100 million and its unsecured (junior) creditors $300 million. There are 100 secured creditors (owed $1 million each), 100 unsecured creditors (owed $3 million each), and 100 pre-petition shareholders. Bebchuk (1988) proposes that the firm is converted to an all-equity firm and that all this new equity, comprised of say 100 RRs, is allocated to the secured creditors. Each unsecured creditor has an option to purchase 1 RR at a price of $1 million, and each (pre-petition) shareholder has an option to purchase 1 RR for $4 million. In effect, the unsecured creditors have the option to purchase the new equity by paying the secured creditors $100 million, while the (pre-petition) shareholders have the option to purchase the same equity for $400 million by paying $100 million to the secured creditors and $300 million to the unsecured creditors. These options can be exercised before the firm emerges from

[16] A "material adverse event" clause in the plan allows the rights offering participants to cancel their financing commitment to the firm; this might be used if the firm or market conditions were to severely deteriorate (refer to the case of Delphi Corporation).

bankruptcy. If both the unsecured creditors and shareholders decide against exercising their options then all the new equity of the firm remains with the secured creditors. Suppose, all the unsecured creditors and shareholders believe that the value of the reorganized firm is $200 million, then all the unsecured creditors will exercise their options and buy back the firm from the secured creditors by paying them $100 million. While the (pre-petition) shareholders will be wiped out as they do not exercise their options.

The new equity (or reorganization rights) holders vote on the firm's future. For instance, the new equity holders determine whether to liquidate the firm or to reorganize it, and whether to replace the incumbent management. The idea is that conflicts of interest among different claimant groups are avoided through the homogenization of ownership, and when a single class of creditors owns the new firm it takes value-maximizing decisions regarding the firm's future (Aghion et al. (1992)). By separating the valuation of the reorganized firm from the decision of how to split the reorganization pie, the proposed method allows for faster resolution of distress.[17]

I now describe how rights offerings work in the real-world setting by extending the framework proposed by Bebchuk (1988) to include the possibility of hedge fund participation. Hedge funds and private equity firms are becoming increasingly active in the Chapter 11 bankruptcy process (Jiang et al. (2012)). They often purchase debt from unsecured (junior) creditors in the distressed firm that is most likely going to be converted into equity in the reorganized firm (Lim (2015)).

In the previous example, assume that a hedge fund owns part of the unsecured debt in the firm, and proposes to *backstop* (or underwrite) a rights offering of $150 million for purchasing all the RRs in the new firm.[18] As the rights offering is underwritten by the hedge fund, the firm is assured to raise cash of $150 million. The rights offering is open to all the other unsecured creditors that belong to the same creditor class as the hedge funds. Each unsecured creditor is given the option to purchase 1 RR for a price of $1.5 million, and in case they do not exercise their option they get paid $0.5 million each from the proceeds of the right offering. Therefore, for an unsecured creditor not participating in the rights offering implies that it is effectively selling its RR at a price of $0.5 million to the hedge fund that is underwriting the rights offering. Also, each secured creditor is paid $1 million from the proceeds of the rights offering. Suppose all the other unsecured creditors believe that the value of the reorganized firm is $200 million, then the payoff from participating in the rights offering is $1 million for each unsecured creditor. This payoff comprises (i) the firm value of $200 million, plus (ii) the excess cash in the firm from the rights offerings proceeds (after paying off the secured creditors) of $50 million, minus (iii) the amount paid for participating in the rights offering of $150 million. Whereas, the payoff from not participating in the rights offering is $0.5 million in cash for each unsecured creditor. A simple decision rule emerges, wherein each

[17] In reference to his proposal Bebchuk (1988) writes, "The new method involves no bargaining or litigation, nor does it require that the value of the reorganized company be identified. Under the method, the participants in a reorganization would receive a set of rights with respect to the securities of the reorganized company. These rights are designed so that, whatever the reorganization value, the participants will never end up with less than the value to which they are entitled."

[18] The simplified framework abstracts away from the backstop fees that are charged by the hedge fund for underwriting the rights offering.

unsecured creditor decides to participate in the rights offering and purchase 1 RR of the new firm iff its valuation of the firm is higher than the rights offering price.

I illustrate this basic framework of a rights offering in Figure 3. For simplicity, I assume that there are only two classes of creditors, secured (senior) and unsecured (junior), but the framework can be easily extended to more than two creditor classes. The secured creditors are owed S, the unsecured creditors are owed U, and the hedge fund is part of the unsecured creditor class. There are N_u creditors in the unsecured creditors' class (each owed $u = U/N_u$). The hedge fund proposes to underwrite a rights offering open to all the other unsecured creditors in its class for purchasing the reorganized firm for V. The valuation of the reorganized firm in the rights offering (V) is set such that $V > S$, implying that the new firm is worth more than what is owed to the secured creditors. Further, $V \leq (S + U)$, implying that after the secured creditors are paid off, the unsecured creditors are the only residual claimants in the firm.[19] The secured creditors receive S from the proceeds of the underwritten rights offering. Each unsecured creditor receives an option to purchase 1 share of the reorganized firm (or 1 RR) at price v (where $v = V/N_u$). If the unsecured creditor decides not to participate, it receives $(v - s)$ in cash from the rights offering proceeds (where $s = S/N_u$). Whereas, if all the unsecured creditors participate in the offering, then the excess proceeds from the rights offering after paying off the secured creditors $(V - S)$ are retained as cash in the firm. The valuation of the reorganized firm for the unsecured creditors is denoted by $\tilde{V}$, and each RR is worth $\tilde{v}$ (where, $\tilde{V} = \tilde{v}N_u$). The payoff for each unsecured creditor from participating in the rights offering is its valuation of the reorganized firm ($\tilde{v}$), plus the excess cash in the firm $(v - s)$, minus the cost of the RR (v), or $\tilde{v} - s$. Therefore, each unsecured creditor decides to participate in the rights offering iff $\tilde{v} \geq v$, or when its valuation of the reorganized firm is higher than the price of the rights offering.

The basic framework can be extended to each unsecured creditor having its own belief about the value of the reorganized firm, $\tilde{v}_i$. In this setting, the unsecured creditors that believe their valuation is higher than the rights offering price ($\tilde{v}_i \geq v$) participate, while the rest of the unsecured creditors do not participate. A key distinction from Bebchuk's model is that rights offerings are underwritten by a group of hedge funds and/or private equity players. These players also bring in the reorganization skills and expertise, and by exerting costly effort they might be able to turn around the distressed firm. Suppose each unsecured creditor's belief about the value of the reorganized firm ($\tilde{v}_i$) is drawn from a random distribution, then the hedge fund sets the price of the rights offering such that it can purchase control rights in the reorganized firm from the unsecured creditors that do not participate in the rights offering.[20] In Appendix A, I formalize the profit maximization problem for the hedge

[19] The logic extends to more than two classes of claimants. For instance, if the rights offerings were open to the (pre-petition) shareholders of the firm then the valuation of the reorganized firm implied from the rights offering (V) must be greater than the debt owed to both the secured and unsecured claimants, i.e. $V > (S + U)$. In this case, the proceeds from the rights offerings would be used to pay the secured creditors in full (S), and the unsecured creditors in full (U), leaving the (pre-petition) shareholders as the residual claimants in the reorganized firm.

[20] An implied assumption in the framework is that there are several dispersed unsecured creditors, as is generally the case in real-world bankruptcy filings. That is, there are large costs associated with coordinating individual unsecured creditors. This assumption is required because if the hedge fund knew each creditor's valuation, the hedge fund would simply purchase their debt at their personal

fund to solve for the optimal price of the rights offering, and the incentive-compatible effort exerted by the hedge fund for turning around the distressed firm. I structurally estimate this model in the data using simulated method of moments (SMM).

The key economic friction that rights offerings help overcome is that property rights are not well-defined in bankruptcy. Even when the priority ordering of different classes of claimants is clearly laid out, the large uncertainties and disputes regarding the valuation of the reorganized firm hamper the efficiency of the Chapter 11 bankruptcy process. In fact, one of the reasons why property rights are not well-defined in bankruptcy is that without a reasonable estimate of the reorganized firm's value, it is not possible to determine the residual claimant on the firm. Matters might be further complicated if the reorganization value depends on which creditor class owns the firm. Therefore, Coasian bargaining fails in the absence of well-defined property rights (Hart and Moore (1990), Hart (2017)). Rights offerings in Chapter 11 have evolved as a market-based response to these bargaining frictions. The simple framework outlined in this section shows how rights offerings can be valuable not only by making valuation disputes between different creditor classes irrelevant but also by mediating valuation differences within the same class of claimants. Rights offerings allow for separation between claimants within the same class, where the ones that are optimistic about the reorganized firm can purchase equity rights in the new firm, while the others can choose to accept cash recoveries from the proceeds of the underwritten rights offering.

Given that my study analyzes firms that have already filed for Chapter 11, the focus of my model is exclusively on assessing the ex-post efficiency of the reorganization process. It is worth highlighting that some level of ex-post inefficiency in bankruptcy might be efficient ex-ante, for instance, by penalizing management adequately in bankruptcy states (Hart (2017)) or by encouraging firms to discipline their borrowing (Glover (2016)). Investigating the ex-ante impact of reducing the costs of Chapter 11 is an important topic for future research (see Bebchuk (2002), Donaldson et al. (2020), and Schoenherr and Starmans (2022)).

2.3 Traditional forms of bankruptcy financing

An extensive literature has recognized that asset sales are used to arrange financing when a firm is facing financial distress (Maksimovic and Phillips (1998, 2001), Pulvino (1998), Hotchkiss and Mooradian (2003)). Section 363(b) is a formal process in the U.S. bankruptcy code (11 U.S.C §363(b)) that allows the managers of the bankrupt firms to sell assets that are outside of the normal course of business. §363 is an expedited asset sale process that only requires the approval of the bankruptcy judge, and does not require any formal voting or consent by creditors. The size of the assets sold in §363 sales can range from a single piece of equipment to the entire firm. The process of a §363 sale involves the debtor entering into a proposed purchase agreement with a potential buyer

valuations. However, when there are dispersed unsecured creditors, it is unlikely that the hedge fund knows each creditor's valuation, and to coordinate this information the hedge fund proposes to underwrite a rights offering at a particular price.

(known as the "stalking horse bidder"). If the bankruptcy judge approves the asset sale, bids from other potential buyers are solicited. In the presence of multiple bidders, an auction mechanism is typically used to clear the bids. Subsequent to the auction, the judge approves the asset sale to the winning bidder at a formal hearing. The bankruptcy judge uses their discretion to determine if the asset sale is justified, and whether the firm would be in worse financial shape without this sale.

In my sample period of 2003–2020, §363 sales have been used in around 28% of bankruptcy filings to generate a total of $17.9 billion in financing. During the same period, rights offerings have been used in 24% of cases to inject $42 billion of fresh capital into bankrupt firms. I find that no firm that was financed by rights offering sold any assets in a §363 sale. Figure 1 plots the percentage of firms involved in §363 asset sales (red line) and rights offerings (grey line). The correlation coefficient between the two series is −31%. Further, the graph shows that in the last decade (2011–2020), §363 sales have been used in only 9% of the bankruptcies, while rights offerings have been used in 46% (by asset size). In recent work, Antill (2022) documents that §363 asset sales in bankruptcy destroy firm value and significantly reduce creditor recoveries. The trends in bankruptcy financing seem to suggest that rights offerings are substituting for §363 sales, and that when market conditions are appropriate distressed firms choose to raise financing via rights offerings instead of asset liquidations. I explore these issues later in my paper.

Firms in bankruptcy are generally low on working capital and have run out of debt capacity, and thus the provisions of Chapter 11 allow for a special kind of "super-priority" financing known as DIP (debtor-in-possession) financing. The DIP facility may be used to fund the operations of the firm while it stays in Chapter 11 bankruptcy protection. The amount and terms of the DIP loan are approved by the bankruptcy judge in a formal court hearing, and the consent of prepetition secured lenders is required to modify or release the collateral for securing the DIP facility. As the collateral used for securing the DIP financing is typically already subject to an existing lien by prepetition creditors, these creditors are in a strong position to block any new lenders from providing the DIP facility (Eckbo et al. (2021)). It is therefore not uncommon to find very limited participation in the DIP loan bidding process, and generally the DIP facility comes from the prepetition creditors.

3 Data

3.1 Data Sources

The analysis in this paper is based on Chapter 11 filings during the period 2003–2020, collected from the UCLA LoPucki Bankruptcy Research Database (BRD). BRD comprises of the entire universe of large publicly listed firms that filed for Chapter 11 bankruptcy protection, with assets greater than $100 million (in constant 1980

dollars). I begin my sample from 2003, as all the U.S. bankruptcy courts started to maintain electronic records of case dockets on PACER (Public Access to Court Electronic Records) only in 2002. I hand-collected data on the details of bankruptcy financing, resolution, and recovery rates from court dockets on BankruptcyData.com and PACER. BankruptcyData.com is a product of New Generation Research that includes case information (and case dockets) for all U.S. corporate bankruptcies. I supplemented and cross-verified this data from news filings on Factiva and 10K statements collected from the SEC EDGAR database. Financial information for the firms filing for bankruptcy is collected from CapitalIQ and COMPUSTAT. A description of variables and data sources is summarized in Table IA.1.

My main sample comprises 396 Chapter 11 filings from 2003 to 2020. Pre-packaged bankruptcy cases are excluded from the main sample, as the decisions on reorganization, financing, and claim distributions have been made prior to filing for bankruptcy. The main sample is restricted to non-financial bankruptcies. An alternate training sample of bankruptcy exit classifications from BankruptcyData.com is used to construct the judge liquidation taste variable. BankruptcyData.com includes exit information on 2,288 large non-prepackaged Chapter 11 bankruptcy filings that are not part of the main sample. These cases are used as a training sample. Following Bernstein et al. (2019) and Antill (2022), the liquidation taste for the judges is calculated as the fraction of their training sample cases that were converted to Chapter 7 (excluding dismissals). As the training sample cases are disjoint from the main sample, there is no mechanical correlation between the judge liquidation taste and reorganizations in my main sample.

3.2 Summary Statistics

In Table 1 Panel A, I summarize firm and bankruptcy characteristics for my main sample of U.S. Chapter 11 filings during the period 2003–2020. Statistics are reported separately for three subsamples: (i) firms that financed their bankruptcy exit via rights offerings, (ii) firms that financed their exit via Section 363 asset sales, and (iii) the remaining firms, those that did not engage in §363 sales or rights offerings. Of the 396 bankruptcy filings, 99 firms engaged in rights offerings, and 110 firms sold assets in §363 sales. I find that larger firms with average assets of $4.23 billion raise financing via rights offerings, compared with smaller firms with average assets of $1.87 billion engaging in §363 sales. The leverage ratio of firms involved in rights offering is significantly higher than that of firms selling assets in §363 sales. Interestingly, the percentage of secured debt in a firm's total debt (the *secured debt share*) is highest, averaging 69%, for firms selling assets in §363 sales. This is consistent with the evidence presented in Gilson et al. (2016) and Ma et al. (2021), who attribute §363 sales to greater use of secured debt.[21] Secured debt percentage is lower, averaging 55%, in firms raising finance via rights offerings, compared with 62% in the remaining firms that are neither involved in rights offering nor in §363 sales. This difference can

[21] Other papers in the literature have also documented the liquidation bias of secured creditors, including Ayotte and Morrison (2009), Vig (2013), and Bergström et al. (2002).

be explained by the fact that rights offerings are generally proposed by unsecured creditors and equity holders, and their occurrence is therefore more prevalent in firms with lower secured debt share. There is no significant difference in profitability (as measured by EBITDA/Assets) among the three subsamples of firms. I explore these differences in a multivariate setting in the next section.

The median number of plans filed by firms engaging in rights offering is 2, indicating that rights offerings are probably more likely in more complex bankruptcies. Consistent with Jiang et al. (2012), I find that hedge funds owning debt and/or equity positions in the firm participate in 86% of bankruptcy proceedings.[22] I report that there is a greater likelihood of hedge funds being involved in those bankruptcy cases where financing is being raised via rights offerings. There is no significant difference in the amount of approved DIP financing (scaled by the firm's assets) in the three subsamples of firms. It is not surprising to find that a larger proportion of firms engaging in rights offerings form equity committees during their bankruptcy proceedings, given that rights offerings are often proposed by unsecured creditors' committees and/or equity committees. The average judge liquidation bias is lowest for firms raising financing via rights offerings, and the S&P returns prior to the firm emerging from bankruptcy are slightly higher for these firms.

In Panel B, I summarize the outcomes for the three subsamples of bankruptcies. I find that 70% of firms selling assets in §363 are ultimately liquidated, while none of the firms engaging in rights offering are liquidated. Another 24% of firms involved in §363 asset sales are immediately acquired upon exiting bankruptcy. I also report that the average duration of 10.5 months for Chapter 11 cases for which the firms did not liquidate assets in §363 sales is significantly shorter than the average duration of 17 months for cases in which firms did engage in §363 sales. The overall creditor recovery rate, calculated as the ratio of total distribution to all creditors over their total claims, is highest for firms engaging in rights offering (58%) and lowest for firms involved in §363 asset sales (37%). The lower recovery rates of creditors of firms selling assets in §363 sales is consistent with the evidence documented in Antill (2022). Similar patterns are observed in the secured and unsecured creditors' recovery rates, and these differences are statistically significant. I report that shareholders receive a distribution in 34% of the bankruptcies that are financed via rights offerings. This proportion is significantly higher than the proportions for the subsamples of §363 asset sales (5%) and of the other bankruptcy filings (18%). 56% of the firms that engaged in rights offering emerged as publicly listed firms with their equity securities being traded on stock exchanges. Interestingly, the other 44% of firms arranging financing via rights offering were taken private upon emergence, a pattern generally associated with increased (and concentrated) hedge fund participation in the exit financing process.

Bankruptcy filings in the U.S. are highly concentrated among a few court districts. Roughly 60% of the Chapter 11 cases (both in terms of numbers and asset size) are filed in New York Southern District (SD) and Delaware.

[22] I am extremely grateful to Wei Jiang, Kai Li, and Wei Wang for sharing their data set on hedge fund participation in the Chapter 11 process. Following their methodology, I have expanded the hedge fund participation data set to my sample period.

Also, 60% of all the rights offerings are concentrated in these two courts. In these courts, roughly 30% of all Chapter 11 filings (in terms of asset size) are financed by a rights offering. In the context of Chapter 11 filings and rights offerings, two other large court districts stand out. In terms of asset size, Texas SD accounts for 15% of the Chapter 11 filings and 20% of all the rights offerings. Virginia Eastern District (ED) accounts for both 5% of the filings and 5% of all the rights offerings. Asset size weighted, 50% of the Chapter 11 filings in Texas SD, and 40% of the Chapter 11 filings in Virginia ED are financed by a rights offering.

Rights offerings are split across several industry sectors. The mining sector accounts for roughly 20% of the Chapter 11 filings and 30% of all the rights offerings. Size weighted, 57% of the Chapter 11 filings in the mining industry are financed by rights offering. While, 37% of the Chapter 11 filings in the transportation, communications, electricity, and gas sector are financed by rights offerings. This sector accounts for both 36% of the Chapter 11 filings and 36% of all the rights offerings (in terms of asset size). The manufacturing industry also accounts for both 30% of the Chapter 11 filings and the rights offerings (in terms of asset size). 30% of the Chapter 11 filings in the manufacturing industry are financed by rights offerings.

3.3 Characteristics and returns on rights offerings

In Table 2, I summarize the characteristics of rights offerings. The average size of financing arranged via rights offering is $438 million, and the median financing size is $175 million. Financing via rights offering makes up roughly 50% of the firm's total exit financing, the other 50% generally being arranged via traditional forms of financing such as secured loans. On average it represents 12% of prepetition assets and 21% of all impaired class claims. The class participating in the rights offering injects on average 36% of its prepetition claims into refinancing the reorganized firm. The proceeds from the rights offering represent 51% of the reorganized firm's equity value (as determined by the court valuation) and 28% of its enterprise value. In 75% of cases the rights offerings are subscribed by the unsecured creditors.

There is also a significant participation of hedge funds or private equity firms in about 70% of the rights offerings. The increased use of rights offerings can partly be attributed to the increasing assets under management (AUM) of hedge funds and private equity firms that specialize in the management of distressed securities.[23] By purchasing a slice of equity in the reorganized firm through the rights offering, these hedge funds tend to establish significant control rights in the new firm. In the subsample of firms that emerged as publicly listed with hedge funds proposing the rights offerings, I find that on average the hedge funds purchased 43% of the reorganized firm's equity. Also, 40% of the board members in the reorganized firm are directly associated with the hedge funds proposing the rights offerings.[24] I find that bankruptcy rights offerings allow participants to purchase

[23] The total AUM of hedge funds specializing in distressed securities has gone up from $10 billion in 2000 to $300 billion in 2020. See Figure IA.1.

[24] All these members are newly appointed by the hedge funds *after* the firm emerges from bankruptcy.

the reorganized firm's equity at an average 23% discount to the court-determined equity valuation. This could represent a reward for the risk undertaken by the participants in financing a distressed firm. Alternatively, it could also indicate supracompetitive pricing of these equity offerings due to the lack of participation in distressed financing markets.

In Figure 4, I plot the post-emergence equity returns for the firms that emerged as publicly listed from Chapter 11. Panel A shows that the average post-emergence cumulative abnormal returns for rights offerings participants are roughly 50%. These high returns persist for at least a year after the firm's emergence from bankruptcy. The returns are significantly higher than the average first-day IPO returns of 17.04% during the 2003–2020 period (calculated from data on Professor Jay Ritter's website (Ritter (2022))). In Panel B, I compare post-emergence returns for firms that raised financing via rights offerings with other firms that emerged from bankruptcy. The cumulative abnormal returns are calculated using the courts' plan value of the firms' equity. I plot the coefficients of regressing these returns on the incidence of rights offering, controlling for firm and bankruptcy characteristics, year of filing, court of filing, and industry fixed effects. Panel B shows that in the months after emerging from bankruptcy, firms that raised financing via rights offerings significantly outperform their post-bankruptcy peers, by around 33% (three months after emergence). During the same time, the realized volatility of the firms using rights offerings is not higher than that of the other firms that emerged from bankruptcy.[25] This finding is consistent with the improved performance of firms raising financing via rights offerings. By allowing hedge funds or private equity firms to purchase equity and control stakes, rights offerings provide these participants with high-powered incentives to improve the overall performance of the reorganized firm. Alternatively, the higher performance of these firms could also reflect a selection of better quality firms into rights offering financing.

The outperformance of the firms being financed by rights offerings post-emergence appears to be driven by the positive earning surprises for these firms. I calculate earnings surprise as the difference between the actual earnings (in the fiscal year after the firm emerges) and the earnings projected for the same period in the court plan, scaled by the earnings projected in the court plan. I find that the average earnings surprises are positive and significantly higher for the firms that raised financing via rights offering compared with the other firms that emerged from bankruptcy as publicly listed.[26] I observe similar patterns when comparing the earnings surprises calculated using analysts' expectations of net earnings. Additionally, I find that a year after emerging from bankruptcy, firms being financed by rights offerings have higher profitability and Tobin's Q compared with the other firms that emerged from bankruptcy.[27]

[25]The realized volatility is measured using the stock price of the newly issued equity securities of the reorganized firms. Figure IA.2 plots the coefficients of regressing realized volatility on the incidence of rights offering, controlling for firm and bankruptcy characteristics, year of filing, court of filing, and industry fixed effects.

[26]The average earnings surprises for firms that emerged from bankruptcy as publicly listed are reported in Table 11.

[27]Table IA.11 presents the results from regressing return on assets (ROA) and Tobin's Q on the incidence of rights offering.

4 Identification Strategy

4.1 Selection into rights offering

The univariate comparisons in Table 1 suggest that larger firms with a lower fraction of secured debt in their capital structure are more likely to use rights offerings to finance their exits from bankruptcy. In Table 3, I explore these differences in a multivariate setting. The dependent variable, *Rights Offering*, equals 1 if a firm secures exit financing via rights offering and 0 otherwise. All specifications include the year of filing fixed effects that control for macro trends in the availability and choice of financing. Industry fixed effects, defined using 2-digit SIC codes, are included to control for variations in the type of operation, business, and assets determining the financing needs of a firm. Court district fixed effects are also included to control for the firm's self-selection into a bankruptcy court (*forum shopping*), which might influence the bankruptcy outcomes (LoPucki and Whitford (1991), Eisenberg and LoPucki (1998)). In all the regressions, the standard errors are clustered at the filing-court district level to account for any correlation between cases filed in the same bankruptcy court (Bernstein et al. (2019), Iverson et al. (2020), Antill (2022)).

In column (1), I report that the probability of a rights offering significantly increases for larger and more profitable firms, with higher leverage ratios and lower fraction of secured debt in their pre-filing capital structure. I also find that the probability of completing a rights offering significantly decreases with an increase in the liquidation propensity of the bankruptcy judge, and with a decrease in the S&P returns during the book-building period.[28] Columns (2) and (3) further control for the court district of Chapter 11 filing and provide a sharper test for analyzing the effects of firm and bankruptcy characteristics on the rights offering choice. In column (2), I report that the probability of a rights offering significantly increases for larger firms, and doubling the asset size increases the probability of rights offering by 0.06.[29] I also find that a one-standard-deviation increase in the (pre-filing) leverage ratio increases the average probability of rights offering by 0.05. Similarly, a one-standard-deviation increase in the fraction of (pre-filing) secured debt decreases the average probability of a rights offering by 0.04. Similar results are reported in column (3).

As the probability of rights offering increases with firm size, this suggests that rights offerings are being used to reduce bargaining frictions in complex Chapter 11 cases. Firm size is often used as a proxy to measure firm complexity. I also use two other proxies to measure the bargaining complexity of the bankruptcy and find that rights offerings are more likely to be used in cases where firms have large numbers of creditors and more fragmented creditor classes. In its petition to file for bankruptcy, the firm reports a range of the number of creditors. Using

[28] For 31 of the 396 Chapter 11 filings the judge liquidation bias is not available, and therefore, the sample size in Table 3 columns (1) and (2) is 365 bankruptcies. In column (3), I exclude the judge liquidation bias variable and report the results for the full sample of 396 bankruptcies.

[29] The coefficient on $log(Assets)$ is 0.085 implying that doubling the assets increases the probability of rights offerings by $0.085 \times log(2) = 0.059$.

this data, I find that 77% of firms that use rights offering in bankruptcy have more than 1,000 creditors, and 47% of firms using rights offerings have more than 5,000 creditors. In the sample of firms that do not use a rights offering, 65% have more than 1,000 creditors, and 38% have more than 5,000 creditors.[30] Further, the average number of classes of claimants in a firm that uses rights offering is 14, compared with 11 for a firm that does not use rights offering.[31] These findings indicate that firms with more complex capital structures and larger coordination frictions are using rights offerings to overcome the bargaining complexity inherent in Chapter 11.

In column (2) of Table 3, I report that the coefficient on the judge liquidation bias, which measures the bankruptcy judge's propensity to convert Chapter 11 filings to Chapter 7 is −0.53. This implies that a one-standard-deviation increase in the liquidation propensity of the judge decreases the probability of a rights offering by roughly 0.09. Lower liquidation bias of the judge implies the firm is more likely to be reorganized, and therefore, there is a higher chance of a rights offering.[32] While the bankruptcy code is uniform at the federal level, bankruptcy judges' interpretation of the law varies significantly (LoPucki and Whitford (1992), Bris et al. (2006), Chang and Schoar (2013)). The liquidation bias variable is calculated from a separate training sample of Chapter 11 cases that is disjoint from the main sample of bankruptcies, ensuring that there is no mechanical relationship between the liquidation propensity and the bankruptcy outcome for any case.

In column (2), I also report that the coefficient on the S&P returns during the book-building period is 0.96, implying that a one-standard-deviation increase in market returns increases the probability of rights offering by around 0.07. The estimate is both economically and statistically significant. I exploit the variations in the S&P 500 returns over the two-month book-building period prior to emergence from bankruptcy as an instrumental variable for rights offering completion. I discuss this in detail in the subsequent subsections.

What is a reasonable counterfactual for firms that decide to raise financing via rights offering in bankruptcy? One might argue that the firms that were ultimately liquidated in Chapter 11 were of worse quality than those that were reorganized. In columns (4) – (6), I restrict my sample to firms that were reorganized and emerged from Chapter 11 as going concerns. In the sample of firms that were reorganized, I continue to find that larger firms with a lower fraction of secured debt are more likely to raise financing via rights offering. Further, I also report that a one-standard-deviation increase in judge liquidation bias decreases the probability of a rights offering by 0.13, while a one-standard-deviation increase in S&P returns increases this probability by 0.13 (column (5)). In columns (7) – (9), I exclude the firms liquidating their assets in §363 sales from my sample. I continue to find

[30] Refer to Table IA.9. Additionally, all my results are robust to controlling for the number of creditors in the firm.

[31] Figure IA.4 plots the distribution of the number of classes of claimants in firms that filed for bankruptcy. The distribution curve for firms using rights offerings (blue curve) dominates that of firms not using rights offerings (red curve). This suggests that firms using rights offerings have more fragmented capital structures.

[32] Within the sample of reorganized firms also lower liquidation bias of the judge predicts a higher propensity to do a rights offerings. I find that a judge who has a bias towards liquidating the firm requires a greater size of investment in rights offerings to substantiate the valuation of the participants. In Table IA.8, I report that the size of the rights offering as a percentage of the enterprise value of the firm increases with the liquidation bias of the judge. Also, the size of the rights offering as a percentage of the pre-petition assets increases with the liquidation bias of the judge.

that firm size, judge liquidation bias, and S&P returns during the book-building period, are statistically and economically significant predictors of a rights offering. This sample partition allows me to compare the firms that arranged financing via rights offering with other similar firms in bankruptcy that did not liquidate their assets in §363 asset sales. As a robustness test, I repeat these regressions in the Probit setup and continue to find similar results.[33]

4.2 Empirical Design

Identifying the effect of rights offerings on distressed firms' outcomes is challenging as several firm, industry, and market characteristics drive the firms' inherent selection into their financing choice. To address this bias, I compare the bankruptcy outcomes for firms financed with rights offering with similar firms in the same industry that filed for Chapter 11 bankruptcy in the same year and in the same court. The baseline specification is

$$Y_i = \beta \ \textit{Rights Offering}_i + X_i'\gamma + \alpha_t + \alpha_k + \alpha_c + \epsilon_{1i} \tag{1}$$

where Y_i measures the bankruptcy outcome (for instance, the duration of Chapter 11 and recovery rate) for firm i. The indicator variable of interest, $\textit{Rights Offering}_i$ equals 1 if the firm arranges exit financing via rights offering and 0 otherwise. Under the null hypothesis that rights offerings do not affect bankruptcy outcomes, β should not be statistically different from zero. X_i includes control variables that might affect the firm's ability to arrange different forms of financing. Specifically, I include controls for the firm's pre-filing assets, leverage ratio, percentage of secured debt, and profitability. I also control for the following bankruptcy process characteristics: the presence of creditors and equity committee, and the experience of the bankruptcy judge assigned to the case. To control for changes to the valuation of the bankrupt firm after it files for bankruptcy, I control for the S&P returns from the date of filing to the date of emergence from bankruptcy. The specification includes year of filing fixed effects (α_t), industry fixed effects (α_k), and court-district of filing fixed effects (α_c).

A crucial challenge in identifying the effects of rights offering on bankruptcy outcomes is the implicit selection issue that arises from the decision to raise financing via rights offering. If the decision to raise financing via rights offering is related to unobservable firm or bankruptcy characteristics (captured in the error term, ϵ_{1i}), then the estimate of β will be biased. For instance, it might be that unsecured creditors and equity holders only propose rights offerings for "good" viable firms. Therefore, the financing via rights offering might be restricted to higher quality firms. If this were the case, the better bankruptcy outcomes for firms engaging in rights offering would be due to the higher quality firms selecting into rights offering. This selection would result in an upward

[33] In Table IA.2, I report the Probit regression coefficients and continue to find that larger firms, that experience higher S&P returns during their book-building period, and are assigned to judges with low liquidation bias are more likely to be financed via rights offerings.

bias in the estimate of β. Alternatively, it might be that rights offerings are being used in complex Chapter 11 cases to overcome bargaining frictions between creditors. In this case, one would be comparing straightforward bankruptcy resolutions that did not use rights offerings with complex bankruptcy cases that use rights offerings, and one might not observe any improvements in bankruptcy outcomes owing to rights offerings. Thus, the unobservable complexity of a case would result in a downward bias in the estimate of β. To test whether the undertaking of rights offering improves bankruptcy outcomes, one must compare two otherwise identical bankruptcy cases that do and do not arrange financing via rights offerings.

To identify the causal effect of a rights offering on bankruptcy outcomes, I instrument for the rights offering completion choice using the CRSP equal-weighted S&P 500 return fluctuations over the two months prior to the firm's emergence from bankruptcy. The relevance of this instrument relates to the limits to arbitrage theories proposed by Shleifer and Vishny (1997) and Gromb and Vayanos (2002).[34] Aggregate market fluctuations impact whether arbitrageurs like hedge funds are able to provide capital and eliminate mispricing in the financial markets. As hedge funds and PE firms generally propose and underwrite rights offerings, the capital constraints of these investors play an important role in determining the rights offerings' propensity. Related literature has found short-run market fluctuations to be a strong predictor of IPO activity (see Busaba et al. (2001), Benveniste et al. (2003), Dunbar and Foerster (2008)). Bernstein (2015) and Borisov et al. (2021) use market fluctuations during the book-building period as an instrument for IPO completion. In recent work, Guenzel (2023) uses market fluctuations to instrument for varying acquisition costs during M&A deals.

Firms in Chapter 11 propose rights offerings in the disclosure statement of the reorganization plan prior to their emergence from bankruptcy (see Figure 2 for an illustration of the bankruptcy timeline). About a month after filing the reorganization plan, the firm emerges from bankruptcy after the court has approved the plan. The book period in my analysis spans the two months before the plan filing. Therefore, I define the start of the book-building period as 90 days before the firm emerges from bankruptcy. For measuring the market fluctuations instrument, I choose a fixed length window of two months for all firms to avoid any possible correlations between the length of the actual book-building period and the bankruptcy outcome.[35] The instrument relies on the sensitivity of rights offering completion to market fluctuations during the book-building phase.

To implement the instrumental variables approach, I estimate the following first-stage regression:

$$Rights\ Offering_i = \delta\ S\&P_i + X_i'\gamma_2 + \alpha_t + \alpha_k + \alpha_c + \epsilon_{2i} \tag{2}$$

where $S\&P_i$ is the instrumental variable, measuring the two-month S&P returns during the book-building phase prior to the firm emerging from bankruptcy. As firms self-select into bankruptcy courts, I include court fixed

[34] Refer to Gromb and Vayanos (2010) for a comprehensive survey on the limits to arbitrage literature.

[35] The choice of a fixed length two-month window is motivated from Bernstein (2015) and Guenzel (2023). The results are also robust to choosing a 45-day window before filing the bankruptcy plan.

effects (α_c) to ensure that bankruptcy outcomes and financing choices within the same court district are compared. Further, year-of-filing fixed effects (α_t), industry fixed effects (α_k), and controls for the firm, market, and bankruptcy characteristics (X_i) are included in all specifications. In an additional specification, I include fixed effects for bankruptcy filing court × year (α_{ct}) to ensure comparison between firms that file for bankruptcy within the same court in the same year.

The second-stage equation estimates the effect of rights offering on bankruptcy outcomes:

$$Y_i = \theta \ \widehat{Rights\ Offering}_i + X_i'\gamma_3 + \alpha_t + \alpha_k + \alpha_c + \epsilon_{3i} \tag{3}$$

where $\widehat{Rights\ Offering}_i$ is the predicted value of the probability of a firm arranging financing via rights offering, estimated from equation 2. If the conditions for instrument validity are satisfied, θ measures the causal effect of rights offering on bankruptcy outcomes. I implement the instrumental variable estimator using the two-stage least squares (2SLS) procedure.

A salient feature of the instrumental variables regression is that the causal estimates are being determined only from the *sensitive* firms (Angrist and Imbens (1995)). That is, the estimates are coming from only those bankrupt firms that would alter their exit financing choices if the market conditions deteriorated while deciding on the terms of the rights offering. In my analysis, the effects of rights offering are, therefore, identified from differences in bankruptcy outcomes between similar firms that file for bankruptcy in the same year and court district but experience different post-filing S&P returns. In the following subsections, I discuss the assumptions that must be satisfied for the instrument to be valid.

4.3 First-Stage Regression

For the instrument to be valid, it must strongly affect the rights offering financing choice of the firm. The first-stage results, presented in Table 3 column (3), demonstrate the effect of S&P returns during the book-building phase on the rights offering choice. The dependent variable, *Rights Offering*, equals 1 if a firm secures exit financing via rights offering and 0 otherwise. The specification includes year of filing, court district of filing, and industry fixed effects. I also include the following controls for firm and bankruptcy characteristics: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors' committees, judge experience, and the overall market returns from the day of filing to the day of emergence from bankruptcy.

In column (3), I report that the probability of completing a rights offering significantly increases with an increase in the S&P returns during the book-building period. The coefficient on the S&P returns during the book-building period is 1.03, implying that a one-standard-deviation increase in market returns increases the

probability of rights offering by 0.07. These estimates are both economically and statistically significant. The Kleibergen and Paap (2006) F-statistic is 28.4, which is above the common threshold for weak instruments of 10 (Bound et al. (1995), Staiger and Stock (1997)). This suggests the instrument is strong and unlikely to be biased towards the OLS estimates.

To account for the time-varying trends in the selection of bankruptcy filings to different courts, I also control for court × year-of-filing fixed effects in a separate specification and continue to find similar results. As 75% of the Chapter 11 cases are filed in the courts of Delaware, New York, and Texas, I also restrict my sample to only cases filed in these three courts and report comparable results. All my results are also robust to excluding the control variables measuring the firm and bankruptcy characteristics. Further, as a robustness check, I control for the liquidation bias of the bankruptcy judge in the regressions. As the liquidation bias variable is not available for 31 cases, the sample size in this alternate specification is limited to 365 bankruptcies; however, all my results remain virtually similar.[36]

In column (6) of Table 3, I restrict my sample to firms that were reorganized and emerged from Chapter 11 as going concerns. In the sample of firms that were reorganized, I continue to find that the instrumental variable strongly affects the rights offering financing choice of firms. I report that a one-standard-deviation increase in S&P returns increases the probability of a rights offering by 14%. The F-statistic of the instrument (in this subsample) is 86, thereby ruling out a weak instrument's concern. In column (9), I similarly report that the instrument is both statistically and economically significant in predicting rights offering when firms liquidating their assets in §363 sales are excluded from the sample. The F-statistic of the instrument in the first-stage regression for this setup is 66.

4.4 The exclusion restriction condition

To be valid, not only does the instrumental variable need to affect the rights offering choice but it is also required to satisfy an exclusion restriction. That is, the instrument must not affect the bankruptcy outcomes through any other channel except for the decision to raise financing via rights offerings.[37] More specifically, the exclusion restriction requires that the instrument is uncorrelated with the residuals in equation 1. In this section, I present evidence that ameliorates concerns regarding the exclusion restriction.

[36] The results from including court × year-of-filing fixed effects are presented in Table IA.3. Table IA.4 reports results for the subsample of bankruptcies filed in Delaware, New York, and Texas. Table IA.5 presents results from excluding control variables. Results from including the judge liquidation taste as a control variable are presented in Table IA.6.

[37] These two requirements are sufficient to ensure the instrument's validity when treatment effects are homogeneous. If the treatment effects are heterogeneous, a monotonicity condition must also be satisfied in order to estimate the local average treatment effect (LATE). The monotonicity condition would require that all else equal; there must be no firms whose chances of arranging financing via rights offering increase as the S&P returns decline. In Appendix C and Figure IA.3, I present evidence that finds support for the monotonicity assumption.

It might be a potential concern that different types of firms file for bankruptcy during different market cycles, and the S&P returns might determine the type of firms that file for bankruptcy at a particular time. First, all my specifications control for year-of-filing fixed effects, and the coefficients are estimated by comparing firms that filed for bankruptcy in the same year.

Second, I test whether within the firms that filed for bankruptcy in the same year, there are any differences in characteristics between firms that experience different S&P returns during the book-building period prior to emerging from bankruptcy. In Table 4 Panel A, I split the sample of firms that filed for bankruptcy in the same year into four quartiles based on the S&P returns during the book-building phase. A firm is classified into the first quartile if the S&P returns during the two months of the book-building period are within the lowest 25% of bankruptcy filers in a given year. Similarly, firms are assigned to the second, third, and fourth quartiles based on the level of S&P returns. In columns (1)–(4), I report the mean value of firm and bankruptcy characteristics across the quartiles. Column (5) reports the p-value for testing for differences in the means between the first and fourth quartiles of firms. At the standard 10% significance level, there is no difference in the two sets of firms across a list of observable firm financial attributes and bankruptcy characteristics. This suggests that firms filing for bankruptcy within the same year face random S&P returns during their book-building periods.

I conduct the following placebo tests to address the concern that S&P returns might affect bankruptcy outcomes through channels other than rights offering. In Panel B, I regress creditor recovery rates on the two-month S&P returns during the book-building phase, that is, prior to the firm emerging from bankruptcy. In column (1), I report that these pre-emergence returns are significantly correlated with creditor recovery rates. If the exclusion restriction is violated, the two-month S&P returns affect recovery rates through channels other than the bankruptcy financing channel. These alternative channels should also be in force *outside* the book-building period of the rights offering when the firms' bankruptcy financing choice is fixed. Using this setting as a placebo, in column (2), I find that the two-month S&P returns immediately following the firm's emergence from bankruptcy do not predict creditor recovery rates. In column (3), I similarly find that the two-month S&P returns just prior to the firm filing for bankruptcy are not correlated with recovery rates. In columns (6) and (7), I repeat the analysis by including pre-emergence S&P returns and the returns outside the rights offering book-building phase. In contrast to the S&P returns prior to the firm's emergence from bankruptcy, outside the book-building window, S&P returns are not correlated with recovery rates.

Another concern could be that higher returns on the S&P index during bankruptcy might result in a higher firm valuation and, therefore, drive better bankruptcy outcomes. One might argue that a rising tide lifts all boats. To address this concern, all my specifications control for the S&P returns from the date of filing to the date of emergence from bankruptcy. Including the total S&P returns controls for the changes in firm valuation stemming from variations in the market condition while the firm operates in bankruptcy. Therefore, controlling for both

the pre-filing characteristics and the return on the market index during bankruptcy allows me to compare the outcomes for (similar) firms that made different financing choices based on the market fluctuations during the book-building window.

To further rule out the concern that higher levels of S&P index *during* the book-building window might lead to firm overvaluation, I test whether the average price-to-earnings ratio (P/E) of the S&P during the book-building period predicts recovery rates. In columns (3) and (8) of Table 4 Panel B, I show that the average P/E ratio of the S&P index during the book-building window is not correlated with creditor recoveries. As an alternate measure of overall market overvaluation, in columns (4) and (9), I use the average level of the S&P index during the book-building window. I find that the average index level is also not correlated with creditor recoveries. These findings are consistent with the notion that S&P fluctuations are likely to affect bankruptcy outcomes only through their impact on firms' bankruptcy financing choices.

As further evidence in support of my identification assumption, in Panel C, I report the univariate correlations between the instrumental variable and the firm and bankruptcy characteristics. Column (1) reports the correlation between the observable characteristics of firms that file for bankruptcy and the S&P returns during the book-building period. Column (2) reports the p-value of these correlations and finds that none of the characteristics are significantly correlated with the market returns. To supplement the univariate analysis, in Panel D, I present the results of randomization tests showing that the instrument is orthogonal to a comprehensive set of firm and bankruptcy characteristics. Column (1) of Table 4, Panel D reports that the adjusted R^2 of regressing the instrument on a set of year-of-filing fixed effects and no other controls is 0.122. In the next two columns, I add industry and court fixed effects, and their inclusion only lowers the adjusted R^2, indicating that the within-year variations between S&P returns are uncorrelated with industry and court fixed effects. In column (4), I include control variables for firm and bankruptcy characteristics and find that none of these variables are significant: the R^2 reduces by their addition. In column (5), I also include the judge liquidation bias and find no significant correlation with the market returns. My findings suggest that the S&P returns during the book-building period are orthogonal to a comprehensive set of industry, court, firm, and bankruptcy characteristics.

5 Results

5.1 Rights offerings and recovery rates

Existing literature finds that reorganizations in Chapter 11 are associated with higher creditor recovery than other forms of exit (Acharya et al. (2007), Bris et al. (2006), Ivashina et al. (2016)). Rights offerings encourage firm reorganization by increasing the space of available exit financing options for firms. LoPucki and Doherty (2007),

Gilson et al. (2016), and Antill (2022) document a negative relationship between Section 363 asset liquidations and creditor recoveries. This would imply that by avoiding Section 363 asset sales, rights offerings could positively impact creditor recoveries. In this section, I empirically test these hypotheses by regressing creditor recovery rates on the probability of completing a rights offering.

Table 5 reports the results. The dependent variable *creditors' recovery rate* is calculated as the ratio of the total amount of distributions over the total amount of claims. In column (1) of Table 5, I report the endogenous OLS model and find that using rights offering significantly increases the creditor recovery rate by 0.08 cents per dollar of debt claim. Column (2) reports the 2SLS estimate. Using rights offering significantly increases the total creditor recoveries by 0.36 cents per dollar of debt claim. The average recovery rate in the sample is 0.50 cents per dollar of debt claim, which implies a 72% increase in recoveries with the use of rights offerings. In another setting, I control for court $\times$ year-of-filing fixed effects to account for the time-varying trends in Chapter 11 filings across different bankruptcy courts and find similar results.[38]

Interestingly, the OLS coefficient reported in column (1) underestimates the effect of rights offerings on creditor recoveries compared to the IV estimate. This suggests that the selection bias associated with the decision to obtain financing via rights offering is negative, and on average, firms with worse creditor recovery prospects are more likely to be financed via rights offerings. These findings support the hypothesis that rights offerings are being used to reduce excess delays and increase recoveries in complex Chapter 11 cases, where junior creditor recoveries have traditionally tended to be lower. This is supported by the evidence presented in Section 4.1, where I document that larger bankruptcy cases, with higher numbers of creditors and more fragmented creditor classes, are more likely to use rights offerings. This suggests that firms with more complex capital structures and significant coordination frictions use rights offerings to ameliorate the bargaining complexity in Chapter 11.

In columns (3) and (4), I restrict my sample to the firms that reorganized and emerged as going concerns from Chapter 11 bankruptcy. In the OLS model in column (3), I report that using rights offering increases the recovery rate by 0.06 cents per dollar of debt claim. In the 2SLS estimates in column (4), I report that rights offerings significantly increase creditor recovery rates by 16 cents per dollar of debt claim in the sample of firms that emerged from bankruptcy as a going concern. This implies a 32% increase over the sample average recovery rate with the use of rights offering. In columns (5) and (6), similar effects are reported by excluding the sample of firms that liquidated their assets in §363 asset sales.

In Table 6, I test whether rights offerings increase the likelihood of shareholders receiving any distribution in bankruptcy. Pre-petition (old) shareholders may receive a payoff in Chapter 11 by retaining their stake in the reorganized firm after all the creditor claims are satisfied. In other instances, shareholders may receive cash through APR (absolute priority rule) deviations as a "gift" from other creditors. The dependent variable

[38]The results of this specification are presented in Table IA.3 columns (2)–(3).

shareholders' distribution equals 1 in cases where shareholders receive a payoff in the bankruptcy plan and equals 0 otherwise. I report the 2SLS estimate in column (2), finding that using a rights offering significantly increases the likelihood of distribution to shareholders by 47%. In columns (3) and (4), I restrict my sample to the firms that emerged as going concerns from Chapter 11 bankruptcy. In this sample, I find that shareholders were 34% more likely to receive a payoff if the firm raised financing via rights offering (column (4)). In columns (5) and (6), I report similar effects by excluding the sample of firms that liquidated their assets in §363 sales.

While the higher participation of hedge funds and private equity players might explain the higher recoveries associated with rights offerings in Chapter 11, my results suggest that this channel explains only some part of the better recoveries. When I restrict my sample to all the bankruptcy cases with hedge fund involvement, I continue to find that rights offerings significantly increase recovery rates.[39] Therefore, it is the interaction of rights offerings with hedge participation that leads to better recoveries.

The instrumental variable approach used here allows me to calculate a two-stage least squares (2SLS) estimate of the local average treatment effect (LATE).[40] This estimate measures the causal effect of rights offering on creditor recoveries for *compliers* or *switchers*: that is, the bankruptcy cases in which the S&P market fluctuations during the book-building period are the deciding factors for whether financing via rights offering takes place. It might be a potential concern that switchers might not be representative of an average case. Thus, this *local* estimate might not generalize to cases other than the switchers. For instance, S&P fluctuations are unlikely to alter the outcome of a case in which the unsecured creditors are unwilling to do a rights offering because their valuation of the firm is too low. To overcome this concern, I structurally estimate the model presented in Section 2.2 using SMM and compute the average increase in recovery rates for the cases that had access to a rights offering compared with the ones that did not. My estimation strategy closely follows Dou et al. (2021). I use the simulated minimum distance approach to estimate the model parameters by matching the model moments with the fraction of rights offering cases and the average secured and unsecured creditors' recovery rates in the data. The details regarding the model and estimation are presented in Appendix A.[41] My structural estimates suggest that having access to a rights offering increases creditor recovery rates by 15.3 cents per dollar of debt claim (a 30% increase in average recovery rates). This increase is similar in magnitude to the increase in recovery rates obtained by using the IV methodology on the sample of reorganized firms (see Table 5 column (4)).

[39] Table IA.7 reports the IV first-stage and second-stage results for the subsample of bankruptcies with hedge fund participation.
[40] Refer to Angrist and Imbens (1995) for a formal definition of the LATE.
[41] In Table IA.12 Panel A, I report that the model moments match the data moments pretty closely. Panel B reports the estimates and standard errors for the model parameters.

5.2 Recidivism

Several papers find evidence of firms refiling for bankruptcy after emerging from Chapter 11 as going concerns (Hotchkiss (1995), Gilson (1997), Roe (1983), and Altman (2013)). Around 18% of the firms emerging from Chapter 11 refile for bankruptcy. An interesting debate in this literature revolves around whether these high rates of recidivism reflect the continuation bias of the Chapter 11 process (Hotchkiss (1995), Altman (2013)). The alternate hypothesis suggested by Gilson (1997) emphasizes that firms emerge from financial distress with abnormally high leverage ratios compared with their industry peers, and are therefore forced to refile for bankruptcy in subsequent years. Further, Roe (1983) and Bebchuk (1988) argue that barriers to reducing debt in a reorganization are so strong that Chapter 11 should be replaced with an alternative system that either requires or encourages firms to adopt equity-heavy capital structures. In my setup, I find that using rights offerings significantly reduces the leverage ratio of the post-emergence firm. Firms that use rights offering emerge with a lower median leverage ratio of 45% (mean 44%) compared with the median leverage ratio of 57% (mean 56%) for firms that are not financed via rights offerings. These differences in leverage ratios are statistically significant at the 1% level.

I test whether using rights offering also lowers the refiling rate for firms emerging from Chapter 11 as going concerns. In Table 7, I report my results. In column (2) I find that using rights offerings reduces the probability of a firm refiling for bankruptcy within two years of emergence by 8%. The probability of refiling for bankruptcy at any time after emergence reduces by 46% (column (4)). Taken together, the results of lower post-emergence leverage ratios and lower refiling rates for firms financed by rights offerings are consistent with Gilson's (1997) hypothesis. Therefore, I conclude that firms using rights offerings are less likely to refile for bankruptcy which might be attributable to their less leveraged capital structures post-emergence.

5.3 Bankruptcy duration

Delays in bankruptcy proceedings increase the direct costs of financing bankruptcies. Longer-duration bankruptcies are associated with higher fees (LoPucki and Doherty (2004)). In this subsection, I document the impact of using rights-offering financing on bankruptcy duration. In column (1) of Table 8, I report the endogenous OLS model and find that rights offerings significantly reduce bankruptcy duration, by around three months. Column (2) reports the 2SLS estimate. The coefficient on rights offering is significant and equals -15.24, implying that firms that finance their bankruptcy exits via rights offerings spend on average 15 months less time in bankruptcy. In columns (3) and (4), I restrict my sample to the firms that reorganized and emerged as going concerns from Chapter 11 bankruptcy. In the OLS regression in column (3), I report that in the sample of reorganized firms rights offerings significantly reduce bankruptcy duration, by around a month. In the 2SLS estimates presented in column (4), I report that in the subsample of firms that reorganized, rights offerings significantly reduce

bankruptcy duration, typically by around three months. In columns (5) and (6), similar effects are reported by excluding the sample of firms that liquidated their assets in §363 asset sales.

Using a structural model, Dou et al. (2021) document that excess delay is one of the most costly bankruptcy inefficiencies. Specifically, they predict that the conflict of interest between senior and junior creditors and the asymmetric information between these two creditor classes causes excessive delays in the bankruptcy proceedings. They find that eliminating these two economic frictions reduces bankruptcy duration by around 13 months. As the rights offerings are being used by bankrupt firms to resolve these bargaining frictions, we would expect to find that their use reduces bankruptcy duration. I find empirical evidence in support of the hypothesis that rights offering are effective in reaching faster consensus between creditor classes in bankruptcy. Also, the delay and costs associated with arranging financing via rights offering and private placements is minimized as these securities are exempted from the SEC securities registration (Section 1145) process.

5.4 Shifts in corporate governance

I next study the impact of rights offerings on post-emergence corporate governance decisions of the firm. I find that firms that use rights offerings replace 84% of their board of directors upon emerging from bankruptcy, compared with 77% of the directors being replaced in firms that do not engage in rights offering. This difference is statistically significant at the 10% level.[42] Moreover, 40% of these newly appointed directors are directly associated with the hedge funds proposing the rights offering. During bankruptcy special types of bonus programs allow firms to retain their key employees. These are known as key employee retention programs (KERP) and key employee incentive programs (KEIP). These contracts had become increasingly commonplace in bankruptcies from the late 1990s, until Congress imposed restrictions limiting the use of these contracts in Bankruptcy Abuse Prevention and Consumer Protection Act (BAPCA) in 2005 (refer to Goyal and Wang (2017) for details). I find that there are considerable shifts in the corporate governance of firms using rights offerings, and these firms are less likely to use employee retention contracts during bankruptcy. The IV 2SLS results are reported in Table 9. Financing via rights offering reduces the probability of a firm using KERP/KEIP by 70% in the full sample, and by around 39% in the sample of firms that emerge from Chapter 11 (columns (1) and (2), respectively).

I also find that firms that were financed by rights offering are restructured differently and have a higher probability of being acquired in the three years post-emergence, compared with other bankrupt firms that were not financed via rights offerings. The dependent variable in columns (4) and (5) of Table 9, *mergers*, equals 1 if there have been any acquisitions, mergers, divestures, or spin-offs of the firm in the three years after its emergence from bankruptcy. The sample is limited to the firms that emerged from Chapter 11 as going concerns. I find in column (4) that rights offerings increase the probability of the firm being acquired in the years after emerging

[42] Please refer to Table 11.

from bankruptcy. This indicates that firms using rights offerings experience a shift in their corporate governance and are restructured differently post-emergence, compared with other firms that do not use rights offerings. As rights offerings are often proposed and subscribed by hedge funds, my findings are consistent with hedge funds playing an important role both during and post-emergence in the reorganized firms (Jiang et al. (2012)).

5.5 Are rights offerings substituting for asset liquidations?

In this subsection, I test if firms using rights offerings are less likely to engage in Section 363 asset liquidations. In Table 10 Panel A, I test which firm characteristics might affect the firm's choice to sell its assets in a §363 sale. The sample is restricted to firms that either engaged in rights offerings or §363 sales. The dependent variable is 1 if the firm engaged in rights offering and 0 if the firm sold assets in a §363 sale. In column (1), controlling for year-of-filing and industry fixed effects, I find that smaller firms with lower leverage ratios and higher secured debt share are more likely to sell assets in §363 sales. The presence of an equity committee strongly decreases the probability of a §363 sale. In column (2), I control for court-of-filing fixed effects and find similar results.[43] After controlling for the firm and bankruptcy characteristics at filing, I find that S&P fluctuations during the book-building phase strongly predict the probability of a rights offering. In column (2), I find that a one-standard-deviation increase in S&P returns increases the probability of a rights offering by around 7%. This evidence suggests that firms are more likely to replace asset sales with rights offerings to finance their exit from bankruptcy when market conditions prior to the emergence from bankruptcy are better.

In Panel B, I control for these observable firm and bankruptcy characteristics and test whether rights offerings substitute for §363 asset sales. I use the full sample of bankruptcies and the dependent variable, §363 sale, is 1 if the firm sold assets in a §363 sale during bankruptcy and 0 otherwise. In columns (1) and (2), I report the results for the full sample; the IV regression in column (2) suggests that rights offerings do not substitute for §363 sales. This indicates some unobservable variations on firm quality that explain whether the firm sells it assets in a §363 sale or finances itself via rights offering. This could be related to the fact that 70% of the firms that sell assets in §363 ultimately end up being liquidated. It might be argued that these firms were of lower (unobservable) quality, so that the asset sales could not be avoided. In columns (3) and (4), I restrict my sample to firms that emerge from Chapter 11 as going concerns. In this subsample of firms, I find that financing via rights offering reduces the likelihood of a §363 asset sale by 31% (column (4)). Therefore, in the subsample of firms that are reorganized in Chapter 11, I find that rights offerings are substituting for §363 asset sales.

[43] In columns (3) and (4), I report the Probit regression coefficients and still find that smaller firms with lower leverage ratios, higher secured debt share, and lower profitability are more likely to sell assets in §363 sales.

5.6 Unintended inter-claimant wealth transfers

By purchasing securities in the reorganized firm through rights offering in bankruptcy, a class of claimants can support a particular valuation of the reorganized firm. This allows for price discovery of the continuation value of the reorganized firm, reducing the uncertainty in court valuation of the firm and increasing the distributional efficiency of the bankruptcy process. Demiroglu et al. (2022) document that public dissemination of transactions in defaulted bonds of bankrupt firms reduces errors in court-determined value of the reorganized firm and largely eliminates inter-claimant wealth transfers. In this subsection, I test whether rights offerings improve the transparency of court valuations by reducing unintended wealth transfers. For this analysis, I focus on a subsample of firms that emerged as publicly listed after their bankruptcy proceedings. This allows me to calculate and compare the market value of a reorganized firm's equity with its court-determined value in the bankruptcy plan. Then I replicate the methodology followed by Demiroglu et al. (2022) to calculate the unintended wealth transfers resulting from the court misvaluation of securities.

Using the bankruptcy plan valuation, the court distributes securities of the reorganized firm to different claimants. Therefore, the recovery rate of the claimants depends on the market performance of these securities. This can be best explained using an example. Consider a very simple bankruptcy filing in which secured creditors are owed \$50 million and unsecured creditors are owed \$100 million, and suppose that the court determines that the value of the reorganized firm is \$100 million. For simplicity assume that no cash or notes distribution takes place and that the court distributes only the securities of the reorganized firm to the claimants. Based on priority of the claims, the court will distribute 50% of the securities of the new firm to the secured creditors for a plan-implied recovery rate of 100%, and the remaining 50% of securities to the junior creditors for a plan-implied recovery rate of 50%. However, suppose after emergence from bankruptcy the securities of the reorganized firm trade for \$140 million. This would imply a market recovery rate of 140% (= 70/50) for the secured creditors. This constitutes as an unintended deviation resulting from court misvaluation of the reorganized firm's securities. The size of the deviation in this case is \$20 million dollars, which is gained by secured creditors at the expense of unsecured creditors. The size of this deviation as a percentage of the plan equity value of the reorganized firm is 20% (= 20/100).[44] In the analysis that follows, I use a similar approach in calculating the size of unintended inter-claimant wealth transfers in the sample of firms that emerged from bankruptcy as publicly listed.[45]

In Table 11, I present my results. I have a sample of 118 firms that emerged from bankruptcy as publicly listed; 44% of these firms raised financing via rights offerings in bankruptcy. I continue to find that the recovery rate calculated from the market value of the firm's securities is higher for firms engaging in rights offerings

[44] If instead the market value of the firm was \$80 million, then the size of unintended deviation would be \$10 million. That is, unsecured creditors would have gained \$10 million at the expense of secured creditors.

[45] Please refer to Demiroglu et al. (2022) for additional details on the methodology.

compared with other firms. I report similar trends for secured and unsecured creditors' recovery rate, although the recovery rates are not statistically significantly different. I find that in 48% of bankruptcies involving rights offerings pre-petition equity holders get some distribution, as opposed to equity holders getting distributions in 33% of cases not involving rights offerings. Further, I report that the average earnings surprises are positive and significantly higher for the firms that raised financing via rights offering, compared with the other firms that emerged from bankruptcy. Moreover, I find that the probability of unintended wealth transfers is higher in firms that do not use rights offerings compared with firms that use rights offerings, at 24% and 15% respectively.[46] Similar trends are observed when comparing the size of these unintended wealth transfers. This indicates that the use of rights offerings helps avoid unintended inter-claimant wealth transfers in bankruptcy, thereby improving on the distributional efficiency of the Chapter 11 process.

6 Conclusion

This paper documents and analyzes the rising trend of distressed firms raising financing via rights offerings in U.S. Chapter 11 bankruptcies. Rights offerings allow firms to raise new capital by offering a class of creditors (or equity holders) the right to purchase equity in the post-emergence company. My paper shows that these rights offerings have evolved as a market-based solution to resolve the creditor bargaining frictions inherent in bankruptcy. Large uncertainties and valuation disputes among different creditor classes are commonplace in Chapter 11 bankruptcies. The disagreements in assigning a value to the reorganized firm often lead to excess delays, reduce creditor recoveries, and adversely effect the distributional efficiency of the Chapter 11 bankruptcy process. The distribution of securities via rights offering in bankruptcy ameliorates these frictions by allowing for the price discovery of the reorganized firm value. Through rights offerings the participating creditors can authenticate their beliefs by purchasing the securities of the firm at a particular price, thereby building creditor consensus around a particular valuation of the reorganized firm. It is therefore not surprising that these rights offerings are on the increase in Chapter 11 bankruptcies, with their use extending to 86% of bankruptcies in 2019 (by asset size).

Raising capital via rights offering is an attractive exit financing option for firms in bankruptcy, especially when the traditional sources of financing are limited and/or excessively costly. By expanding the space of available exit financing options, rights offerings allow firms to access new capital without resorting to asset liquidations or secured financing. In fact, I find that in my sample of firms that emerge from Chapter 11 the use of rights offerings displaces §363 asset sales. These sales have been negatively associated with creditor recoveries in the

[46] In Table IA.10, I report the results of regressing the unintended wealth transfers on the incidence of rights offering, controlling for firm and bankruptcy characteristics, year of filing, court of filing, and industry fixed effects. I find that raising financing via rights offering significantly reduces the likelihood of unintended wealth transfers.

literature (LoPucki and Doherty (2007), Antill (2022)). The firms in bankruptcy are most likely to replace §363 asset sales with rights offering financing when market returns are high. This finding is consistent with a large literature documenting increased IPO activity during periods of market booms.

My paper focuses on the resolution of U.S. Chapter 11 bankruptcies to document the increasing use of rights offerings, especially in large and complex bankruptcy cases. An open question for future research is whether rights offerings are being used in other countries to resolve bankruptcies. As bankruptcy laws differ across countries, it would be interesting to compare bankruptcy outcomes of using rights offerings across different jurisdictions. For countries that do not have similar going concern procedures as the U.S. Chapter 11 (for example, Sweden or the UK), there are no provisions for rights offerings inside the formal bankruptcy process. Although, it might be the case that in these countries, rights offerings are being used just prior to the firm formally filing for bankruptcy. Franks and Sanzhar (2006) document evidence of equity issues made by severely distressed firms in the UK during their restructuring efforts as a means to avoid filing for formal bankruptcy. These trends point to other market-based mechanisms that are similar to the rights offerings (inside Chapter 11), but are being adapted to the bankruptcy laws of different countries.

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Figure 1: Bankruptcy Rights Offerings and Section 363 Assets Sales

The figure plots the proportion of Chapter 11 bankruptcy cases that were financed via rights offerings. The grey line marked by circles plots the percentage of firms, by asset size at filing, that used rights offering (left axis). The red line marked by triangles plots the percentage of firms, by asset size at filing, that used Section 363 sales (left axis). The annual number of firms that filed for Chapter 11 are plotted as blue bars (right axis).

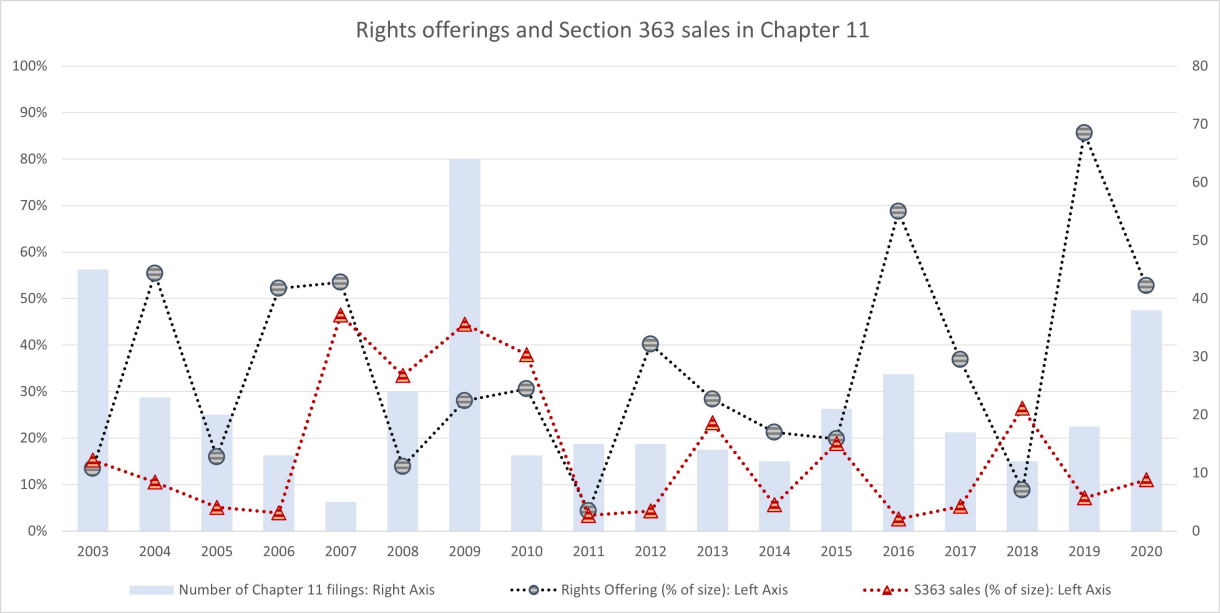


Figure 2: Chapter 11 Bankruptcy Timeline

This figure presents the key events during Chapter 11 reorganizations as well as the average time interval between each event and the filing date.

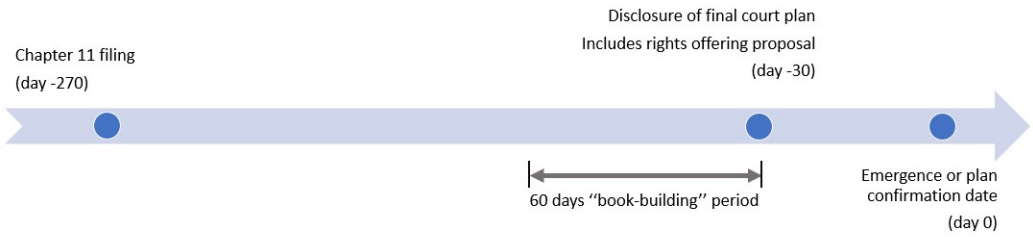


Figure 3: Framework of Rights Offering

The figure outlines a simplified framework for a typical rights offering.

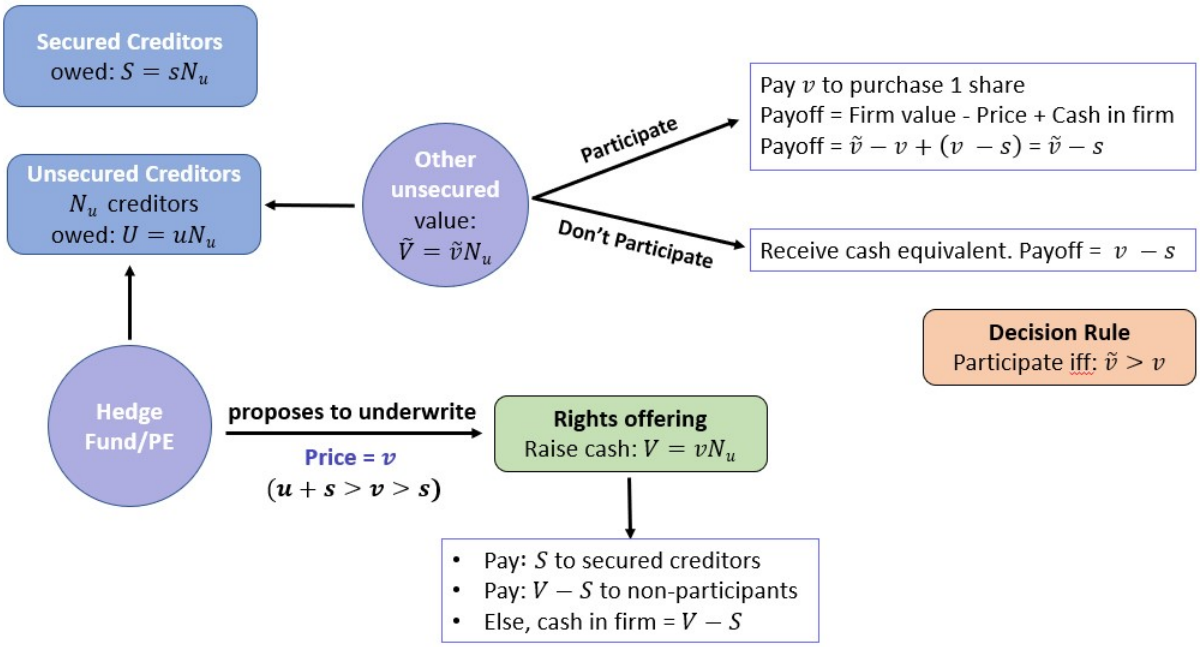
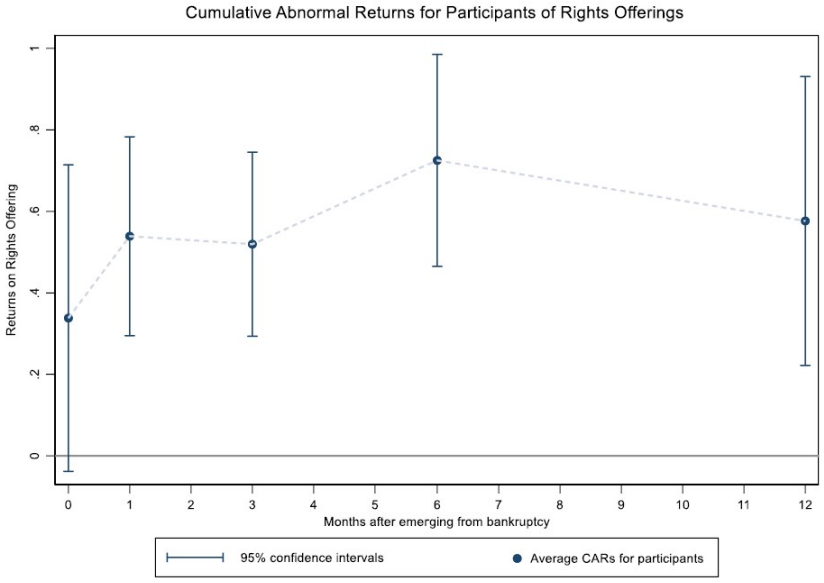


Figure 4: Returns to Rights Offerings Participants

The figure plots the returns to rights offerings for firms that emerged from bankruptcy as publicly listed firms. Panel A plots the cumulative abnormal returns (CAR) for the rights offering participants. The CAR returns are calculated as the difference between the CRSP equal-weighted index-adjusted (or market-adjusted) price of the newly issued equity securities of the reorganized firm and the rights offering participation price, scaled by the rights offering participation price of these securities. The CAR returns are calculated on the day of emergence and one month, three months, six months, and one year after emergence from bankruptcy. Panel B compares the market returns for firms that arranged financing via rights offering versus other firms that did not do so. In Panel B, the abnormal returns are calculated as the difference between the CRSP equal-weighted index-adjusted price of the newly-issued equity securities of the reorganized firm and the court's plan valuation, scaled by the court's plan valuation of these securities. The court's plan valuation is the court-approved equity valuation of the reorganized firm reported in the final bankruptcy plan/disclosure statement. Panel B plots the coefficients (β_m) and standard errors from the following regressions: $CAR_{i,m} = \beta_m \ \textit{Rights Offering}_i + X_i'\gamma + \alpha_t + \alpha_k + \alpha_c + \epsilon_i$ where $CAR_{i,m}$ measures the abnormal return for firm i, m months after its emergence from bankruptcy. $\textit{Rights Offering}_i$ equals 1 if the firm arranges exit financing via rights offering and 0 otherwise. X_i includes controls for the firm's pre-filing assets, leverage ratio, percentage of secured debt, profitability, presence of creditors' committee and/or equity committee, experience of the bankruptcy judge, and S&P returns from the date of filing to the date of emergence. The regression includes year-of-filing fixed effects (α_t), industry fixed effects (α_k), and court-of-filing fixed effects (α_c).

Panel A



Panel B

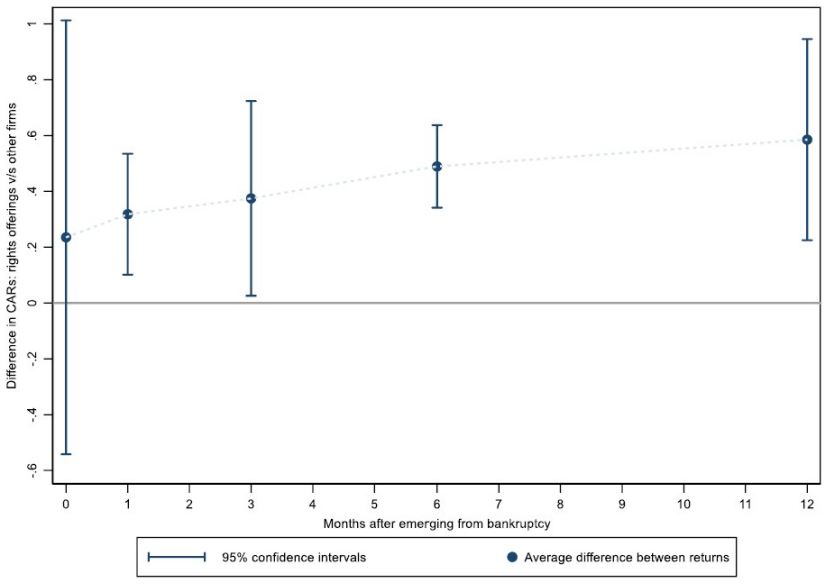


Table 1: Panel A: Summary Statistics

This table reports the summary statistics for U.S. Chapter 11 bankruptcy filings for the period 2003–2020. Statistics are reported for three subsamples of bankruptcies: (i) firms that financed their bankruptcy exit via rights offerings, (ii) firms that financed their exit via Section 363 asset sales, and (iii) the remaining firms, which did not engage in Section 363 sales or rights offerings. *Assets* reports the assets of the firm (in $ billion) at filing. *Employees* reports the number of employees with the firm at filing (in thousands). *Leverage Ratio* is the ratio of the firm's total debt to total assets at filing. *Secured Debt share* measures the proportion of the firm's total debt that is secured. *Bank loans/Assets* reports total bank debt as a proportion of the firm's prefiling assets. $Profitability$ is defined as the ratio of the firm's annual earnings (before interest, taxes, and depreciation) to its assets (EBITDA/Assets). *Number of plans* equals the plans filed by the firm in Chapter 11. *Hedge Fund Participation* equals 1 if hedge funds were involved (as equity holders or creditors) during the firm's bankruptcy proceedings. *DIP Loan/Assets* equals the amount of approved debtor-in-possession (DIP) loan scaled by the total assets of the firm at filing. *Creditors Committee* equals 1 if a formal committee of creditors was appointed during the bankruptcy proceedings. *Equity Committee* equals 1 if a formal committee of equity holders was appointed during the bankruptcy proceedings. *Delaware/NY SD* equals 1 if the bankruptcy case was filed in the courts of Delaware or the Southern district of New York. *S&P returns (from file to emerge)* measure the total S&P 500 index returns from the date of filing to the date of emergence from bankruptcy. *Judge liquidation bias* measures the fraction of Chapter 11 cases converted to Chapter 7 by the bankruptcy judge appointed on the case. *S&P Returns (pre-emergence)* reports the CRSP equal-weighted S&P returns over the two-month book-building period prior to the firm emerging from bankruptcy (the book-building period commences three months prior to the confirmation of firms' bankruptcy plan). The last two columns report the p-values of testing for the differences in columns (1) and (4) and columns (1) and (7) respectively, with the assumption of unequal variances.

	Rights Offering (N = 99)			§363 sales (N = 110)			Other filings (N = 187)			Differences	
	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.	(1)-(4)	(1)-(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	p-value	p-value
Firm Characteristics (pre-filing)											
Assets ($ billion)	4.23	1.64	8.85	1.87	0.61	8.70	2.72	0.81	5.02	0.054	0.119
Employees (in thousands)	8.90	2.89	15.25	9.57	2.70	26.78	7.62	2.59	18.18	0.823	0.528
Leverage Ratio	0.77	0.68	0.37	0.55	0.49	0.31	0.78	0.69	0.37	0.000	0.825
Secured Debt Share	0.55	0.59	0.33	0.69	0.80	0.34	0.62	0.66	0.34	0.016	0.102
Bank loans/Assets	0.28	0.23	0.24	0.29	0.26	0.24	0.35	0.26	0.40	0.722	0.073
Profitability	-0.01	0.06	0.36	-0.01	0.03	0.18	0.02	0.06	0.25	0.901	0.446
Chapter 11 Characteristics											
Number of plans	2.17	2	1.24	1.70	1	1.04	2.15	2	1.37	0.008	0.935
Hedge Fund Participation	0.90	1	0.30	0.83	1	0.38	0.87	1	0.34	0.131	0.407
DIP Loan/Assets	0.13	0.06	0.16	0.13	0.08	0.14	0.11	0.06	0.16	0.841	0.305
Creditors Committee	0.87	1	0.34	0.97	1	0.16	0.89	1	0.32	0.006	0.645
Equity Committee	0.19	0	0.40	0.06	0	0.25	0.10	0	0.30	0.006	0.036
Delaware/NY SD	0.58	1	0.50	0.65	1	0.48	0.55	1	0.50	0.245	0.625
S&P returns (from file to emerge)	0.14	0.13	0.15	0.18	0.14	0.26	0.12	0.10	0.16	0.263	0.317
Judge liquidation bias	0.54	0.56	0.13	0.61	0.61	0.16	0.57	0.57	0.18	0.000	0.121
S&P Returns (pre-emergence)	0.04	0.04	0.07	0.04	0.03	0.06	0.03	0.03	0.08	0.361	0.089

Panel B: Summary Statistics

This table reports the summary statistics for U.S. Chapter 11 bankruptcy filings for the period 2003–2020. Statistics are reported for three subsamples of bankruptcies: (i) firms that financed their bankruptcy exit via rights offerings, (ii) firms that financed their exit via Section 363 asset sales, and (iii) the remaining firms, which did not engage in Section 363 sales or rights offerings. *Liquidation/conversion* equals 1 if the firm was liquidated or the Chapter 11 bankruptcy case was converted to Chapter 7. *Acquisition* equals 1 if the firm was acquired upon exit. *Number of plans* equals the number of plans filed by the firm in Chapter 11. *Duration of Ch11* measures the number of months spent by the firm in Chapter 11, from the date of filing to the date of plan confirmation. *Creditors' Total Recovery Rate* is the total dollar amount distributed to all the creditors at the end of the bankruptcy, as a percentage of the total dollar amount of pre-petition claims. The recovery rates are calculated based on the plan value assigned by the court to the reorganized firm. *Secured Creditors' Recovery* is the dollar amount distributed to all the secured creditors at the end of the bankruptcy, as a percentage of the total dollar amount of secured creditors' pre-petition claims. *Unsecured Creditors' Recovery* is the dollar amount distributed to all the unsecured creditors at the end of the bankruptcy, as a percentage of the total dollar amount of unsecured creditors' pre-petition claims. *Shareholders' Distribution* equals 1 if the (pre-petition) equity holders received a payoff in the bankruptcy proceedings and 0 otherwise. *Emerged as publicly listed* equals 1 if the firm emerged as a publicly listed company upon exiting from bankruptcy. The last two columns report the p-values of testing for the differences in columns (1) and (4) and columns (1) and (7) respectively, with the assumption of unequal variances.

	Rights Offering (N = 99)			§363 sales (N = 110)			Other filings (N = 187)			Differences	
	Mean	Median	S.D.	Mean	Median	S.D.	Mean	Median	S.D.	(1)-(4)	(1)-(7)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	p-value	p-value
Bankruptcy Outcomes											
Liquidation/conversion	0	0	0	0.70	1	0.46	0.07	0	0.26	0.000	0.000
Acquisition	0.03	0	0.17	0.24	0	0.43	0.07	0	0.26	0.000	0.125
Duration of Ch11 (months)	10.34	8.47	7.95	17.17	11.70	17.23	10.57	8.57	7.63	0.000	0.811
Creditors' Total Recovery Rate	0.58	0.58	0.26	0.37	0.28	0.29	0.52	0.51	0.27	0.000	0.078
Secured Creditors' Recovery	0.85	1	0.24	0.73	0.99	0.33	0.80	1	0.27	0.002	0.097
Unsecured Creditors' Recovery	0.39	0.28	0.36	0.20	0.06	0.29	0.30	0.17	0.33	0.000	0.043
Distribution to Equity holders	0.34	0	0.48	0.05	0	0.23	0.18	0	0.39	0.000	0.042
Emerged as publicly listed	0.56	1	0.50	0.02	0	0.16	0.33	0	0.49	0.000	0.008

Table 2: Characteristics of Rights Offerings

This table reports the summary statistics for the rights offering financing facilities arranged in Chapter 11 bankruptcy filings. *Rights Offering Size* reports the amount of capital injected into the bankrupt firm via rights offering in million dollars. *Offering Size/Total Exit Financing* is the ratio of the rights offering amount to the total exit financing amount. Total exit financing includes all financing agreements made by the firm on emergence from bankruptcy, including rights offering financing and other secured financing loans. *Offering Size/Prepetition Assets* is the ratio of the rights offering amount to the total assets of the firm at the time of its filing for bankruptcy. *Offering Size/Impaired Class Claims* is the ratio of the rights offering amount to the total amount of claims of all the classes that were impaired by the firm's bankruptcy filing. *Offering Size/Participating Class Claims* is the ratio of the rights offering amount to the total amount of claims of all the creditors in the class that participated in arranging the rights offering. *Offering Size/Plan Equity Value* equals the ratio of the offering size to the court-approved equity valuation of the firm reported in the final bankruptcy plan. *Offering Size/Plan Enterprise Value* equals the ratio of the offering size to the court-approved total enterprise valuation of the firm in the final bankruptcy plan. The table also lists the participants in the bankruptcy rights offering. *Secured Claimants* equals 1 if the rights offering was subscribed by secured creditors and 0 otherwise. Similarly, *Unsecured Claimants* equals 1 if the rights offering was subscribed by unsecured creditors and 0 otherwise, and *Pre-petition Equity holders* equals 1 if the rights offering was subscribed by old equity holders and 0 otherwise. *Hedge Fund or Private Equity Firm* equals 1 if the rights offering was proposed and/or underwritten (i.e. backstopped) by hedge funds or private equity firms. *Rights Offering Discount to Plan Value* is calculated as the percentage of discount at which the rights issue securities are offered to the participating class of creditors. This discount is calculated with respect to the court-determined equity value of the firm in the bankruptcy plan. *Discount to Plan Value* reports the actual size of this discount in million dollars. *Discount (fraction of impaired class claims)* calculates the ratio of the dollar amount of the discount to the total amount of claims of all the classes impaired by the firm's bankruptcy filing. *Discount (fraction of participating class claims)* calculates the ratio of the dollar amount of the discount to the total amount of claims of the creditor class that participated in arranging the rights offering.

	Mean	Median	S.D.	N
Size of Rights Offering				
Rights Offering Size ($ million)	427.16	150	1010.90	99
Offering Size/Total Exit Financing	0.50	0.41	0.30	99
Offering Size/Prepetition Assets	0.12	0.10	0.11	99
Offering Size/Impaired Class Claims	0.21	0.14	0.23	96
Offering Size/Participating Class Claims	0.35	0.23	0.35	83
Offering Size/Plan Equity Value	0.50	0.43	0.32	93
Offering Size/Plan Enterprise Value	0.27	0.22	0.21	91
Participation in Rights Offering				
Secured Claimants	0.19	0.00	0.40	99
Unsecured Claimants	0.74	1.00	0.44	99
Pre-petition Equity holders	0.16	0.00	0.37	99
Hedge Fund or Private Equity Firm	0.70	1.00	0.46	99
Discount on the Rights Offering				
Rights Offering Discount to Plan Value	0.23	0.24	0.17	58
Discount to Plan Value ($ million)	145.17	47.25	298.02	58
Discount (fraction of impaired class claims)	0.07	0.03	0.10	57
Discount (fraction of participating class claims)	0.11	0.07	0.15	53

Table 3: Selection into Rights Offering

This table reports the determinants of rights offerings. The dependent variable *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. *Log(Assets)* is the logarithm of assets at filing. *Leverage* is defined as total debt over total assets. *Secured debt share* measures the percentage of secured debt in total debt. *Profitability* is defined as the ratio of the firm's annual earnings (before interest, taxes, and depreciation) to its assets (EBITDA/Assets). *Equity Committee* equals 1 if an equity committee was formed and 0 otherwise; *Creditors Committee* is similarly defined. *Log(Judge experience)* is the logarithm of judge experience (in months) calculated from the date of judge's appointment to the date of filing. *S&P returns (file to emerge)* measure the total S&P 500 index returns from the date of filing to the date of emergence from bankruptcy. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). *Judge liquidation Bias* is calculated as the fraction of Chapter 11 cases converted to Chapter 7 by the bankruptcy judge appointed on the case. *Delaware/NY SD* is 1 if the case was filed in Delaware or Southern District of New York. Columns (1) – (3) report results for the full sample of bankruptcies. Columns (4) – (6) exclude firms that were liquidated in bankruptcy (no firms that engaged in rights offerings were liquidated). Columns (7) – (9) exclude firms that made asset sales in Section 363 (no firms that engaged in rights offerings made Section 363 sales). All specifications include year-of-filing and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (2), (3), (5), (6), (8) and (9) also include court-of-filing fixed effects. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Rights Offering								
	Full Sample			Reorganized Firms			Excluding §363 sales		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
log(Assets)	0.0770***	0.0852***	0.0892***	0.0556*	0.0646**	0.0735***	0.0657*	0.0692**	0.0771***
	(0.021)	(0.020)	(0.016)	(0.030)	(0.031)	(0.026)	(0.033)	(0.028)	(0.024)
Leverage	0.140***	0.133***	0.108*	0.0867	0.0765	0.0382	0.0294	0.0232	-0.0271
	(0.037)	(0.040)	(0.056)	(0.071)	(0.082)	(0.083)	(0.067)	(0.080)	(0.086)
Secured Debt share	-0.137**	-0.112	-0.112**	-0.198**	-0.144	-0.172**	-0.130	-0.099	-0.107
	(0.060)	(0.072)	(0.052)	(0.078)	(0.105)	(0.083)	(0.121)	(0.138)	(0.120)
Profitability	0.096**	0.089*	0.083*	0.079	0.080	0.048	0.040	0.073	0.030
	(0.042)	(0.045)	(0.046)	(0.068)	(0.068)	(0.059)	(0.049)	(0.054)	(0.050)
Equity Committee	0.188	0.180	0.177	0.106	0.073	0.090	0.087	0.060	0.079
	(0.140)	(0.155)	(0.161)	(0.148)	(0.175)	(0.177)	(0.141)	(0.157)	(0.172)
Creditors Committee	-0.108	-0.103	-0.103	-0.084	-0.077	-0.050	-0.073	-0.059	-0.049
	(0.095)	(0.099)	(0.097)	(0.084)	(0.093)	(0.100)	(0.094)	(0.103)	(0.101)
log(Judge Experience)	0.003	0.006	0.006	-0.017	-0.024	-0.014	-0.015	-0.026	-0.016
	(0.016)	(0.018)	(0.017)	(0.024)	(0.024)	(0.020)	(0.040)	(0.041)	(0.036)
S&P Returns (file to emerge)	-0.072	-0.132**	-0.201**	0.083	0.014	-0.287	0.184	0.045	-0.173
	(0.065)	(0.058)	(0.093)	(0.156)	(0.108)	(0.194)	(0.167)	(0.177)	(0.222)
S&P Returns (pre-emergence)	0.859***	0.963***	1.025***	1.502***	1.832***	1.974***	1.338***	1.624***	1.785***
	(0.170)	(0.156)	(0.191)	(0.284)	(0.189)	(0.211)	(0.294)	(0.223)	(0.219)
Judge liquidation bias	-0.265**	-0.530***		-0.295*	-0.779***		-0.269*	-0.715***	
	(0.100)	(0.182)		(0.151)	(0.131)		(0.139)	(0.213)	
Delaware/NY SD	0.005			-0.011			0.0275		
	(0.070)			(0.081)			(0.091)		
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Court FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Observations	365	365	396	278	278	304	263	263	286
Adjusted R^2	0.093	0.056	0.041	0.056	0.051	0.012	0.064	0.046	0.016

Table 4: Panel A: S&P Returns and Firm Characteristics

This table presents the firm and bankruptcy characteristics for bankrupt firms that experienced different S&P drops during the book-building period of the rights offering. A firm is classified as being assigned to the first quartile of lowest S&P returns if the two-month S&P returns during its book-building period are among the bottom 25% of the distribution of all bankrupt firms in the same year. The firms in the second, third, and fourth quartile are classified similarly. That is, a firm is assigned to the fourth quartile if its S&P returns during the book building period are among the top 25% of the distribution of all bankrupt firms in the same year. Column (1) reports the average statistics for firm and bankruptcy characteristics for the firms assigned to the bottom 25% S&P returns, and columns (2)–(4) report these statistics for the second, third, and fourth quartiles of returns. Column (5) reports the p-value of testing for the differences in columns (1) and (4), with the assumption of unequal variances. All variables are defined in Table 1.

	S&P Returns (pre-emergence)				
	First Quartile	Second Quartile	Third Quartile	Fourth Quartile	Diff. (1)–(4) (p-value)
Firm Characteristics (pre-filing)					
Assets ($ billion)	2.59	3.55	2.10	3.17	0.5669
Employees (in thousands)	8.90	12.32	6.24	6.28	0.3619
Leverage Ratio	0.68	0.70	0.72	0.75	0.2087
Secured Debt share	0.56	0.64	0.67	0.60	0.5088
Bank loans/Assets	0.3	0.30	0.35	0.32	0.6955
Profitability	-0.01	0.00	0.00	0.02	0.5159
Chapter 11 Characteristics					
DIP Loan/Assets	0.13	0.12	0.14	0.10	0.1020
Creditors Committee	0.90	0.93	0.89	0.91	0.8466
Equity Committee	0.15	0.10	0.11	0.08	0.1336
Judge liquidation bias	0.59	0.57	0.54	0.58	0.6935
S&P Returns (from file to emerge)	0.11	0.15	0.17	0.14	0.2826

Panel B: Placebo Test

This table reports a placebo test to access the validity of the S&P returns instrumental variable exclusion restriction. The dependent variable *Creditor Recovery Rates* is calculated as the ratio of the total dollar amount of distributions to the total dollar amount of claims of all creditor classes. The claims and distributions are obtained from the bankruptcy disclosure statement. The distributions are calculated based on the plan value assigned by the court to the reorganized firm. *S&P Returns pre-emergence* are the two-month S&P returns during the book-building period, prior to the firm emerging from bankruptcy. *S&P Returns post-emergence* are the two-month S&P returns calculated immediately after the firm emerging from bankruptcy. *S&P Returns pre-filing* are the two-month S&P returns calculated from 60 days prior to the firm filing for bankruptcy. *Avg. S&P P/E pre-emergence* is the average of the two-months S&P price to earnings ratio during the book-building period, prior to the firm emerging from bankruptcy. The S&P P/E ratio is obtained from Bloomberg, it measures the price of the S&P index divided by the consensus estimate of the earnings per share (mean of sell-side analysts' estimates). *Avg. S&P Index pre-emergence* is the average of the two-months S&P index during the book-building period, prior to the firm emerging from bankruptcy (the average S&P index level is divided by 100). All specifications include year of filing, court of filing, and industry fixed effects (two-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, judge experience, and S&P returns from the date of filing to the date of emergence. The control variables are defined in Table 3. The model is estimated using OLS, and standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Creditor Recovery Rates								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
S&P Returns pre-emergence	0.377**					0.378**	0.365**	0.399**	0.327**
	(0.150)					(0.149)	(0.155)	(0.157)	(0.159)
S&P Returns post-emergence		0.012				0.042			
		(0.076)				(0.082)			
S&P Returns pre-filing			-0.188				-0.119		
			(0.122)				(0.120)		
Avg. S&P P/E pre-emergence				-0.0003				-0.005	
				(0.009)				(0.010)	
Avg. S&P Index pre-emergence					-0.012				-0.009
					(0.008)				(0.008)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	396	396	396	396	396	396	396	396	396
Adjusted R^2	0.256	0.250	0.253	0.250	0.246	0.255	0.258	0.256	0.258

Panel C: Correlation between Instrumental Variables and Firm Characteristics

This table presents the univariate correlation of firm and bankruptcy characteristics with judge liquidation propensity and with S&P returns during the book-building phase of the rights offering. All the firm and bankruptcy characteristics are demeaned for court of filing, year of filing and industry fixed effects. Column (1) reports the correlation between firm characteristics and judge liquidation propensity. Column (2) reports the p-value of this correlation. Column (3) reports the correlation between firm characteristics and S&P returns during the book-building phase of the rights offering. Column (4) reports the p-value of this correlation. All variables are defined in Table 1.

	S&P Returns (pre-emergence)	
	Correlation	p-value
Firm Characteristics (pre-filing)		
Assets ($ billion)	0.029	0.5646
Employees (in thousands)	-0.046	0.3598
Leverage Ratio	0.031	0.5427
Secured Debt share	0.049	0.3297
Bank loans/Assets	0.011	0.8325
EBITDA/Assets	0.032	0.5233
Chapter 11 Characteristics		
DIP Loan/Assets	0.036	0.4720
Creditors Committee	0.001	0.9809
Equity Committee	-0.028	0.5731
Judge liquidation bias	-0.042	0.4240

Panel D: Randomization Test (multivariate results)

This table reports the randomization test for the instrumental variable. The dependent variable *S&P Returns*, equals the two-month pre-emergence CRSP equal weighted S&P 500 returns (during the book-building phase). All specifications include year of filing fixed effects. Columns (2) – (5) additionally include industry fixed effects. Columns (3) – (5) additionally include court of filing fixed effects. The firm and bankruptcy characteristics are included in columns (4) and (5). These independent variables are defined in Table 3. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	S&P Returns (pre-emergence)				
	(1)	(2)	(3)	(4)	(5)
log(Assets)				-0.002	-0.002
				(0.004)	(0.004)
Leverage				0.007	0.007
				(0.012)	(0.013)
Secured debt share				0.010	0.001
				(0.012)	(0.013)
Profitability				0.013	0.011
				(0.014)	(0.015)
Equity Committee				-0.006	-0.006
				(0.013)	(0.013)
Creditors Committee				0.001	0.002
				(0.011)	(0.011)
log(Judge Experience)				-0.001	-0.002
				(0.004)	(0.004)
Judge liquidation bias					-0.040
					(0.041)
Year FE	YES	YES	YES	YES	YES
Industry FE	NO	YES	YES	YES	YES
Court FE	NO	NO	YES	YES	YES
Observations	396	396	396	396	365
Adjusted R^2	0.122	0.122	0.092	0.078	0.076

Table 5: Rights Offering and Recovery Rates

This table reports the effect of rights offering on creditor recovery rates. The dependent variable *Creditor Recovery Rates* is calculated as the ratio of the total dollar amount of distributions to the total dollar amount of claims of all creditor classes. The claims and distributions are obtained from the bankruptcy disclosure statement. The distributions are calculated based on the plan value assigned by the court to the reorganized firm. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year-of-filing, court-of-filing, and industry fixed effects (two-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, judge experience, and S&P returns from the date of filing to the date of emergence. Columns (1) and (2) report results for the full sample of bankruptcies. Columns (3) and (4) exclude the sample of firms that were liquidated. Columns (5) and (6) exclude firms that made asset sales in Section 363. Columns (1), (3), and (5) report the results using the OLS specification. In columns (2), (4), and (6) the instrumental variable 2SLS second-stage results are reported. The *S&P returns* during the book-building period are used as an instrument for rights offering completion. The first-stage instrumental variable regression is reported in Table 3. The first-stage F-statistic for the instrument is reported in the last row. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Creditor Recovery Rates					
	Full Sample		Reorganized Firms		Excluding §363 sales	
	OLS	IV 2SLS	OLS	IV 2SLS	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Rights Offering	0.079*	0.367***	0.057*	0.157**	0.054	0.142*
	(0.045)	(0.110)	(0.031)	(0.062)	(0.042)	(0.083)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES
Observations	396	396	304	304	286	286
Adjusted R^2	0.264	0.282	0.299	0.339	0.242	0.201
Instrument F-statistic (First Stage)		28.40		86.22		65.87

Table 6: Rights Offering and Distributions to (Old) Shareholders

This table reports the effect of rights offering on creditor recovery rates. The dependent variable *Shareholders' Distribution* equals 1 if (pre-petition) equity holders receive a payoff in the bankruptcy proceedings and 0 otherwise. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year-of-filing, court-of-filing, and industry fixed effects (two-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, judge experience, and S&P returns from the date of filing to the date of emergence. Columns (1) and (2) report results for the full sample of bankruptcies. Columns (3) and (4) exclude firms that were liquidated. Columns (5) and (6) exclude firms that made asset sales in Section 363. Columns (1), (3), and (5) report the results using the OLS specification. In columns (2), (4), and (6) the instrumental variable 2SLS second-stage results are reported. The *S&P returns* during the book-building period are used as an instrument for rights offering completion. The first-stage instrumental variable regression is reported in Table 3. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Shareholders' Distribution					
	Full Sample		Reorganized Firms		Excluding §363 sales	
	OLS	IV 2SLS	OLS	IV 2SLS	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Rights Offering	0.145***	0.474**	0.124***	0.340***	0.125***	0.379***
	(0.035)	(0.217)	(0.025)	(0.123)	(0.031)	(0.111)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES
Observations	396	396	304	304	286	286
Adjusted R^2	0.282	0.281	0.237	0.260	0.246	0.239

Table 7: Rights Offering and Recidivism

This table reports the effect of rights offering on refiling rates of firms emerging from Chapter 11. In columns (1) and (2), the dependent variable *Refiled (2 years)* is 1 if the firm refiled for bankruptcy in the two years after its emergence from bankruptcy and 0 otherwise. In columns (3) and (4), the dependent variable *Refiled (anytime)* is 1 if the firm has ever refiled for bankruptcy after emerging from its current bankruptcy. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year-of-filing, court-of-filing and industry fixed effects (two-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, judge experience, and S&P returns from the date of filing to the date of emergence. The sample includes all firms that emerged from Chapter 11 as going concern. Columns (1) and (3), report the results using the OLS specification. In columns (2) and (4), the instrumental variable 2SLS second-stage results are reported. The *S&P returns* during the book-building period are used as an instrument for rights offering completion. The first-stage instrumental variable regression is reported in Table 3. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Recidivism			
	Refiled (2 years)		Refiled (anytime)	
	OLS	IV 2SLS	OLS	IV 2SLS
	(1)	(2)	(3)	(4)
Rights Offering	-0.047	-0.080**	0.0003	-0.459**
	(0.040)	(0.036)	(0.058)	(0.210)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Court FE	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES
Observations	223	223	204	204
Adjusted R^2	0.256	0.249	0.395	0.318

Table 8: Bankruptcy Duration and Rights Offering

This table reports the effect of rights offering on the duration of Chapter 11 court cases. The dependent variable *Bankruptcy duration* equals the amount of time measured in months, that the firm spends in Chapter 11, from the date of its filing to the date of emergence. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year-of-filing, court-of-filing and industry fixed effects (two-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, and judge experience. Columns (1) and (2) report results for the full sample of bankruptcies. Columns (3) and (4) exclude the firms that were liquidated. Columns (5) and (6) exclude firms that made asset sales in Section 363. Columns (1), (3), and (5) report the results using the OLS specification. In columns (2), (4), and (6) the instrumental variable 2SLS second-stage results are reported. The *S&P returns* during the book-building period are used as an instrument for rights offering completion. The first-stage instrumental variable regression is reported in Table 3. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Bankruptcy Duration (months)					
	Full Sample		Reorganized Firms		Excluding §363 sales	
	OLS	IV 2SLS	OLS	IV 2SLS	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Rights Offering	-3.378***	-15.243*	-1.082*	-3.303***	-0.560	-3.849***
	(1.157)	(9.083)	(0.608)	(0.949)	(0.540)	(1.067)
Industry FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES
Observations	396	396	304	304	286	286
Adjusted R^2	0.111	0.117	0.394	0.391	0.398	0.415

Table 9: Rights Offering, Corporate Governance, and the Nature of Reorganization

This table reports the effect of rights offering on the corporate governance and post-emergence restructuring of the firm. The dependent variable in columns (1) to (3), *KERP/KEIP*, equals 1 if there were any key employee retention programs (KERP) or key employee incentive programs (KEIP) in place during the firm's bankruptcy process and 0 otherwise. The dependent variable in columns (4) and (5), *Mergers (within 3 years)*, equals 1 if there have been any acquisitions, mergers, divestures, or spin-offs of the reorganized firm in the three years after its emergence from bankruptcy and 0 otherwise. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year-of-filing, court-of-filing, and industry fixed effects (two-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, judge experience, and S&P returns from the date of filing to the date of emergence. The control variables are defined in Table 3. The results are reported on the sample of the firms that emerged from Chapter 11 as going concerns (i.e. they exclude the firms that were liquidated). All columns report the IV 2SLS results. The *S&P returns* during the book-building period are used as an instrument for rights offering completion. The first-stage instrumental variable regression is reported in Table 3. Column (1) reports the results for the full sample of bankruptcies. Columns (2) and (4) exclude the sample of firms that were liquidated. Columns (5) and (6) exclude firms that made asset sales in Section 363. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	KERP/KEIP			Mergers (within 3 years)	
	Full Sample	Reorganized	Excluding §363	Reorganized	Excluding §363
	(1)	(2)	(3)	(4)	(5)
Rights Offering	-0.697**	-0.393**	-0.342**	0.471***	0.439***
	(0.313)	(0.176)	(0.142)	(0.102)	(0.112)
Industry FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES
Observations	396	304	286	261	255
Adjusted R^2	0.180	0.146	0.160	0.207	0.198

Table 10: Panel A: Characteristics of Chapter 11 Rights Offering and Section 363 sales

This table compares the characteristics of firms that arrange exit finance via rights offerings with those that sell assets in Section 363 sales. The dependent variable *Rights Offering* is 1 for firms that were financed by rights offering and 0 for firms that liquidated their assets in Section 363 sale. *Log*(*Assets*) is the logarithm of assets at filing. *Leverage* is defined as the total debt over total assets. *Secured debt share* measures the percentage of secured debt in total debt. $Profitability$ is defined as the ratio of the firm's annual earnings (before interest, taxes, and depreciation) to its assets (EBITDA/Assets). *Equity Committee* equals 1 if an equity committee was formed and 0 otherwise. *Creditors Committee* equals 1 if a creditors' committee was formed and 0 otherwise. *Log(Judge experience)* is the logarithm of judge experience (in months) calculated from the judge's date of appointment to the date of filing. *S&P returns (file to emerge)* measure the total S&P 500 index returns from the date of filing to the date of emergence from bankruptcy. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). All specifications include year-of-filing and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (2) and (4) also include court-of-filing fixed effects. In columns (1) and (2) ordinary least square (OLS) estimates are reported, while in columns (3) and (4) the Probit estimates are reported. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Rights Offering or §363 sale			
	OLS Regressions		Probit Regressions	
	(1)	(2)	(3)	(4)
log(Assets)	0.171***	0.169***	0.903***	1.137***
	(0.045)	(0.040)	(0.211)	(0.271)
Leverage	0.522***	0.555***	2.453***	2.967***
	(0.101)	(0.109)	(0.460)	(0.760)
Secured debt share	-0.137**	-0.159**	-0.489*	-0.403
	(0.059)	(0.057)	(0.251)	(0.280)
Profitability	0.196**	0.144	1.041***	1.301***
	(0.091)	(0.112)	(0.349)	(0.413)
Equity Committee	0.401***	0.385***	1.984***	2.501***
	(0.135)	(0.129)	(0.602)	(0.780)
Creditors Committee	-0.241	-0.191	-1.333*	-1.052
	(0.160)	(0.172)	(0.777)	(0.884)
log(Judge Experience)	0.043	0.059**	0.147	0.397***
	(0.031)	(0.028)	(0.125)	(0.049)
S&P Returns (file to emerge)	-0.325***	-0.283***	-1.952***	-3.100***
	(0.088)	(0.065)	(0.701)	(0.806)
S&P Returns (pre-emergence)	0.698**	0.989***	4.685***	8.980***
	(0.299)	(0.330)	(1.039)	(2.247)
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Court FE	NO	YES	NO	YES
Observations	209	209	179	146
Adjusted/Pseudo R^2	0.344	0.372	0.486	0.571

Panel B: Are Rights Offering Substituting for Section 363 Sales?

This table tests whether rights offerings reduce the probability of a firm selling assets in a Section 363 sale during bankruptcy. The dependent variable, *Section 363 sale*, is 1 if the firm sold assets in a Section 363 sale during bankruptcy and 0 otherwise. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year-of-filing, court-of-filing, and industry fixed effects (two-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, judge experience, and S&P returns from the date of filing to the date of emergence. Columns (1) and (2) report results for the full sample of bankruptcies. Columns (3) and (4) exclude the subsample of firms that were liquidated. Columns (1) and (3) report the results using the OLS specification. In columns (2) and (4) the instrumental variable 2SLS second-stage results are reported.The *S&P returns* during the book-building period are used as an instrument for rights offering completion. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Section 363 sale			
	Full Sample		Reorganized Firms	
	OLS	IV 2SLS	OLS	IV 2SLS
	(1)	(2)	(3)	(4)
Rights Offering	-0.278***	-0.046	-0.143***	-0.312***
	(0.048)	(0.484)	(0.025)	(0.093)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Court FE	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES
Observations	396	396	304	304
Adjusted R^2	0.378	0.277	0.263	0.229

Table 11: Recovery Rates for Firms Emerging as Publicly Listed

This table reports the summary statistics for firms that emerged as publicly listed from Chapter 11 bankruptcy filings. Statistics are reported for two subsamples of bankruptcies: (i) firms that financed their bankruptcy exit via rights offerings and (ii) the other bankrupt firms, which did not engage in rights offerings. *Total recovery rate* is the amount distributed to all the claimants at the end of the bankruptcy as a percentage of their pre-petition claims, calculated based on the post-emergence market value of the firm. The market value of the reorganized firm is calculated from its stock price three months after its emergence from bankruptcy. *Secured creditors' recovery rate* is the amount distributed to all the secured claimants at the end of the bankruptcy as a percentage of their pre-petition claims, calculated in the same way. *Unsecured creditors' recovery rate* is the amount distributed to all the unsecured claimants at the end of the bankruptcy as a percentage of their pre-petition claims, again calculated based on the post-emergence market value of firms. *Distribution to equity holders* equals 1 if the pre-petition equity holders received any distribution in the bankruptcy proceedings. *Earnings Surprise (court plan)* equals the difference between the actual net earnings of the firm in the fiscal year after its emergence from bankruptcy and the net earnings projections for the same period in the court's valuation plan, scaled by the net earning projections in the court plan. *Earnings Surprise (analyst)* equals the mean forecast error in analysts' expectations about the net earning of the firm. It is calculated as the difference between the actual net earnings of the firm in the fiscal year after its emergence and the mean net earnings projections for the same period by the analysts, scaled by the analysts' mean net earning projections. The mean analyst earnings projections are collected from FactSet. *Unintended wealth transfer* equals 1 if there were any unintended wealth transfers between claimants due to differences in court plan value and market value of the reorganized firm. *Size of unintended wealth transfer* equals the dollar amount of the wealth transfers scaled by the average of the court plan valuation of the firms' equity. If there is an unintended wealth transfer, *Conditional size of unintended wealth transfer* equals the dollar amount of the wealth transfers scaled by the average of the court plan valuation of the firms' equity, otherwise it equals 0. *% of board of directors replaced* equals the number of directors that were fired/replaced from the board during bankruptcy scaled by the total number of directors immediately prior to filing for bankruptcy. The last column reports the p-value of testing for the differences in means with the assumption of unequal variances.

	Rights Offering (N=52)			No Rights Offering (N=66)			Difference
	Mean	Median	SD	Mean	Median	SD	(p-value)
Total recovery rate (market value)	0.80	0.69	0.73	0.69	0.66	0.29	0.1524
Secured creditors' recovery rate	0.95	1	0.20	0.93	1	0.31	0.3582
Unsecured creditors' recovery rate	0.60	0.42	0.81	0.54	0.53	0.40	0.3037
Distribution to equity holders	0.48	1	0.50	0.33	0	0.48	0.0531
Earnings Surprise (court plan): $(NI_{actual} - NI_{plan})/\|NI_{plan}\|$	0.57	-0.04	3.02	-1.44	-0.38	4.97	0.0227
Earnings Surprise (analyst): $(NI_{actual} - NI_{exp})/\|NI_{exp}\|$	0.33	0.00	1.19	-0.02	0.00	0.24	0.0602
Unintended wealth transfer	0.15	0	0.36	0.24	0	0.43	0.1200
Size of unintended wealth transfer (% of plan value)	0.06	0	0.27	0.10	0	0.36	0.2516
Conditional size of unintended wealth transfer	0.39	0.15	0.62	0.42	0.16	0.66	0.4689
% of board of directors replaced	0.84	0.88	0.19	0.77	0.86	0.28	0.0457

Appendix

A. Theoretical Framework

In this section, I discuss a framework that sheds light on the key frictions that rights offerings help ameliorate. The starting point of the model is the theoretical framework of Bebchuk (1988) and Aghion et al. (1992). Bebchuk (1988) proposes that all the existing debt of the firm is cancelled when the firm files for bankruptcy. The new ownership structure of the firm is homogenized to an all-equity firm, and reorganization rights (RRs) to this firm are created. The idea is to allocate all the new equity (or RRs) to senior creditors, and give junior claimants the option to buy back this equity from the senior creditors. Consider a simple example of a firm that files for bankruptcy, owing its senior creditors $100 million and its junior creditors $300 million. Bebchuk (1988) proposes that the firm is converted to an all-equity firm and that all this new equity is allocated to the senior creditors. The junior creditors have the option to purchase this new equity by paying the senior creditors $100 million, while the (pre-petition) shareholders have the option to purchase the same equity for $400 million by paying $100 million to the senior creditors and $300 million to the junior creditors. These options can be exercised prior to the firm's emergence from bankruptcy. The new equity (or reorganization rights) holders vote on the firm's future. For instance, the new equity holders determine whether to liquidate the firm or to reorganize it, and whether to replace the incumbent management. The idea is that conflicts of interest among different claimant groups are avoided through the homogenization of ownership, and when a single class of creditors owns the new firm it takes value-maximizing decisions regarding the firm's future (Aghion et al. (1992)). By separating the valuation of the reorganized firm from the decision of how to split the reorganization pie, the proposed method allows for faster resolution of distress.[47]

I add to Bebchuk's framework by including the possibility of hedge fund participation. Hedge funds and private equity firms are becoming increasingly active in the Chapter 11 bankruptcy process (Jiang et al. (2012)). They often purchase debt from unsecured (junior) creditors in the distressed firm that is most likely going to be converted into equity in the reorganized firm (Lim (2015)). In my setup hedge funds or private equity firms bring in the reorganization skills and expertise that can turn around the distressed firm. Through purchasing control rights, hedge funds can increase the value of the firm by exerting costly effort. The intuition follows from models by Leland and Pyle (1977) and Grossman and Hart (1986).

[47] In reference to his proposal Bebchuk (1988) writes, "The new method involves no bargaining or litigation, nor does it require that the value of the reorganized company be identified. Under the method, the participants in a reorganization would receive a set of rights with respect to the securities of the reorganized company. These rights are designed so that, whatever the reorganization value, the participants will never end up with less than the value to which they are entitled."

A.1. Model Setup

I present a simple three-period model in which a firm files for bankruptcy at time 0. For simplicity, I assume that there are only two classes of creditors, secured (senior) and unsecured (junior). The secured creditors are owed S, the unsecured creditors are owed U, and the total debt $(S+U)$ is normalized to 1. Following Dou et al. (2021), I assume that the (pre-petition) equity holders have been wiped out and that the secured and unsecured creditors are bargaining with each other.[48] At time 1, the bankruptcy is resolved by the court and the firm is either liquidated or reorganized. If the firm is liquidated the proceeds available for distribution are L, and these are split amongst the creditors by absolute priority.[49] At time 2, I model a two-state world in which the firm either generates high cash flows $(=\overline{V})$ or low cash flows $(=0)$. The probability of occurrence of the high state is q. Therefore, at the time of bankruptcy resolution (at time 1), the expected continuation value of the firm is $E(V)=q\overline{V}$. Neither the court nor the creditors can directly observe q.

There are N_s creditors in the secured creditors' class (each owed S/N_s) and N_u creditors in the unsecured creditors' class (each owed $(1-S)/N_u$). Each creditor i receives a signal s_i about the probability of the high state of the world (or q). That is, if it receives the signal s_i, then the creditor believes that the expected continuation value of the firm is $s_i\overline{V}$. The signals s follow a beta distribution with mean q (or $E(s_i)=q$). I choose a beta distribution as this allows for the signals to be bounded between 0 and 1 $(0 \leq s_i \leq 1)$.[50] A creditor can only observe its own signal. The beliefs for the secured and unsecured creditors are symmetric: on average neither class is more or less optimistic about the firm's performance than the other. I next model hedge fund participation. Under hedge fund control the probability of the high state can be increased to eq, where e is the effort exerted by the hedge fund $(1 \leq e \leq 1/q)$. The cost of this effort is assumed to be κe^2. The hedge fund gets a perfect signal about the probability q, and it can decide to participate in the reorganization by purchasing debt from the unsecured creditors at price P.

I discuss three cases for comparison. Case 1 is a setting in which the firms and creditors do not have access to a rights offering. Each creditor bids strategically and ultimately the court determines the expected continuation value of the reorganized firm. As happens in practice, all creditors can observe each others' bids. However, there is no learning (and updating) from bids as each creditor only bids strategically. The court has no estimate of q, but it knows that the high-state cash flows are $\overline{V}$, so that bids higher than $\overline{V}$ are therefore not considered. I assume that at time 1 the firm has no cash to pay creditors and the judge converts it to an all-equity firm upon emergence. Creditors know that the court will choose a particular valuation of the reorganized firm, V_c. If $V_c \leq L$ the court

[48] I make this assumption to simplify the model. Also, in my sample (pre-petition) equity holders receive a distribution in only 18% of bankruptcies.

[49] That is, if the firm is liquidated the secured creditors get $min(S,L)$ and the unsecured creditors get $max(L-S,0)$. Also, $L<1$: the liquidation value of firm's assets is less than the total debt of the firm.

[50] The beta distribution is a continuous probability distribution defined on the interval $[0,1]$ and characterized by two shape parameters, α and β. The mean of this distribution is $\frac{\alpha}{\alpha+\beta}$. Without loss of generality, for my calibration I assume that $\alpha=3$. Then for the distribution to be centered around the true high state probability (q), I set $\beta=\frac{\alpha}{q}-\alpha$.

liquidates the firm; otherwise the firm is reorganized and new equity is distributed as per absolute priority.[51] Ex-ante no creditor knows whose bid will be selected by the court (or what procedure the court will follow to arrive at its particular valuation V_c). Given this setup, all creditors bid strategically to maximize their personal recovery rates. The secured creditor i bids $b_s^i = min(s_i\overline{V}, S)$, while the unsecured creditors bid $b_u = min(\overline{V}, 1)$. After receiving all the bids, I assume that the court decides the value of the firm by averaging the bids of secured and unsecured creditors weighted by their claims, yielding $V_c = S\overline{b_s} + (1-S)\overline{b_u}$.[52]

In Case 2, I apply the model by Bebchuk (1988) and Aghion et al. (1992) to my setting. On filing for bankruptcy (at time 0) the court converts the firm into an all-equity firm and distributes 100% of the reorganization rights to secured claimants. At time 1, each unsecured creditor can buy a fraction $1/N_u$ of the firm from the secured creditor at price $P_2 = S/N_u$. This is identical to a rights offering at a purchase price of P_2 that is open for subscription to the unsecured creditors. Unsecured creditors have the option to buy these rights (in proportion to their claims), but they are not obligated to participate. An unsecured creditor i participates in the rights offering if and only if $\frac{s_i\overline{V}}{N_u} \geq P_2$. That is, the creditor participates if its valuation is higher than the price it has to pay for its share of the firm.[53] I assume that the rights offering goes ahead if more than 2/3 of the unsecured creditors vote to participate in the offering.[54] The money raised from the rights offering is paid to the secured creditors, who also retain the non-purchased reorganization rights in the firm. If the rights offering doesn't go ahead, the firm belongs to the secured creditors. If more than 2/3 of the secured creditors vote to liquidate the firm then the firm is liquidated. A secured creditor i votes to liquidate the firm if and only if its valuation is lower than the liquidation value (i.e. $s_i\overline{V} < L$). More details are given in Appendix B.

In Case 3, I extend the rights offering setting in Case 2 to allow for hedge fund participation. As discussed before, a hedge fund can exert effort e, at cost κe^2, so as to increase the probability of the high cash flow state to eq, where $1 \leq e \leq 1/q$. The hedge fund tries to purchase the control rights to the firm from the creditor class most likely to get the reorganization rights, if the rights offering were to take place.[55] For illustration, suppose that class is the unsecured claimants. Then the hedge fund proposes to underwrite a rights offering to unsecured

[51] This implies that if $V_c < S$, secured creditors will get the entire firm and unsecured creditors will not receive any distribution. If $S < V_c \leq 1$ the secured creditors will get a fraction S/V_c of the firm and the unsecured creditors will get the remaining $(1 - S/V_c)$. If $V_c > 1$, then secured creditors will get a fraction S/V_c, unsecured creditors will get a fraction $(1-S)/V_c$, and pre-petition equity holders will get the remaining fraction of the firm $(1 - 1/V_c)$.

[52] Ex-ante no creditor is aware of the court's averaging function. This is similar to the court following a mixed strategy of picking one of the secured creditor's bids with probability S/N_s and one of the unsecured creditor's bids with probability $(1-S)/N_u$. The weighting procedure used by the court might seem like an oversimplification, given the court is aware that all the creditors are bidding strategically. However, the evidence of huge errors in court valuations of the reorganized firm implies that the courts only use very superficial procedures in valuing the firm. Demiroglu et al. (2022) document that the average absolute error in the court's valuation of the reorganized firm is 50% of the firm's value. Ayotte and Morrison (2018) also find very large valuation errors in court-determined firm values in bankruptcy.

[53] If $L > S$, then the junior creditors might purchase the reorganization rights but decide to liquidate the firm if their combined valuations are lower than the liquidation value of the firm. I discuss how I handle this possibility in Appendix B.

[54] I use the fraction 2/3 of unsecured creditors because in U.S. bankruptcy law, for a plan to be agreed to it must receive approval by a two-thirds majority in value terms (as well as a simple majority in number terms) of each debt class. It also needs a two-thirds majority of equity, although under some circumstances a plan might be forced on a class using the cram-down provision of the U.S. bankruptcy code. In my setting, since each unsecured creditor is owed the same amount, a two-thirds majority in value terms implies that 2/3 of the creditors are willing to participate in the offering.

[55] As the hedge fund gets a perfect signal about q, it can ascertain which class is most likely to get the reorganization rights.

claimants at a purchase price $P > P_2$. A proportion α of unsecured creditors do not participate and their rights are allocated to the hedge fund.[56] If for an unsecured creditor i, $\frac{s_i \overline{V}}{N_u} < P$, it doesn't participate in the rights offering and instead its share is purchased by the hedge fund.[57] As the hedge fund is the underwriter of the rights offering, it buys the residual shares not purchased by the unsecured creditors at price P, and so owns a proportion α of the firm. At time 2, if the hedge fund decides to participate then the firm emerges from bankruptcy under hedge fund control. The hedge fund chooses effort e and price P to maximize its utility subject to the following constraints:

$$U_{HF} = \max_{e,P} \left(\alpha e q \overline{V} - \kappa e^2 - \alpha P N_u \right) \tag{A-1}$$

$$\text{subject to,} \qquad \alpha = \frac{1}{N_u} \sum_{1}^{N_u} \mathbb{1} \left(\frac{s_i \overline{V}}{N_u} < P \right) \quad \text{and} \quad 1 \leq e \leq 1/q$$

The hedge fund utility is its expected returns from the firm minus the cost of effort and the price it pays for purchasing the rights; α is the fraction of unsecured creditors that do not participate in the rights offering, where $\mathbb{1}$ is an indicator function that equals 1 if the creditor does not participate. The hedge fund proposes (and underwrites) the offering only if $U_{HF} > 0$.

A.2. Model estimation in data

I use simulated method of moments (SMM) to estimate my model in data. I structurally estimate the model by selecting parameter values that minimize the distance between moments simulated from the model and their sample analogues. I estimate four model parameters: q, κ, λ, and β. The first parameter, q, is the probability of a high cash flow state. The second parameter, κ, is the cost parameter for hedge fund effort. The third parameter, λ, is the probability of the firm not having access to rights offering, namely Case 1. The parameter λ could reflect cases that are assigned to high liquidation-bias judges, denying the firm access to a rights offering. Alternatively, a firm might not have access to a rights offering if the unsecured creditors lack the liquidity to finance the offering. The parameter λ allows me to capture such cases. The fourth parameter, β, is the probability of hedge fund participation in the cases that have access to a rights offering. Thus, the probability of Case 1 is λ, that of Case 2 is $(1-\lambda)(1-\beta)$, and that of Case 3 is $(1-\lambda)\beta$. Note that having access to rights offering (i.e. being in Cases 2 or 3) does not necessarily mean that the firm actually uses a rights offering. This is because the unsecured creditors or the hedge fund might decide not to subscribe to the rights offering if their valuations are low.

In estimating the model I closely follow Dou et al. (2021). Following their methodology, I use three other parameters that are directly observed in the data. These parameters are S, the proportion of debt held by

[56] Here I assume that N_u is large. That is, there are large costs associated with coordinating individual unsecured creditors. If the hedge fund knew each creditor's valuation, it would just purchase their debt at their personal valuations. However, the hedge fund does not possess this information and therefore offers to underwrite a rights offering at price P.

[57] Details about the purchase price and recovery for unsecured creditors that decide not to participate in the offering are discussed in Appendix B.

secured creditors; the maximum cash flows of the firm in the high state $\overline{V}$; and the liquidation value L.[58] In the data, L is collected from the bankruptcy disclosure statements and equals the hypothetical gross proceeds from liquidation scaled by the total debt of the firm. I use a proxy for $\overline{V}$ following the methodology of Edmans et al. (2012) and Dou et al. (2021), who try to estimate the firms' maximum potential value absent managerial inefficiency and mispricing. I also incorporate realistic heterogeneity into the estimation model by clustering the firms on the basis of $\{S, \overline{V}, L\}$. I use a K-means algorithm to form ten clusters with similar values of $\{S, \overline{V}, L\}$ and assign each sample case to one of these ten clusters. When simulating data off the model, I solve the model for each of the ten average values of $\{S, \overline{V}, L\}$. Data is then simulated from these ten model solutions, and these ten simulations are sampled in proportion to the clusters' empirical frequencies.

I choose four moments from the data that help me identify the parameters. The first moment is the fraction of cases in which the firm did a rights offering. This moment primarily helps me identify λ, as when λ increases the fraction of rights offerings decrease. It also helps in identifying q and β, both of which are positively correlated with the fraction of firms doing a rights offering. The second moment is the average recovery rate of the secured creditors. Mainly this moment identifies q, and a higher secured recovery rate implies a higher q. The third moment is the average recovery rate for the unsecured creditors. This moment primarily identifies β, as the unsecured creditor's recovery rate increases with hedge fund participation. The last moment is the unsecured creditors' recovery rates conditional on a rights offering. The main parameter this moment helps identify is κ, as high κ lowers hedge fund participation and thereby lowers unsecured creditors' recovery rates in a rights offering. The model is estimated using SMM. In Table IA.12 Panel A, I present the average data moments and the model moments. The table shows that the model moments match the data moments pretty closely, and the t-statistics for their comparison are reported in column (4).

In Table IA.12 Panel B, I report the estimates and standard errors for the model parameters. I estimate that the average probability of the high state, q, equals 0.43. The cost parameter κ for the hedge fund effort is calibrated at 0.055. The estimate of λ indicates that roughly 63% of the cases do not have access to a rights offering (i.e., are in Case 1). The estimate of β implies that around 14% of the firms are in Case 2, while 23% are in Case 3. After estimating the parameters in each cluster, I simulate data from these ten model solutions, and these ten simulations are sampled in proportion to the clusters' empirical frequencies. I find that conditional on there being a rights offering the likelihood of hedge participation is 78.2%. This is reasonably close to the actual hedge fund participation in the data of 70% (see Table 2). The model's estimate of the average total recovery rate is also in line with the data. These observations indicate that the model does a reasonable job of fitting the data. I find that the average creditor recovery rate is 15.3 cents higher in Cases 2 and 3 versus Case 1. This implies that having access to rights offering increases creditor recovery rates by 15.3 cents per dollar of debt claim

[58] As total debt is normalized to 1, S, $\overline{V}$, and L are scaled by the total debt of the firm.

(a 30% increase in average recovery rates). This increase is similar in magnitude to the increase in recovery rates obtained by using the IV methodology on the sample of reorganized firms (see Table 5 column (4)).

The instrumental variable approach used in the previous section allows me to calculate a two-stage least squares (2SLS) estimate of the local average treatment effect (LATE).[59] This estimate measures the causal effect of rights offering on creditor recoveries for *compliers* or *switchers*: that is, the bankruptcy cases in which the S&P market fluctuations during the book-building period are the deciding factors for whether financing via rights offering takes place. However, it could be a potential concern that switchers might not be representative of a typical case, and thus this estimate might not generalize to cases other than the switchers. For instance, S&P fluctuations are unlikely to alter the outcome of a case in which the unsecured creditors are unwilling to do a rights offering because their valuation of the firm is too low. In reference to my model, these would be firms in Case 2 and Case 3 that had access to rights offering but the unsecured creditors decided not to inject fresh capital. In the data, however, it is not possible to separate these cases from the firms in Case 1, which did not have access to rights offering. This is because we only observe whether or not a firm did a rights offering, and not whether it had access to it. This is where the structural estimates can add value by informing us about the average increase in recovery rates for the cases that had access to rights offering compared with those that did not.

B. Technical Details of the Model

In this section, I describe some of the technical details of my model. Case 2 of the model is a direct application of Bebchuk (1988) and Aghion et al. (1992) in my setting. The unsecured creditors can buy back the equity (or reorganization rights) of the firm from the secured creditors in a rights offering at a purchase price of $P_2 = S/N_u$. An unsecured creditor i participates in the rights offering if its valuation of the firm is higher than what is owed to the secured creditors, $s_i\overline{V} \geq S$. I assume that the rights offering goes ahead if more than 2/3 of the unsecured creditors participate in the offering. I use the fraction 2/3 of unsecured creditors because for a plan to be agreed in U.S. bankruptcy law, it must receive approval by two-thirds majority in value terms, and a simple majority in number terms, of each debt class.[60] The money raised in the rights offering, M_2, is given by

$$M_2 = \begin{cases} \sum_{1}^{N_u} P_2 \mathbb{1}\left(s_i\overline{V} \geq S\right) & \text{if} \quad \sum_{1}^{N_u} \mathbb{1}\left(s_i\overline{V} \geq S\right) \geq \frac{2}{3}N_u \\ 0 & \text{otherwise} \end{cases}$$

where $\mathbb{1}$ is an indicator function that equals 1 if the unsecured creditor participates in the rights offering. If

[59] Refer to Angrist and Imbens (1995) for a formal definition of the LATE.

[60] The plan also needs a two-thirds majority of equity, although under some circumstances a plan might be forced on a class using the cram-down provision of the U.S. bankruptcy code.

$M_2 > 0$ then the rights offering goes ahead and unsecured creditors get a fraction $\frac{M_2}{P_2 N_u}$ of the firm. The secured creditors get the cash M_2 and retain the remaining firm value (i.e. $1 - \frac{M_2}{P_2 N_u}$).

Next, I discuss the possibility that the combined valuations of the unsecured creditors are lower than the liquidation value of the firm (L) but higher than the debt owed to the secured creditors (S). That is, for an unsecured creditor i, $S < s_i \overline{V} < L$. If the average valuation of 2/3 of the unsecured creditors is less than the liquidation value of the firm, then they will choose to liquidate the firm (even after participating in the rights offering). In this case, as there is no uncertainty with respect to the liquidation value of the firm, whether the rights offering goes ahead or not is irrelevant. Both the secured and the unsecured creditors will get the same amount of money in liquidation irrespective of the rights offering. For cases where $\sum_{1}^{N_u} \mathbb{1}\left(S < s_i \overline{V} < L\right) > \frac{2}{3} N_u$, I assume that the firm is liquidated and, there is no rights offering. The recovery rate for both secured and unsecured creditors does not change with a rights offering when the firm is liquidated. As a rights offering makes no difference in this case, in practice we do not observe a rights offering for the firms that are liquidated in Chapter 11.

It should be noted that while doing a rights offering doesn't make any difference in the above case, having access to it might help in avoiding inefficient continuation of firms that should have been liquidated. This is because if this filing were in Case 1, the unsecured creditors could still have bid $min(\overline{V}, S + J)$ for this firm without revealing their true valuations. This overbidding by the unsecured creditors might have resulted in the inefficient continuation of the firm in Case 1. However, in Case 2, if the unsecured creditors want to continue the firm they have to "put their money where their mouth is" and inject cash to first pay off the secured creditors. Therefore, if the valuations of the unsecured creditors suggest that the firm is worth more liquidated, they would never inject more money into such a firm. The unwillingness of unsecured creditors to raise fresh capital signals their true valuations to the court, thereby helping avoid the inefficient continuation of "zombie" firms.

Next, I discuss the recovery rates for different creditors in the Case 3 rights offering with hedge fund participation. Consider that the hedge fund proposes to underwrite a rights offering to unsecured claimants at a purchase price $P > P_2$. A proportion α of unsecured creditors do not participate and their rights are allocated to the hedge fund. The total money raised when the rights offering goes ahead (i.e. $U_{HF} > 0$) is $M = PN_u$. The unsecured creditors that participate in the rights offering together pay $(1 - \alpha)PN_u$ and own $(1 - \alpha)$ fraction of the firm. Their recovery is therefore $(1 - \alpha)(qe\overline{V} - P)$. The amount of money raised in the rights offering implies that the value of the firm is at least $M = PN_u$. The court uses this valuation to determine recoveries for those creditors that do not participate in the rights offering. The cash proceeds M are used to fully repay the secured creditors the amount S ($M > S$ as $P > P_2$). The unsecured creditors that do not participate in the rights offering together receive a recovery of $\alpha(PN_u - S)$ from the cash raised in the offering. This is effectively the money the hedge fund pays to non-participating unsecured creditors for purchasing their reorganization rights. The

non-participating unsecured creditors also receive a recovery as the court determines that the value of the firm is $M > S$. Section 1123(a)(4) of the U.S. Bankruptcy Code requires that a plan must "provide the same treatment for each claim or interest of a particular class, unless the holder of a particular claim or interest agrees to a less favorable treatment of such claim or interest." Equal treatment amongst unsecured creditors is ensured because the participating unsecured creditors get equity in the reorganized firm while the non-participating unsecured creditors get the cash equivalent of their forgone equity. The reorganized equity value for the purpose of this distribution is assumed to be M.

C. Monotonicity assumption

When the treatment effects are heterogeneous, monotonicity condition needs to be satisfied in order to estimate the local average treatment effect (LATE). The monotonicity condition would require that, all else equal, there must be no firms whose propensity of arranging financing via rights offering increases as the S&P returns decline. That is, the likelihood of rights offerings must be a monotonically increasing function of the S&P returns instrument. Following Antill (2022), I use a nonparametric regression to test the monotonicity assumption. In the first step, I estimate the residuals from the following regressions:

$$Rights\ Offering_i = X_i'\gamma_r + \alpha_t + \alpha_k + \alpha_c + \epsilon_{ri}$$

$$S\&P\ returns_i = X_i'\gamma_l + \alpha_t + \alpha_k + \alpha_c + \epsilon_{li}$$

where α_c, α_t, and α_k, refer to the court, year-of-filing, and industry fixed effects respectively. The controls for the firm and bankruptcy characteristics (X_i) are included in the regressions. Specifically, I include controls for the firm's pre-filing assets, leverage ratio, percentage of secured debt, profitability, presence of creditors and equity committee, experience of the bankruptcy judge.

In the next step, I estimate the conditional means of the residuals from the rights offering regression (ϵ_r) as a function of the residuals from the S&P returns regression (ϵ_l), using local linear regressions. The estimated conditional means are plotted in Figure IA.3. The figure shows an (approximately) linear and monotonically increasing relationship between rights offering and S&P fluctuations during the book-building period, controlling for observable heterogeneity. The conditional mean plotted from the local linear regression is approximately linear in S&P fluctuations as the data implies that this gives the best out-of-sample fit.

Figure IA.1: AUM of Hedge Funds specializing in distressed securities

The figure plots the total assets under management (AUM) of hedge funds specializing in distressed securities (in billion dollars). The data on hedge funds' AUM classified by specializing is collected from Morningstar.

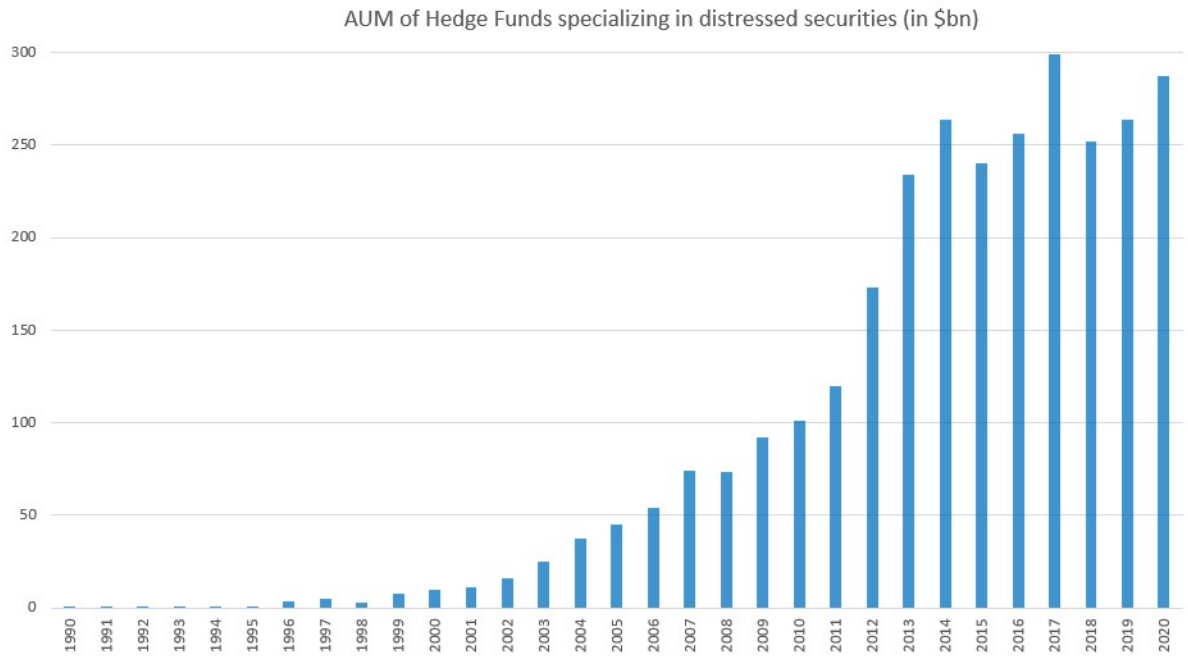


Figure IA.2: Realized Volatility of firms being financed by Rights Offerings versus other firms

The figure plots the realized volatility differences between firms being financed by rights offerings and other firms that emerged from bankruptcy as publicly listed firms. The (annualized) realized volatility is calculated as: $Volatility = \sqrt{\frac{252}{n}\sum_{j=1}^{n} R_j^2}$ using the stock price of the newly issued equity securities of the reorganized firms. Returns R are calculated as: $R = ln\frac{S_j}{S_{j-1}}$ where S_j is the stock price of the firm on day j. The realized volatility is calculated from the daily stock price of the firm for the following time periods (n): one month, three months, six months, and one year after emergence from bankruptcy. The graph plots the coefficients (β_m) and standard errors from the following regressions:
$Volatility_{i,m} = \beta_m\ Rights\ Offering_i + \delta\ Market\ Volatility_{i,m} + X_i'\gamma + \alpha_t + \alpha_k + \alpha_c + \epsilon_i$
where $Volatility_{i,m}$ measures the (annualized) realized volatility return for firm i, m months after its emergence from bankruptcy. $Rights\ Offering_i$ equals 1 if the firm arranges exit financing via rights offering and 0 otherwise. $Market\ Volatility_{i,m}$ measures the (annualized) market realized volatility of the S&P 500 index, m months after firm i emerges from bankruptcy. X_i includes controls for the firm's pre-filing assets, leverage ratio, percentage of secured debt, profitability, presence of creditors' committee and/or equity committee, and the experience of the bankruptcy judge assigned to the case. The regression includes year-of-filing fixed effects (α_t), industry fixed effects (α_k), and court-of-filing fixed effects (α_c).

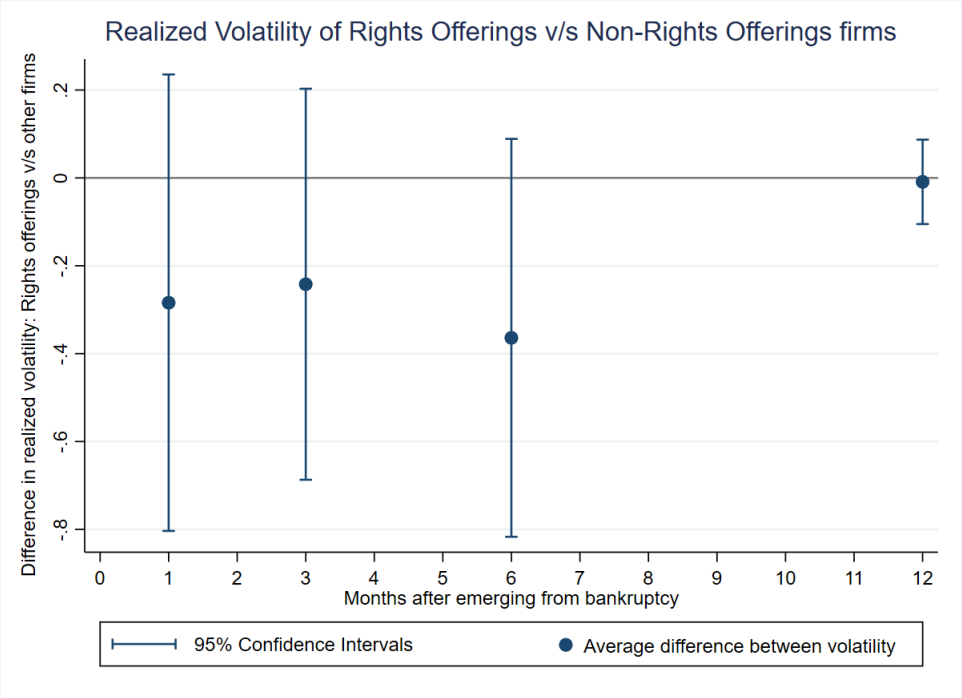


Figure IA.3: Monotonicity

The figure plots the estimates from a local linear regression of rights offerings on the instrumental variables. All variables are residualized with respect to court fixed effects, year-of-filing fixed effects, industry fixed effects, and control variables from Table 3. The figure plots the conditional mean estimates from the local linear regression of rights offering on S&P returns during the book-building period.

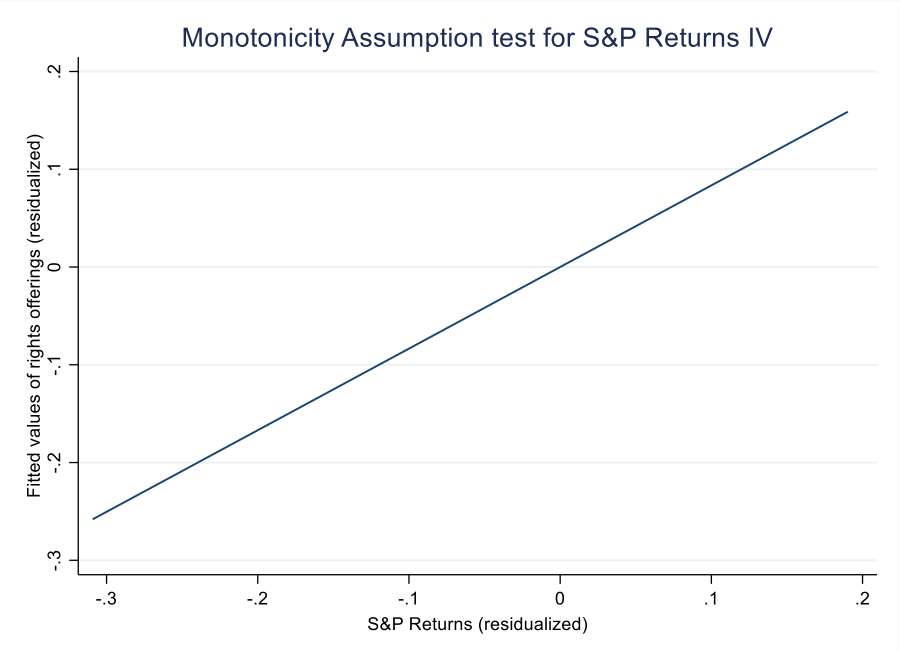


Figure IA.4: Distribution of the number of classes

The figure plots the distribution of the log of number of classes of claimants in a bankruptcy filing. The blue line plots the kernel density of log(number of classes) for firms that arranged financing via a rights offering, and the red line plots it for firms that did not use a rights offering.



Table IA.1: Description of Variables

Variable	Definition and Construction	Source
Firm Characteristics (pre-filing)		
• Assets	Book total assets of the firm.	LoPucki BRD
• Employees	Number of employees with the firm.	LoPucki BRD
• Leverage Ratio	Ratio of the firm's total debt to total assets.	COMPUSTAT, CapitalIQ
• Secured Debt share	Proportion of the firm's total (pre-filing) debt that is held by secured creditors.	CapitalIQ
• Bank loans/Assets	Total bank debt as a proportion of the firm's prefiling assets.	CapitalIQ
• Profitability	(EBITDA/Assets) Ratio of the firm's annual earnings (before interest, taxes, and depreciation) to its pre-filing assets.	COMPUSTAT
Chapter 11 Characteristics		
• Hedge fund participation	Equals 1 if hedge funds were involved (as equity holders or creditors) during the firm's bankruptcy proceedings, 0 otherwise.	PACER, BankruptcyData.com
• DIP Loan/Assets	Ratio of amount of approved debtor-in-possession (DIP) loan to total pre-filing assets.	LoPucki BRD
• Creditors Committee	Equals 1 if a formal committee of creditors was appointed during bankruptcy, 0 otherwise.	LoPucki BRD
• Equity Committee	Equals 1 if a formal committee of equity holders was appointed during bankruptcy, 0 otherwise.	LoPucki BRD
• Delaware/NYSD	Equals 1 for bankruptcy cases filed in Delaware or Southern district of New York, 0 otherwise.	LoPucki BRD
• Judge experience	Number of months from date of the bankruptcy judge's appointment to the date of filing.	LoPucki BRD
• Judge liquidation bias	Fraction of training sample Chapter 11 cases converted to Chapter 7 by the bankruptcy judge appointed on the case. An alternate training sample of bankruptcy exits from BankruptcyData.com is used to construct this variable.	BankruptcyData.com
• Number of plans	Number of plans filed in Chapter 11. Plans may be filed by the debtor, creditors, or the (pre-petition) equity holders.	PACER, BankruptcyData.com
• Number of creditor classes	Number of separate classes of claimants in the final bankruptcy plan approved by the court.	PACER
• Number of creditors	The range of the number of creditors reported by the firm in its bankruptcy filing petition.	PACER
Market Conditions		
• S&P Returns (from file to emerge)	Total S&P 500 index returns from the date of filing to the date of emergence from bankruptcy. Calculated as [S&P index(emergence date)/S&P index(filing date) - 1]	CRSP
• S&P Returns (pre-emergence)	Sum of daily CRSP equal weighted S&P 500 returns over the 60 days book-building window (-90 to -30 days before emergence from bankruptcy).	CRSP
• S&P Returns (post-emergence)	Sum of daily CRSP equal weighted S&P 500 returns calculated 60 days after the firm emerges from bankruptcy.	CRSP
• S&P Returns (pre-filing)	Sum of daily CRSP equal weighted S&P 500 returns calculated for 60 days prior to the firm's filing for bankruptcy.	CRSP
• Avg. S&P P/E (pre-emergence)	Average of the two-months S&P price to earnings ratio during the 60 days book-building window (-90 to -30 days before emergence from bankruptcy). P/E ratio measures the price of the S&P divided by the consensus estimate of the earnings per share (mean of sell-side analysts' estimates).	Bloomberg
• Avg. S&P Index (pre-emergence)	Average of the two-months S&P index during the 60 days book-building window (-90 to -30 days before emergence from bankruptcy).	CRSP
Bankruptcy Outcomes		
• Liquidation	Equals 1 if the firm was liquidated or the bankruptcy case was converted to Chapter 7, 0 otherwise	LoPucki BRD
• Acquisition	Equals 1 if the firm was acquired upon emergence from bankruptcy, 0 otherwise.	LoPucki BRD
• Section 363 sale	Equals 1 if the firm sold any of its assets in a Section 363 sales in Chapter 11, 0 otherwise. Section 363 sale is an expedited process that allows managers of a bankrupt firm to sell assets in Ch11. This sale requires the approval of the bankruptcy judge but does not require formal voting by creditors.	LoPucki BRD
• Duration of Ch11 (months)	Number of months spent by the firm in Chapter 11, from the date of filing to the date of plan confirmation.	LoPucki BRD
• Creditors' Total Recovery Rate	Total dollar amount distributed to all the creditors on emergence from bankruptcy, as a percentage of their pre-petition claims. The dollar amounts distributed to creditors is calculated from the plan value assigned by the court to the reorganized firm in the final bankruptcy plan.	PACER, BankruptcyData.com

Variable	Definition and Construction	Source
Bankruptcy Outcomes		
• Secured Creditors' Recovery	Dollar amount distributed to all the secured creditors on emergence from bankruptcy, as a percentage of the dollar amount of secured claims. The distributions are calculated from the final plan value.	PACER, BankruptcyData.com
• Unsecured Creditors' Recovery	Dollar amount distributed to all the unsecured creditors on emergence from bankruptcy, as a percentage of the dollar amount of unsecured claims. The distributions are calculated from final plan value.	PACER, BankruptcyData.com
• Distribution to Equity holders	Equals 1 if the (pre-petition) equity holders received a payoff in the bankruptcy proceedings, 0 otherwise.	PACER, BankruptcyData.com
• Refiled (2 years)	Equals 1 if the firm refiled for bankruptcy in the 2 years after its emergence from bankruptcy, 0 otherwise. Not defined for firms that were liquidated/acquired in bankruptcy.	LoPucki BRD, BankruptcyData.com
• Refiled (anytime)	Equals 1 if the firm has ever refiled for bankruptcy after emerging from its current bankruptcy, 0 otherwise. Not defined for firms that were liquidated/acquired in bankruptcy.	LoPucki BRD, BankruptcyData.com
• KERP/KEIP	Equals 1 if there were any key employee retention programs (KERP) or key employee incentive programs (KEIP) in place during the firm's bankruptcy process, 0 otherwise.	PACER, BankruptcyData.com
• Mergers (within 3 years)	Equals 1 if there have been any acquisitions, mergers, divestures, or spin-offs of the reorganized firm in the 3 years after its emergence from bankruptcy, 0 otherwise.	COMPUSTAT
Rights Offering Characteristics		
• Rights Offering Size ($ million)	amount of fresh capital injected into the bankrupt firm via the rights offering in the bankruptcy plan (in million dollars).	PACER, BankruptcyData.com
• Offering Size/ Exit Financing	Ratio of the rights offering amount to the total exit financing amount. Total exit financing includes financing agreements of the firm upon emergence, including rights offering and other loans.	PACER, BankruptcyData.com
• Offering Size/ Prepetition Assets	Ratio of the rights offering amount to the total assets of the firm at the time of its filing for bankruptcy.	Lo Pucki BRD, BankruptcyData.com
• Offering Size/ Impaired Claims	Ratio of rights offering amount to total amount of claims of all the classes that were classified as impaired in the final bankruptcy plan. A creditor class is classified as *impaired* in the plan if it is not fully repaid in cash when the firm emerges from bankruptcy.	PACER BankruptcyData.com
• Offering Size/ Participating Class	Ratio of rights offering amount to total amount of claims of all the creditors in the class that participates in arranging the rights offering financing.	PACER, BankruptcyData.com
• Offering Size/ Plan Equity Value	Ratio of rights offering amount to the court-approved equity valuation of the firm reported in the final bankruptcy plan.	PACER, BankruptcyData.com
• Offering Size/ Enterprise Value	Ratio of rights offering amount to the court-approved total enterprise valuation of the firm reported in the final bankruptcy plan.	PACER, BankruptcyData.com
• Offering Discount to Plan Value	Percent of discount at which the rights offering securities are offered to the participating class of creditors. The discount is calculated with respect to the equity valuation in the final bankruptcy plan.	PACER, BankruptcyData.com
• Discount to Plan Value ($ million)	Amount of rights offering discount to the equity plan valuation (in million dollars).	PACER, BankruptcyData.com
• Discount (fraction of impaired claims)	Ratio of the dollar amount of the discount to the total amount of claims of all the classes that are classified as impaired in the firm's final bankruptcy plan.	PACER, BankruptcyData.com
• Discount (fraction of participants' claims)	Ratio of the dollar amount of the discount to the total amount of claims of the creditor class that participates in arranging the rights offering financing.	PACER, BankruptcyData.com
• CARs for participants$_{i,m}$	Cumulative abnormal returns for rights offering participants of firm i over m months after emergence. CARs are calculated as the difference between the CRSP equal-weighted index-adjusted (or market-adjusted) price of newly issued equity securities of the reorganized firm and the rights offering participation price, scaled by the price of these securities in the rights offering.	PACER, CRSP, 10-K
• Directors appointed by hedge funds	Percentage of new directors that are directly associated with the hedge funds scaled by the number of new directors appointed in the firm when it emergences from bankruptcy.	10-K, CapitalIQ

Variable	Definition and Construction	Source
Additional outcome variables calculated for firms that emerged as publicly listed		
• $CAR_{i,m}$	Cumulative abnormal returns of firm i over m months after its emergence. CARs are calculated as the difference between the CRSP equal-weighted index-adjusted (or market-adjusted) price of the newly-issued equity of the reorganized firm and the court-approved equity valuation of the firm, scaled by the court's valuation of these securities (i.e. reported in the final bankruptcy plan).	CRSP
• $\text{Volatility}_{i,m}$	Measures the (annualized) realized volatility return of firm i over m months (or n days) after its emergence. $Volatility = \sqrt{\frac{252}{n}\sum_{j=1}^{n} R_j^2}$ and uses the daily stock price of the new equity of the reorganized firms. Returns R are calculated as: $R = ln\frac{S_j}{S_{j-1}}$ where S_j is the stock price of the firm on day j.	CRSP
• Percent directors replaced	Equals the number of directors that were fired/replaced from the board during the bankruptcy, scaled by the total number of directors immediately prior to filing for bankruptcy.	10-K, CapitalIQ
• Market Value	Market value of the reorganized firm is calculated from the stock price of the newly-issued equity three months after the firm's emergence from bankruptcy.	CRSP
• Total recovery rate (market value)	Amount distributed to all creditors in bankruptcy as a percent of their pre-petition claims, calculated based on the market value of the firm. The market value is computed from stock prices 3 months after emergence from bankruptcy.	PACER, CRSP, BankruptcyData.com
• Secured Creditors' Recovery (market value)	Amount distributed to secured creditors in bankruptcy as a percent of their pre-petition claims, calculated based on the market value of the firm. The market value is computed from stock prices 3 months after emergence from bankruptcy.	PACER, CRSP, BankruptcyData.com
• Unsecured Creditors' Recovery (market value)	Amount distributed to unsecured creditors in bankruptcy as percent of their pre-petition claims, calculated based on the market value of the firm. The market value is computed from stock prices 3 months after emergence from bankruptcy.	PACER, CRSP, BankruptcyData.com
• Earnings Surprise (court plan)	Equals the difference between the actual net earnings of the firm in the fiscal year after its emergence from bankruptcy and the net earnings projections for the same period reported in the final court plan, scaled by the (absolute) net earning projections reported in the final bankruptcy plan.	PACER, CapitalIQ, BankruptcyData.com
• Earnings Surprise (analyst)	Equals the mean forecast error in analysts' expectations about the net earning of the firm. Calculated as the difference between the actual net earnings of the firm in the fiscal year after its emergence from bankruptcy and the mean net earnings projections for the same period by the analysts, scaled by the (absolute) net earning projections. The analyst earnings projections are collected from FactSet.	PACER, CapitalIQ, BankruptcyData.com, Factset
• ROA	Equals the net income divided by the assets of the firm one year after its emergence from bankruptcy.	COMPUSTAT
• Tobin's Q	Equals the ratio of market value of assets to book value of assets one year after emerging from bankruptcy. The market value of assets equals the book value of assets plus the market value of common equity less the book value of common equity and balance sheet deferred taxes.	COMPUSTAT
• Unintended wealth transfer	Equals 1 if there were any unintended wealth transfers between claimants due to differences in court plan value and market value of firm 3 months post-emergence (for details refer to Demiroglu et al. (2022)).	PACER, CRSP, BankruptcyData.com
• Size of unintended wealth transfer (% of plan value)	Equals the dollar amount of the wealth transfers between claimants scaled by the average of the court-approved equity valuation of the firm (i.e. reported in the final bankruptcy plan).	PACER, CRSP, BankruptcyData.com
• Conditional size of unintended wealth transfer	Equals the dollar amount of the wealth transfers scaled by the average of the court-approved equity valuation of the firm when there is an unintended wealth transfer, 0 otherwise	PACER, CRSP, BankruptcyData.com

Table IA.2: Selection into Rights Offering (Probit Regressions)

This table reports the determinants of rights offerings in a Probit setting. The dependent variable *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. *Log(Assets)* is the logarithm of assets at filing. *Leverage* is defined as total debt over total assets. *Secured debt share* measures the percentage of secured debt in total debt. *Profitability* is defined as the ratio of the firm's annual earnings (before interest, taxes, and depreciation) to its assets (EBITDA/Assets). *Equity Committee* equals 1 if an equity committee was formed and 0 otherwise; *Creditors Committee* is similarly defined. *Log(Judge experience)* is the logarithm of judge experience (in months) calculated from the date of judge's appointment to the date of filing. *S&P returns (file to emerge)* measure the total S&P 500 index returns from the date of filing to the date of emergence from bankruptcy. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). *Judge liquidation Bias* is calculated as the fraction of Chapter 11 cases converted to Chapter 7 by the bankruptcy judge appointed on the case. *Delaware/NY SD* is 1 if the case was filed in Delaware or Southern District of New York. Columns (1) – (3) report results for the full sample of bankruptcies. Columns (4) – (6) exclude firms that were liquidated in bankruptcy (no firms that engaged in rights offerings were liquidated). Columns (7) – (9) exclude firms that made asset sales in Section 363 (no firms that engaged in rights offerings made Section 363 sales). All specifications include year-of-filing and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (2), (3), (5), (6), (8) and (9) also include court-of-filing fixed effects. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Rights Offering								
	Full Sample			Reorganized Firms			Excluding §363 sales		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
log(Assets)	0.302***	0.400***	0.429***	0.164	0.244**	0.275***	0.225*	0.287**	0.306***
	(0.100)	(0.104)	(0.088)	(0.103)	(0.115)	(0.097)	(0.118)	(0.130)	(0.106)
Leverage	0.695***	0.798***	0.747***	0.325	0.324	0.265	0.0867	0.0968	0.00777
	(0.173)	(0.148)	(0.191)	(0.296)	(0.333)	(0.344)	(0.251)	(0.286)	(0.337)
Secured Debt share	-0.522**	-0.456	-0.483*	-0.702***	-0.536	-0.593**	-0.437	-0.381	-0.391
	(0.217)	(0.339)	(0.257)	(0.218)	(0.350)	(0.301)	(0.342)	(0.521)	(0.449)
Profitability	0.425***	0.450***	0.394**	0.247	0.317	0.196	0.076	0.227	0.088
	(0.138)	(0.161)	(0.155)	(0.176)	(0.233)	(0.206)	(0.118)	(0.181)	(0.182)
Equity Committee	0.662*	0.819	0.818	0.336	0.526	0.554	0.257	0.418	0.477
	(0.390)	(0.523)	(0.532)	(0.402)	(0.572)	(0.596)	(0.366)	(0.508)	(0.541)
Creditors Committee	-0.304	-0.399	-0.384	-0.225	-0.312	-0.217	-0.249	-0.227	-0.182
	(0.267)	(0.322)	(0.309)	(0.251)	(0.347)	(0.347)	(0.281)	(0.342)	(0.329)
log(Judge Experience)	0.012	0.042	0.052	-0.066	-0.131	-0.046	-0.075	-0.204*	-0.093
	(0.062)	(0.089)	(0.082)	(0.082)	(0.088)	(0.063)	(0.121)	(0.113)	(0.102)
S&P Returns (file to emerge)	-0.409	-0.942***	-1.389***	0.504	-0.0580	-1.188	0.919	0.347	-0.783
	(0.354)	(0.219)	(0.487)	(0.640)	(0.572)	(0.932)	(0.659)	(0.493)	(0.826)
S&P Returns (pre-emergence)	3.708***	5.341***	5.605***	6.032***	8.286***	8.267***	5.458***	7.476***	7.609***
	(0.815)	(0.712)	(0.869)	(0.898)	(0.650)	(0.847)	(0.951)	(0.937)	(0.886)
Judge liquidation bias	-1.133***	-2.081***		-1.254**	-3.362***		-1.228**	-3.468***	
	(0.373)	(0.482)		(0.516)	(0.509)		(0.504)	(0.814)	
Delaware/NY SD	-0.004			-0.062			0.101		
	(0.259)			(0.244)			(0.296)		
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Court FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Observations	306	276	289	238	213	223	218	193	204
Pseudo R^2	0.215	0.253	0.241	0.209	0.269	0.226	0.204	0.265	0.212

Table IA.3: Rights Offerings and Recovery Rates (with Court × Year Fixed Effects)

This table reports the determinants of rights offering and the effect of using a rights offering on recovery rates. The dependent variable in column (1), *Rights Offering*, is 1 for firms that were financed by rights offering and 0 otherwise. In columns (2) and (3), the dependent variable is *Creditor Recovery Rate*, calculated as the ratio of the total dollar amount of distributions to the total dollar amount of claims of all creditor classes. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). The firm and bankruptcy characteristics control variables are defined in Table 3. All specifications include court × year of filing fixed effects and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (1) – (3) report results for the full sample of bankruptcies. Columns (4) – (6) exclude the subsample of firms that were liquidated. Columns (2) and (5) report the OLS coefficient of rights offering on recovery rates, while columns (3) and (6) report its IV 2SLS coefficient. The instrument is *S&P returns*, and its F-statistic is reported in the last row. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Full Sample			Reorganized Firms		
	Rights Offering	Recovery Rate		Rights Offering	Recovery Rate	
	First Stage	OLS	IV 2SLS	First Stage	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Rights Offering		0.110	0.339***		0.0924	0.281**
		(0.076)	(0.083)		(0.069)	(0.128)
log(Assets)	0.108***	0.020	-0.002	0.098***	-0.012	-0.026
	(0.017)	(0.017)	(0.022)	(0.021)	(0.019)	(0.022)
Leverage	0.161***	0.022	-0.019	0.037	0.003	-0.014
	(0.038)	(0.035)	(0.058)	(0.100)	(0.090)	(0.096)
Secured debt share	-0.092*	0.016	0.036	-0.136	-0.021	0.001
	(0.050)	(0.051)	(0.055)	(0.084)	(0.052)	(0.071)
Profitability	0.058	-0.046	-0.065	-0.047	-0.056	-0.058
	(0.041)	(0.055)	(0.043)	(0.061)	(0.052)	(0.044)
Equity Committee	0.303**	0.241***	0.172***	0.240*	0.212***	0.165***
	(0.147)	(0.034)	(0.032)	(0.140)	(0.045)	(0.043)
Creditors Committee	-0.121	-0.122***	-0.095***	-0.057	-0.123***	-0.111***
	(0.088)	(0.035)	(0.022)	(0.107)	(0.038)	(0.036)
log(Judge Experience)	-0.000	-0.012	-0.013	-0.057	-0.003	0.003
	(0.032)	(0.008)	(0.011)	(0.035)	(0.014)	(0.022)
S&P Returns (file to emerge)	-0.179***	-0.060	-0.029	-0.195	0.125	0.124
	(0.059)	(0.057)	(0.057)	(0.152)	(0.151)	(0.149)
S&P Returns (pre-emergence)	0.774***			1.751***		
	(0.140)			(0.237)		
Industry FE	YES	YES	YES	YES	YES	YES
Court × Year FE	YES	YES	YES	YES	YES	YES
Observations	396	396	396	304	304	304
Adjusted R^2	0.105	0.216	0.247	0.050	0.221	0.270
Instrument F-statistic	28.47			50.18		

Table IA.4: Subsample of Bankruptcies filed in Delaware, New York, and Texas

This table reports the first stage regression and the effect of using a rights offering on recovery rates for the subsample of bankruptcies filed in courts of Delaware, New York, and Texas. The dependent variable in column (1), *Rights Offering*, is 1 for firms that were financed by rights offering and 0 otherwise. In columns (2) and (3), the dependent variable, *Creditor Recovery Rate*, is calculated as the ratio of the total dollar amount of distributions to the total dollar amount of claims of all creditor classes. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, and judge experience. The control variables are defined in Table 3. All specifications include court, year-of-filing, and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (1) – (3) report results for the full sample of bankruptcies. Columns (4) – (6) exclude the subsample of firms that were liquidated. Columns (2) and (5) report the OLS coefficient of rights offering on recovery rates, while columns (3) and (6) report its IV 2SLS coefficient. The instrument is the *S&P returns*, and its F-statistic is reported in the last row. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Full Sample			Reorganized Firms		
	Rights Offering	Recovery Rate		Rights Offering	Recovery Rate	
	First Stage	OLS	IV 2SLS	First Stage	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
S&P Returns (pre-emergence)	1.054***			2.249***		
	(0.232)			(0.099)		
Rights Offering		0.068	0.290***		0.056	0.234***
		(0.054)	(0.049)		(0.042)	(0.051)
Industry FE	YES	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES
Observations	298	298	298	235	235	235
Adjusted R^2	0.053	0.235	0.247	0.068	0.262	0.242
Instrument F-statistic	19.83			502.09		

Table IA.5: Rights Offerings and Recovery Rates (without control variables)

This table reports the first stage regression and the effect of using a rights offering on recovery rates. The dependent variable in column (1), *Rights Offering*, is 1 for firms that were financed by rights offering and 0 otherwise. In columns (2) and (3), the dependent variable is *Creditor Recovery Rate*, calculated as the ratio of the total dollar amount of distributions to the total dollar amount of claims of all creditor classes. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). All specifications include court × year of filing fixed effects and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (1) – (3) report results for the full sample of bankruptcies. Columns (4) – (6) exclude the subsample of firms that were liquidated. Columns (2) and (5) report the OLS coefficient of rights offering on recovery rates, while columns (3) and (6) report its IV 2SLS coefficient. The instrument is *S&P returns*, and its F-statistic is reported in the last row. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Full Sample			Reorganized Firms		
	Rights Offering	Recovery Rate		Rights Offering	Recovery Rate	
	First Stage	OLS	IV 2SLS	First Stage	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
S&P Returns (pre-emergence)	0.879***			1.683***		
	(0.240)			(0.252)		
Rights Offering		0.115*	0.348**		0.074*	0.229**
		(0.059)	(0.143)		(0.041)	(0.104)
Industry FE	YES	YES	YES	YES	YES	YES
Court × Year FE	YES	YES	YES	YES	YES	YES
Control Variables	NO	NO	NO	NO	NO	NO
Observations	396	396	396	304	304	304
Adjusted R^2	0.038	0.115	0.164	0.056	0.184	0.168
Instrument F-statistic	13.25			44.06		

Table IA.6: Rights Offerings and Recovery Rates (controlling for Judge Liquidation Bias)

This table reports the first stage regression and the effect of using a rights offering on recovery rates for the subsample of bankruptcies with hedge fund participation. The dependent variable in column (1), *Rights Offering*, is 1 for firms that were financed by rights offering and 0 otherwise. In columns (2) and (3), the dependent variable, *Creditor Recovery Rate*, is calculated as the ratio of the total dollar amount of distributions to the total dollar amount of claims of all creditor classes. *Judge liquidation Bias* is calculated as the fraction of Chapter 11 cases converted to Chapter 7 by the bankruptcy judge appointed on the case. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, number of employees, presence of equity and creditors committee, and judge experience. The control variables are defined in Table 3. All specifications include court, year-of-filing, and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (1) – (3) report results for the full sample of bankruptcies. Columns (4) – (6) exclude the subsample of firms that were liquidated. Columns (2) and (5) report the OLS coefficient of rights offering on recovery rates, while columns (3) and (6) report its IV 2SLS coefficient. The instrument is *S&P returns*, and its combined F-statistic is reported in the last row. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Full Sample			Reorganized Firms		
	Rights Offering	Recovery Rate		Rights Offering	Recovery Rate	
	First Stage	OLS	IV 2SLS	First Stage	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
S&P Returns (pre-emergence)	0.963***			1.832***		
	(0.156)			(0.189)		
Judge liquidation bias	-0.530***	-0.157	0.022	-0.779***	-0.186	-0.076
	(0.182)	(0.204)	(0.260)	(0.131)	(0.189)	(0.196)
Rights Offering		0.073	0.389***		0.052	0.183**
		(0.045)	(0.149)		(0.031)	(0.082)
Industry FE	YES	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES
Observations	365	365	365	278	278	278
Adjusted R^2	0.056	0.284	0.303	0.051	0.324	0.302
Instrument F-statistic	37.89			94.20		

Table IA.7: Subsample of Bankruptcies with Hedge Fund Participation

This table reports the first stage regression and the effect of using a rights offering on recovery rates for the subsample of bankruptcies with hedge fund participation. The dependent variable in column (1), *Rights Offering*, is 1 for firms that were financed by rights offering and 0 otherwise. In columns (2) and (3), the dependent variable, *Creditor Recovery Rate*, is calculated as the ratio of the total dollar amount of distributions to the total dollar amount of claims of all creditor classes. *S&P Returns (pre-emergence)* are the two-month pre-emergence equal weighted S&P returns (during the book-building phase). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, and judge experience. The control variables are defined in Table 3. All specifications include court, year-of-filing, and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Columns (1) – (3) report results for the full sample of bankruptcies. Columns (4) – (6) exclude the subsample of firms that were liquidated. Columns (2) and (5) report the OLS coefficient of rights offering on recovery rates, while columns (3) and (6) report its IV 2SLS coefficient. The instrument is *S&P returns*, and its F-statistic is reported in the last row. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Full Sample			Reorganized Firms		
	Rights Offering	Recovery Rate		Rights Offering	Recovery Rate	
	First Stage	OLS	IV 2SLS	First Stage	OLS	IV 2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
S&P Returns (pre-emergence)	0.934***			1.858***		
	(0.197)			(0.202)		
Rights Offering		0.094*	0.469***		0.079*	0.183*
		(0.049)	(0.129)		(0.044)	(0.107)
Industry FE	YES	YES	YES	YES	YES	YES
Court FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Control Variables	YES	YES	YES	YES	YES	YES
Observations	322	322	322	247	247	247
Adjusted R^2	0.053	0.308	0.303	0.076	0.343	0.302
Instrument F-statistic	22.30			83.00		

Table IA.8: Size of rights offering and judge's liquidation bias

This table reports the determinants of rights offering size. The dependent variable in column (1), *Size/Assets* equals to the ratio of the rights offering amount to the total assets of the firm at the time of its filing for bankruptcy (Offering Size/Prepetition Assets). The dependent variable in column (2), *Size/EV* equals the ratio of the rights offering amount to the court-approved total enterprise valuation of the firm in the final bankruptcy plan (Offering Size/Plan Enterprise Value). *Judge liquidation Bias* is calculated as the fraction of Chapter 11 cases converted to Chapter 7 by the bankruptcy judge appointed on the case. The firm and bankruptcy characteristics control variables are defined in Table 3. All specifications include year and court-of-filing and industry fixed effects. Industry fixed effects are defined using two-digit SIC codes. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Size/Assets	Size/EV
	(1)	(2)
Judge liquidation bias	0.189**	0.419**
	(0.071)	(0.163)
log(Assets)	-0.042**	0.067*
	(0.017)	(0.031)
Leverage	0.087	-0.011
	(0.078)	(0.081)
Secured debt share	0.107	0.0233
	(0.084)	(0.133)
Profitability	-0.177***	0.152
	(0.007)	(0.085)
log(Employees)	0.031**	-0.043
	(0.013)	(0.028)
Equity Committee	0.133***	0.0852
	(0.040)	(0.062)
Creditors Committee	-0.017	0.001
	(0.048)	(0.021)
log(Judge Experience)	0.047**	0.111***
	(0.021)	(0.018)
Industry FE	YES	YES
Year FE	YES	YES
Court FE	YES	YES
Observations	91	85
Adjusted R^2	0.304	0.203

Table IA.9: Number of Creditors in Bankruptcy

This table lists the number of creditors in bankruptcy. The range of the number of creditors is reported by the firm in its bankruptcy filing petition. The number of firms with creditors in a given range are reported in columns (1) and (3). Columns (2) and (4), report the cumulative frequency of creditors, i.e. the percentage of firms that have at least a particular number of creditors. The statistics are presented for firms that did not arrange financing via rights offerings in columns (1) and (2), and for firms using rights offerings in columns (3) and (4).

	No Rights Offering		Rights Offering	
Number of Creditors	Firms	Cum. Freq.	Firms	Cum. Freq.
	(1)	(2)	(3)	(4)
more than 100,000	13	4.50	9	9.68
50,001 - 100,000	8	7.27	5	15.05
25,001 - 50,000	21	14.53	8	23.66
10,001 - 25,000	38	27.68	8	32.26
5,001 - 10,000	31	38.41	14	47.31
1,000 - 5,000	79	65.74	28	77.42
200 - 999	42	80.28	6	83.87
100 - 199	8	83.04	3	87.10
50 - 99	10	86.51	0	87.10
1 - 49	39	100	12	100

Table IA.10: Are Rights Offerings Reducing Unintended Wealth Transfers?

This table tests whether rights offerings reduce the probability of unintended wealth transfers in firms emerging from bankruptcy as publicly listed. The dependent variable *Unintended wealth transfer* equals 1 if there were any unintended wealth transfers between claimants due to differences in court plan value and market value of the reorganized firm, and 0 otherwise. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year and court-of-filing and industry fixed effects (1-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables: prefiling asset size, leverage ratio, secured debt share, profitabilityf, presence of equity and creditors committee, and judge experience. The control variables are defined in Table 3. Column (1) reports the results for the OLS specification, while column (2) reports results using Probit specification. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	Unintended Wealth Transfers	
	OLS Regression	Probit Regression
	(1)	(2)
Rights Offering	-0.146*	-1.180**
	(0.081)	(0.529)
Industry FE	YES	YES
Year FE	YES	YES
Court FE	YES	YES
Control Variables	YES	YES
Observations	114	71
R^2	0.411	0.359

Table IA.11: Performance of firms after emerging from bankruptcy

This table tests whether firms using rights offerings outperform other firms emerging from bankruptcy. The results are reported for firms that emerge from bankruptcy as publicly listed firms. The dependent variable in columns (1) and (2), *ROA* equals to net income divided by the assets of the firm one year after emerging from bankruptcy. The dependent variable in columns (3) and (4), *Tobin's Q* is computed as the ratio of market value of assets to book value of assets (MVA/BVA) one year after emerging from bankruptcy. The market value of assets equals the book value of assets plus the market value of common equity less the book value of common equity and balance sheet deferred taxes. *Rights Offering* is 1 for firms that were financed by rights offering and 0 otherwise. All specifications include year and industry fixed effects (1-digit SIC codes). The following firm and bankruptcy characteristics are used as control variables in columns (2) and (4): prefiling asset size, leverage ratio, secured debt share, profitability, presence of equity and creditors committee, and judge experience. The control variables are defined in Table 3. Standard errors clustered by court of filing are denoted in parentheses. *** denotes significance at 1%, ** at 5%, and * at 10%.

	ROA		Tobin's Q	
	(1)	(2)	(3)	(4)
Rights Offering	0.083***	0.063***	0.094*	0.114**
	(0.013)	(0.010)	(0.052)	(0.053)
Industry FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Control Variables	NO	YES	NO	YES
Observations	99	99	95	95
Adjusted R^2	0.477	0.524	0.146	0.188

Table IA.12: Panel A: Model Fit

This table shows how well the model fits the data moments that are targeted in estimation. The moments simulated from the model are reported in column (1), while the data moments are reported in column (2) for comparison. Column (3) reports their standard error. The t-statistics in column (4) test whether the model moment equals the data moment.

Moments	Model moments	Data moments	Std. Error	t-stat.
Fraction of Rights Offerings	0.214	0.242	0.022	1.32
Average senior creditors' recovery rate	0.799	0.793	0.014	-0.46
Average junior creditors' recovery rate	0.279	0.296	0.017	0.99
Average junior creditors' recovery conditional on rights offering	0.362	0.388	0.037	0.59

Panel B: Parameter Estimates

This table reports the parameter estimates and their standard errors from the simulated minimum distance estimator.

Parameters	Notation	Estimate	Std. Error
Probability of high cashflow state	q	0.431	0.030
Cost of effort by hedge fund	κ	0.055	0.023
Probability of no access to rights offering (Case 1)	λ	0.630	0.092
Hedge fund participation in cases with access to rights offering	β	0.623	0.261