Bankruptcy as Filtering Failure:

Evidence of Filtering Failure in the U.S. Bankruptcy Process

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Abstract: The institution of bankruptcy law seeks to facilitate economic efficiency by enabling the reorganization of economically viable but financially distressed firms and facilitating the liquidation of economically failed firms. Does the U.S. Chapter 11 bankruptcy process perform this filtering function efficiently? Using data from large public bankruptcies between 1981-2010, we find that it does not. Specifically, (1) evidence on matched performance differences between bankrupt firms and industry counterparts indicate that there is no improvement in the performance gap between bankrupt firms and industry right before and after bankruptcy, and, (2) firms emerging from bankruptcy do not exhibit financial performance catch-up behavior to their going concern industry counterparts. In addition, we find (3) judicial bias in favor of reorganization in cases involving firms with more employees and operations closer to the judge's district, suggesting that bankruptcy judges respond to social-political considerations, when deciding whether to reorganize the firm.

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1. Introduction

The question of whether to reorganize or liquidate under US bankruptcy law turns on whether a firm is suffering from economic failure or merely financial distress. An economically failed firm is one in which the current deployment of the firm's assets—its financial, human, and physical capital—is less than the opportunity cost of those assets redeployed elsewhere in the economy. As a result, the firm is worth more dead than alive and economic efficiency calls for liquidation and reallocation of the firm's assets. A financially distressed firm, by contrast, is one in which the going-concern value of the assets in their current configuration exceeds their opportunity cost but the firm is nevertheless insolvent in light of its debts. As a result, the firm is worth more alive than dead, and creditors can benefit from this increased value generated by continued operation.[3] The bankruptcy process' role is to distinguish accurately between economically failed firms that should be liquidated and economically viable but financially distressed firms that should be reorganized to preserve their going-concern value.

Although bankruptcy practitioners and academics have expressed concern about filtering failure, little empirical work has been done to measure its extent[4] or whether bankruptcy as an

[3] We focus here on the economic rationales for reorganization and ignore normative rationales advanced by others, such as the preservation of current worker's jobs or the impact on particular communities from liquidation, even when those goals clash with economic efficiency. (Warren 1999). Needless to say, pursuit of those goals not only lock-in inefficient investment but also raise the cost of capital for new firms which suggests that preservation of current jobs would only come at the expense of foregone new, more jobs with higher productivity. (Zywicki 2003)
[4] For example Fisher & Martel (2005) estimate filtering failure in the Canadian bankruptcy system, they estimate that Type I errors are four times more likely than Type II errors and that the incidence of filtering failure is between 22 and 53 percent or 18 and 44 percent, depending on the definition of a firm's viability.

institution facilitates industry convergence, which would be expected if bankruptcy was an efficient filtering mechanism. This paper examines whether the U.S. Bankruptcy process facilitates industry convergence as well as to test the relevance of judicial influence in the filtering decision.

To test the presence of filtering failure, we gather data on large public bankruptcies from the UCLA-Lopucki Bankruptcy Research Database (BRD) in the time period 1981-2010 as well as compile firm financial data from the Center for Research in Security Prices (CRSP) - CRSP Computstat merged database. Both data sources are combined in a relational database and data management system (RDDMS) that enables a dynamic querying of the combined two datasets.

We test hypotheses related to filtering failure in two ways and, in addition, we test one possible explanation for filtering failure. Specifically, we test three hypotheses: (1) whether bankruptcy facilitates industry-convergence by measuring if the matched performance gap between firms and their respective industry is smaller after bankruptcy, as compared to the same difference after bankruptcy; (2) whether bankruptcy facilitates industry-convergence by evaluating whether firms that emerge "catch-up" to industry levels of performance; and (3) whether the bankruptcy decision could be biased by judicial influence.

To preview our results, we find evidence of filtering failure in bankruptcy and that judicial bias contributes to that filtering failure. Evidence on matched performance differences between bankrupt firms and industry counterparts before and after bankruptcy indicate that there is no improvement in the performance gap—as measured by various firm performance ratios. Second, firms that emerge from bankruptcy do not exhibit performance "catch-up" behavior in terms of various performance metrics to their going concern industry counterparts as is expected from viable firms that are relieved from financial distress.

Third, we find that the bankruptcy judge may be a source of filtering failure: Bankruptcies featuring more employees as well as with operations closer to the judge's district are systematically more likely to reorganize than firms without those attributes. This finding suggests the possible impact of judicial influence on bankruptcy filtering failure, perhaps driven possibly by local pressure from the public and the bar to reorganize firms with a large local economic impact

The paper is organized as follows. First, we review the bankruptcy literature with respect to the possible sources of bankruptcy filtering failure. Then, we describe the data sources and research methodology. Part 3 presents the results of our empirical tests. Part 4 Concludes.

2. The Presumption of Filtering Failure in Bankruptcy

The essence of firm bankruptcy turns on a fundamental separation of the asset side of the firm's balance sheet from the liabilities side. As an initial question, bankruptcy seeks to maximize the value of the assets of the firm and then as a secondary question to determine the distribution of those assets to holders of the firm's liabilities and claims. Although conceptually distinct, in practice these two factors are often interwoven as part of the strategic element of bankruptcy. Here we focus on the question of how the bankruptcy system seeks to maximize firm value through the decision whether to reorganize or liquidate the firm, and whether this process is presumed to be efficient.

Whether to reorganize a firm turns on the distinction between financial distress on one hand and economic failure on the other. The assets (human capital, physical capital, and financial capital) of a financially distressed firm are maximized by presumptively retaining their current combination and deployment to their current use. Reorganization of the distressed firm thus is believed to maximize the firm's value to be distributed to claimants. The total surplus available to

distribute to claimants is thus maximized through reorganization rather than liquidation, thereby increasing the total distribution to creditors and other claimants as a group. Priority rules in bankruptcy in turn provide for the distribution allocation of these assets to claimants. [5]

Economically failed firms, by contrast, are worth more dead than alive, in that the opportunity cost of those assets is higher in other uses than in the current deployment. Thus, the firm's value is maximized for claimants by an orderly liquidation of the firm and reallocation of those assets to alternative uses.

Efficient reorganization of financially distressed firms thus can benefit firm creditors and the economy at large by preserving the "going-concern surplus" of enabling firms to remain in operation instead of being liquidated.[6] On the other hand, even where it is efficient to reorganize a distressed firm, reorganization produces high costs relative to liquidation. For example, reorganization usually takes much longer than liquidation, costs which are borne by creditors (not the debtor or shareholders) who lose the time value of money and the ability to reinvest those proceeds elsewhere.[7] A complicated reorganization case can also incur massive administrative costs relative to liquidation, often reaching into the tens or hundreds of millions of dollars in lawyers, accountants, and investment banker fees.

[5]The initial foundational purpose of a bankruptcy system is to solve a common pool problem that arises when individualized debt-collection pursuing their individual efforts to maximize their individual returns threaten the maximization of value for all of the firm's creditors. (See Jackson & Skeel, 2013). Institutions such as the automatic stay and avoidance power are linked to that purpose of bankruptcy. For current purposes we set that aspect of bankruptcy aside and focus on the question of reorganization.

[6] "Going-concern surplus" is functionally equivalent to economic quasi-rents in that they arise from specialized deployment of otherwise fungible reseources.

[7] We consider the effects of this delay on the value of the firm elsewhere (Van Bergem et al., 2020)

2.1. Reasons for Filtering Failure: The Bankruptcy Judge as Socialist Planner

There is reason to believe that the United States bankruptcy process does not efficiently distinguish, or "filter," between economically failed and financially distressed firms. Filtering failure can take the form of Type-I error occurs if economically failed firms are reorganized in bankruptcy, while Type-II error occurs a firm that should be reorganized is instead liquidated (White, 1994) (See Table 1).

		Economic Reality	
		Economically Failed Firm	Financially Distressed Firm
Bankruptcy Procedural Outcome	Liquidation	Accurate Decision	Type II Error: Economically Efficient- Firm Liquidated
	Reorganization	Type I Error: Economically Inefficient- Firm Saved	Accurate Decision

Table 1: Possible States of the World as a result of the outcome of the Bankruptcy's Procedural Decision to Reorganize or Liquidate a Firm.

In theory, deciding whether a firm should be reorganized or liquidated requires the bankruptcy judge to determine the opportunity cost of all of the firm's assets in their next-best allocation without the aid of a market price mechanism to establish those values. This is a daunting challenge, akin to that of a central planner under socialism (Zywicki & Rajagopalan 2017). Moreover, there is no active market for control of the assets of the bankrupt firm because it is discouraged by the structure of Chapter 11[8] (Gilson et al., 2000). Thus, the judge must guide a

[8] Moreover, third parties need to inform themselves about the value of the firm via expensive due diligence. According to Casey (2011) it is puzzling that the information constraint is not resolved by the market: Given the discount at which the bankruptcy can be bought one might expect investors to swoop in. Possibly, even given the significant discount, investors don't make use of the discount because it would attract new, less valuable firms into the market. "In a pure lemons market, the problem might unravel until no market exists. In the market for bankrupt firms, this unraveling appears to be solved by way of the stalking-horse bid. A "stalking horse" is a potential purchaser who is given access to the inside information of the firm and performs the expensive due diligence to give itself comfort with regard to the firm's value. Because the stalking horse must expend resources to gain this information, and because its bid creates an externality, it is highly compensated for its position" (Casey, 2011).

process "in a market institutional vacuum where relevant prices are suppressed" (Zywicki & Rajagopalan, 2017) and will experience difficulty adjudicating value. Yet bankruptcy judges are neither financial experts nor residual claimants of the decisions they make as to what strategy will maximize firm value.[9] Thus, errors would not be unexpected in this institutional context.

2.1. Reasons for Filtering Failure: Debtor Control and Creditor Conflict

Two themes dominate the debates surrounding bankruptcy law and firm reorganization. Both focus on the bargaining power of the firm's constituencies in the bankruptcy process. In the first theme, managers and or equity holders exert undue influence over the bankruptcy process (Bradley and Rosenzweig 1992; Bebchuk and Chang 1992; Adler 1993; Schwartz 1997). In the US system, the initiation of a bankruptcy case does not result in the immediate removal of incumbent management of the firm, but instead creates a presumption of the "debtor in possession," i.e., that incumbent management will continue to guide the firm into, through, and after bankruptcy.[10] In addition, incumbent management (with the advice of bankruptcy counsel) makes the decision as to which court in which it will file the case; hence, they will favor filing in a venue that is more favorable toward incumbent management and reorganization.[11] (LoPucki 2005, Lopucki & Whitford, 1993). This dynamic would be expected to tend to create a bias toward inefficient reorganization, especially in cases involving large companies that can afford sophisticated legal counsel and whose large geographic footprint might make it easier to engage in forum-shopping for friendly bankruptcy courts. Under this "debtor control" model of

[9] Shifts in power between creditor classes in the bankruptcy process can result from unpredictability of valuation of the assets of the firm (see Baird and Bernstein, 2006)
[10] In practice, however, incumbent management often will be replaced at some point in the process but in many cases will not.
[11] Given the high turnover rate of management within bankruptcy, managers, knowing this, might invest in wasteful strategies to delay a filing, as Adler, Capkun, and Weiss (2013) argue.

bankruptcy, Type-I filtering errors should be more prevalent than Type-II errors.

The debtor control theme has been challenged by research and bankruptcy professionals who argue that notwithstanding chapter 11's formal enshrinement of debtor control, in practice creditors, especially secured creditors, have come to control the bankruptcy process (f.e: Baird and Rasmussen 2002; Skeel 2003; Warren and Westbrook 2003; Miller and Waisman 2004; Adler, Capkun, and Weiss 2013). Under this creditor-control model, creditors with senior, secured claims can gain dominance in the bankruptcy process. Secured creditors gain their influence in bankruptcy through extending secured lines of credit to the firm, both before and after it files a bankruptcy petition. Secured creditors, being aware of their privileged position[12] in chapter 11, strengthen their senior claims on the assets of the firm before filing happens. Ayotte and Morrison (2009) find that senior creditors obtain substantial control through their loan agreements with distressed firms.[13] According to Miller (2007), senior creditors, having more control over the debtor firm before and during bankruptcy, usually determine that liquidation is the preferred option for the distressed firm.

However, most firms have two classes of creditors—secured and unsecured. As a result, neither the debtor nor secured creditors have free reign in the bankruptcy process: unsecured creditors have often opposite interests and at least some power to frustrate secured interests. As a result, the creditor control model often evolves into a model of creditor-conflict, as the interests of

[12] It is difficult – outside bankruptcy - for the secured creditor to foreclose and sell the firm while preserving the going – concern value. Therefore the secured creditor – whenever exercising control – has an interest that the firm enters Chapter 11 such that a "free and clear" sale of the firm can be achieved. The free-and-clear sale of the entire firm results in a higher value liquidation of the firm's assets as compared to outside bankruptcy.

[13] 75 percent of the bankrupt firms obtain senior secured financing prior to entering bankruptcy and, after entering bankruptcy, in 76 percent of the cases the debtor received post-petition financing. (Ayotte & Morrison 2009, 814). Ayotte and Morrison (2009) observe low levels of secured debt among the firms in their sample when they study documents filed one or two years before their bankruptcy filings. Thus most loans originated during the year before the bankruptcies. This is a strong measure of senior creditor control. Secured creditors , when imposing , can impose the firm to not obtain additional secured financing in bankruptcy without getting permission from or offering adequate protection to the pre-petition secured lender (11 U.S.C. §§ 364(c), (d)).Large amounts of loans allow the creditor to demand payment before reorganization can be confirmed , or allow them to unilaterally to seize collateral without court approval.

secured and unsecured creditors often diverge. In practice, the interests of unsecured creditors are sometimes aligned with secured creditors; in many cases, however, the interests of unsecured creditors are often more closely aligned with the debtor's. Fully secured creditors gain little benefit from a firm undergoing reorganization as they gain nothing from a successful reorganization and are harmed by the delay produced by an extended reorganization. Unsecured creditors, on the other hand, are the residual claimants of the firm's going-concern surplus and may be served by a lengthy reorganization that preserves going-concern value. Thus, unsecured creditors keep most of the upside if firm value improves over time but whenever firm value declines, unsecured creditors losses are absent or effectively subsidized by senior creditors.

A study by Kenneth Ayotte and Edward Morrison (2009) show substantial conflict between senior and junior interests; junior creditors, acting through a creditors' committee, filed objections in more than 50 percent of the cases. Moreover, they show that this intercreditor conflict distorts bankruptcy outcomes: When secured creditors are undersecured and when there is no secured debt—i.e., the unsecured creditors are the approximate residual claimants of the firm's value—the cases are relatively long and more likely to result in a traditional reorganization.[14] Creditor conflict is likely to be most pronounced when secured creditors are oversecured. (see Figure 1). Oversecured creditors' interests are best served by a quick liquidation: Their claims are paid in full even if the firm is sold for less than its fundamental value.[15][16]

[14] This is consistent with the idea that, in the absence of conflict, creditors value the reorganization process as a means of alleviating liquidity problems. See Shleifer and Vishny (1992) and Gertner and Picker (1992).

[15] See, for example, Lynn M. LoPucki and Joseph W. Doherty (2007) who find that sales yield significantly lower value than reorganization

[16] Although oversecured creditors receive both interest payments and adequate protection for any deterioration of the collateral over time while the firm is in bankruptcy, they run the risk that the court will underestimate the appropriate interest rate or fail to award sufficient adequate protection, leading them to generally support swift liquidation notwithstanding those protections. Thus, a delay in the bankruptcy process could diminish the value of their claims if firm value deteriorates over time.

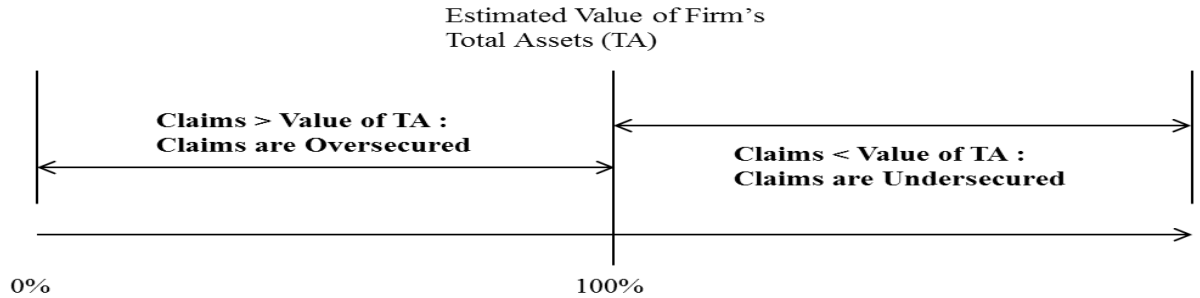

Figure 1: Secured Creditors' size of claims as a percentage of Estimated Value of the Total Assets of the Firm. When the size of the secured creditors' claims exceed the face value of the firm's Total Assets the firm is more likely to undergo reorganization as opposed to when the claims are less than the face value of Total Assets.

According to Casey (2011) the conflict is the direct result of a mandatory asset-distribution mechanism imposed by bankruptcy law. That mechanism, known as the "absolute priority rule" (APR), requires that assets in bankruptcy must be distributed in strict adherence to the contractual priority that exists in the case of the liquidation of the firm outside bankruptcy.[17] What the APR implicitly does not take into account is that when a firm issues debt the repayment of that debt is contingent upon the future value of the firm. Reasoning from the future value of the firm, a secured creditor receives payment of all future value up to the face value of its debt. The junior creditor receives the future value that exceeds that face value. That means the "junior creditor's interest is the equivalent of a call option with a strike price equal to the face value of the senior debt" (Casey 2011). In comparison the bankruptcy process, given the APR[18][19] rule, negates the value of the call

[17] The rule pays out assets by class of creditor and is codified in 11 USC § 1129(b)'s requirement that a reorganization be "fair and equitable, with respect to each class of claims or interests." There are some notable judge-made exceptions to the Absolute Priority Rule, such as the new value exception that permits junior claimants under certain circumstances to retain an interest in the reorganized firm. *See Case v. Los Angeles Lumber Products Co., Ltd.*, 308 U.S. 106 (1939). Those exceptions are not relevant to the inquiry here.

[18] It is difficult to contract around the APR: In Chapter 11 there are four major transaction costs that cumulatively make it prohibitively expensive for the junior creditors to efficiently purchase control from the senior creditors: (1) liquidity constraints (see Buccola & Keller; 2010 :"There are periods where capital is scarce even to the most credit-worthy borrowers."), (2)information constraints (see Baird & Rasmussen,2002; Lopucki & Doherty, 2007), (3) lack of coordination among junior creditors, and (4) impediments to negotiation with the senior creditors (see Adler, 2012,11-14).

[19] Casey (2011) proposed an alternative rule for APR; the Option-Preservation Priority. "Option-Preservation Priority, requires that a senior creditor buy out the option value of junior creditors before taking control of the Chapter 11 process. With that method, the non-bankruptcy contract rights of creditors prior to filing are (1)

option because all future possibilities are collapsed into given present-day values (Baird & Bernstein 2006). The creditor conflict view of bankruptcy can be interpreted as claiming that the bankruptcy decision is driven by distributional questions rather than pure questions of the firm's economic viability.[20]

The creditor conflict view of bankruptcy procedures clearly has some empirical support; however, it is insufficient to explain fully the bankruptcy decision to liquidate or reorganize and thus possible filtering failure. As illustrated in Figure 2, even where the size of secured creditors' claims approximates the estimated value of the firm, the ratio at which secured creditor control is expected to be strongest, firms are still likely to reorganize.

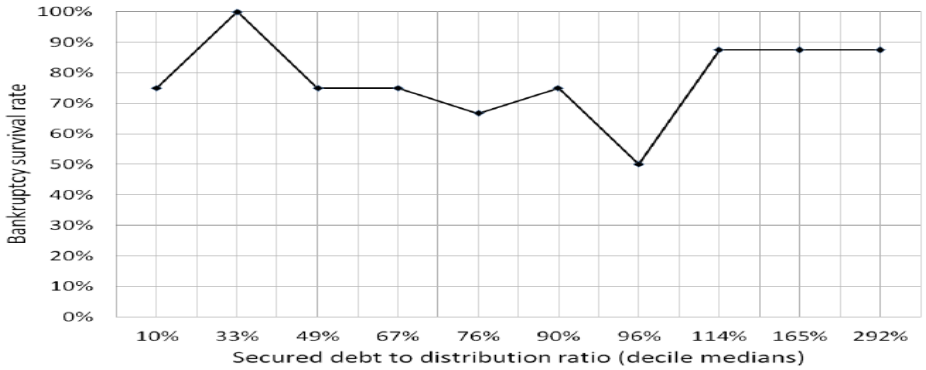

Figure 2: Secured Debt Coverage Ratio as a Percentage of the Value of Total Assets (Jenkins & Smith, 2014). Whenever the amount of the secured debt is approximately equal to the value of the business, the secured creditor bears the most risk of the continued operation of the firm without having a chance of increased payouts.

foreclosure and sale rather than a hypothetical right to full payment of the face value of the senior debt (which it would not realize outside bankruptcy) for the secured creditor; (2) a call option with an exercise price that is equal to the face value of the senior debt for the junior creditor; and (3) the value of the firm up to the face value of the senior debt after the junior creditor's option value has been paid for by the secured creditor. All of these rights must be protected in bankruptcy".

[20]Note that this same dynamic is replicated in the case of equity holders with respect to unsecured creditors—where there are insufficient funds to pay all creditor claims in full, equity holders expected payout is zero. Delay, however, could lead to a potential appreciation of the firm, potentially resulting in excess available to pay shareholders. In addition, because unsecured creditors are not paid interest on their claims while the case is pending, the ability of shareholders to engage in rent-seeking behavior through delay and repeated objections can eventually extract concessions from creditors to resolve those objections.

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2.3. Existing Empirical Evidence Supporting Bankruptcy Filtering Failure

Prior empirical studies have found evidence of bankruptcy filtering failure. Overall there is a big difference in the reorganization rates between different sized firms as well as questionable post reorganizational performance. A large majority of small businesses filing for Chapter 11 reorganizations fail to obtain confirmation of a Chapter 11 plan and typically end up in liquidation. Fewer than 10% of small to medium-size firms (assets under $500,000) emerge from Chapter 11 as going concerns (Baird 1993).

On the other hand, empirical studies of filtering failure have failed to identify a determinate mechanism for filtering failure, including the relative frequency of Type-I and Type-II errors. Some scholars have claimed support for the debtor-control hypothesis and have concluded that there is a "continuation bias" in bankruptcy that systematically biases the bankruptcy process toward inefficient reorganization, especially in larger cases. LoPucki & Whitford (1993) examine bankruptcies involving large companies with assets over $100 million and find some evidence of an inefficient bias toward reorganization. While the confirmation rate in these cases is 96%; post confirmation performance is poor. Over 32% of these cases re-file[21] for bankruptcy after emerging from Chapter 11. Another study—examining the post-bankruptcy performance of 197 firms—found that over 40% experience operating losses in the three years following bankruptcy and 32% of the firms re-enter bankruptcy or privately restructure their debt (Hotchkiss 1995).

[21] One commenter suggested that re-filing is not necessarily a sign of bankruptcy filtering failure. For instance, it may be a rational strategy for creditors to take a relatively small haircut in bankruptcy reorganization, while leaving the firm relatively leveraged. If the firm thrives, the creditors get their restructured debt paid in full. If not, then refiling can be a viable option.

Unless small firms are somehow much less likely to be financially distressed but economically viable than larger firms and unless experiencing operating losses post-bankruptcy is a sign of successful reorganization, these numbers should give pause on the effectiveness of bankruptcy as a filtering mechanism. With respect to small business bankruptcies, however, Morrison (2007) examined the conventional belief that small business bankruptcy cases evidence a "continuation bias" that results in excessively long cases and a tendency toward inefficient reorganization and found no evidence to support that claim. So far the literature found indications of filtering failure. However no systematic evidence is presented that studies the role of bankruptcy in allowing for industry convergence and performance catch-up by a firm emerging from reorganization, as would be expected if bankruptcy filters accurately.

The remainder of this article provides empirical analysis of the extent of filtering failure by determining whether bankruptcy allows for industry convergence and catch-up in performance. As noted, prior research has found ambiguous results as to the presence of filtering failure in bankruptcy as well as the relative frequency of Type-I and Type-II errors. In particular, we test two hypotheses related to bankruptcy filtering as a facilitator of industry convergence.

In addition, we examine whether the preferences of bankruptcy judges play a role in explaining filtering failure. Both the debtor control and creditor conflict models of bankruptcy posit a passive role for bankruptcy judges in the reorganization process. This approach has implicitly assumed that bankruptcy judges make no active contribution to the problem of filtering failure. We test whether that assumption is valid.

3. Methodology and Data Analysis

To test the hypotheses, we acquired data from two separate data sources: the UCLA-Lopucki Bankruptcy Research Database (BRD)[22] and firm financial data from the Center for Research in Security Prices (CRSP)[23]'s CRSP/ Compustat Merged Database. We then compile the data in a relational database and data management system (RDDMS) to be able to query the combined two datasets. From the BRD we acquire data on large (100M in 1980 dollars) U.S. public corporate bankruptcies ranging from the beginning of 1981 to the end of 2010.[24] We specifically obtain data on the firm's bankruptcy filing and court disposition date, the number of workers the firm employed one quarter before filing for bankruptcy; the distance of the firm head quarter (HQ) from the bankruptcy court; whether the bankruptcy case was pre-negotiated or pre-packaged; whether the bankruptcy case resulted in liquidation or reorganization / emergence[25]; as well as the

[22] The UCLA-Lopucki Bankruptcy Research Database is available from http://lopucki.law.ucla.edu/ upon request

[23] Data from the Center for Research in Security Prices (CRSP) is available from http://www.crsp.com/ upon subscription

[24] We recognize that some scholars have argued that changes occurred in the nature of bankruptcy reorganization practice midway through this multi-decade period that shifted the balance of control in bankruptcy cases from debtors to creditors. (Baird and Rasmussen 2002). For our purposes, however, we have been unable to identify objectively a precise or even approximate year when that change might have occurred, if it could be demonstrated objectively at all. Instead, if that change has occurred, it likely evolved over a several year period. As a result, while recognize that that the impact of this hypothesized change in bankruptcy practice would be an interesting empirical question in its own right, we do not examine that question in this article although we hope to do so in future research.

[25] Two commenters indicate problems with the viability of using the "emerge" category with regards to the question of Bankruptcy Filtering. They note that a company that goes through a 363(b) sale or merges with another firm does not "emerge". Moreover, data on firms that went private after bankruptcy reorganization do not show up in the CRSP (see Baird & Rasmussen (2002) on those points). Thus, if assets of firms in the mentioned categories significantly overperform firms that "emerge", than the results we present are biased in favor of bankruptcy as filtering failure. On the other hand if one maintains that mergers, or another means of absorbing assets into another business, are not within the category of bankruptcy "emergence" than the mentioned bias is absent. Moreover, firms within the BRD that go through a 363(b) sale are not necessarily not "emerging" (see Lopucki (2003), pp.666-671). We do not resolve that debate here but accept for current purposes LoPucki's established coding of cases.

firm identification number; CUSIP.[26][27] The CRSP/Compustat Merged Database provides the quarterly reported financial indicators of all publicly traded firms between 1981 and 2010 as well the CUSIP identifier and the industry identifier, SIC[28] to which the firm belongs. The firm financial values we use in this paper are (see appendix A for more detail on data acquisition); the value ($M) of Totals Assets (TA); firm Net Worth (NW) ($M); the value ($M) of Total Sales (Sale); Operating Income before Depreciation (OIBDP in $M); Profitability[29] (Prof); the Asset Turnover Ratio (ATO); Leverage (Lev), Tobin's Q (Q), Operating Margin (Ope), Return on Assets (ROA), Book to Market ratio (BM) and Return on Equity (ROE) .

[26] The CUSIP is a nine-digit security identification number to identify identifies most financial instruments, including: stocks of all registered U.S. and Canadian companies, commercial paper, and U.S. government and municipal bonds. Each U.S. firm that is publicly traded has a CUSIP identifier.

[27] For purposes of our analysis we use all relevant cases regardless of jurisdiction. Scholars have debated whether Delaware and New York bankruptcy courts have developed reorganization practices that are distinct from the rest of the country. *See* Zywicki (2006) (summarizing arguments). To address this question we analyzed Delaware and New York separately and have presented the results in the Appendix (E & G). Interpretation of the results can be found in section 3.4 of this paper (p.31).

[28] The Standard Industrial Classification SIC is a system for classifying industries by a four-digit code.

[29] The elements from the financial ratios used are collected quarterly from CRSP/Compustat Merged database, and are calculated thus:

The firm's **Profitability ($\boldsymbol{Prof_i}$)** is a ratio between the values of operating income before depreciation and amortization (OIBDP), and total assets (AT):

The firm's **Asset turnover Ratio ($\boldsymbol{ATO_i}$)** – the firm's ability to generate revenue – is a ratio between the values of revenue (Sale) divided by the total assets (AT):

The firm's **Leverage ($\boldsymbol{Lev_i}$)** is the ratio between the value of total liabilities ($DLC + DLTT$) and total assets (TA):

The firm's **Tobin's ($\boldsymbol{Q_i}$)** value is defined as the sum of the share price multiplied by number of common shares outstanding (market value equity; MVE), value of debt in current liabilities (DLC) , value of long-term debt (DLTT) and the value of preferred stock (PSTKL) minus deferred taxes (TXDITC) , divided by the value of total assets (AT); the value of net revenues (Sale); and profitability (Prof) (operating income before depreciation divided by total assets):

The firm's Operating Margin **($\boldsymbol{Ope_i}$)** is a ratio between operating income before depreciation and amortization (OIBDP), and revenue from sales (Sale):

Return on Assets **($\boldsymbol{ROA_i}$)** is a product of the firm's values for Operating Margin **($\boldsymbol{Ope_i}$)** and the Asset turnover Ratio **($\boldsymbol{ATO_i}$)**:

The firm's Book to Market ratio **($\boldsymbol{BM_i}$)** is a ratio between the values of total assets (TA) and market value equity (MVE):

Return on Equity **($\boldsymbol{ROE_i}$)** is a product of the firm's values for Return on Assets **($\boldsymbol{ROA_i}$)** and Book to Market ratio **($\boldsymbol{BM_i}$)**

In both datasets we delete observations of financial firms, regulated firms as well as quasi-public firms.[30] To ensure consistency of firm size between the BRD and the CRSP /Compustat Merged Database we delete all firm financial observations of publicly traded firms that have a value of total assets which are under $100 million (in 1980 dollars) in the CRSP/Compustat Merged Database database.[31]

3.1. Does Bankruptcy Produce Industry Convergence?

Efficient reorganization of financially distressed firms can benefit firm creditors and the economy at large by preserving the "going-concern surplus" of enabling firms to remain in operation instead of being liquidated. For such reorganization to be realized two conditions have to be present: (1) The bankruptcy judge has to correctly determine whether the reorganization of the bankrupt firm maximizes the firm's value to be distributed to claimants (Zywicki & Rajagopalan, 2017) and (2) the reorganization plan has to decrease managerial inefficiency, agency conflict (Lang, Stulz, and Walkling, 1991) as well as reduce constrained investment possibilities due to the bankrupt firm's financial position (Smith & Watts, 1992; Gaver & Gaver, 1993). In short, regardless of the cause of financial distress, bankruptcy – conceptualized as a filtering mechanism - should pick the firms that are economically sound and facilitate an amelioration of the underlying causes of distress and enable the post-bankruptcy firm to perform better than prior to bankruptcy.

[30] Excluded from our analyses are financial segments (SIC 6000–6999) and segments for regulated utilities (SIC 4900 and SIC 4999).
[31] Variables are deflated to constant 1980 dollars using the GDP deflator provided by the Bureau of Economic Analysis.

If such characterization of the bankruptcy is correct we would expect performance equalization to occur between firms emerging from bankruptcy and their matching industry counterparts, as a result of the selection and facilitation of the proper reorganization of economically viable firms while liquidating the non –viable[32]. More precisely, if the bankruptcy process facilitates industry convergence, we would at least expect the performance differences (firm - matching industry) between firms that have emerged from bankruptcy and their matching industry counterparts to be smaller than the same performance differences – between firms that are about to go bankrupt and their matching industry[33].

To test the industry convergence hypothesis we use a number of performance metrics: Tobin's Q (Q)[34][35]—as a ratio of market over book value of the firm— the Asset Turnover ratio[36]

[32] The liquidation of assets of failed firms are more profitably taken over by the existing going concern firm within the same industry given the lower adjustment costs. Therefore bankruptcy as an institution – if properly functioning in its filtering task- is expected to have the most noticeable effect on intra industry convergence.

[33] Note that we do not test for the significance of the efficacy of bankruptcy filtering for *overall* industry convergence, but whether bankruptcy in its current form *contributes*, if at all, to convergence. The overall significance test is important and requires controlling for other factors affecting industry convergence (f.e. see Syverson, 2011).

[34] See section "methodology and data analysis" for more details on the quarterly Tobin's Q calculation, as well as the other metrics used.

[35] Firms with low Q values can be interpreted as having severely constrained investment opportunities given their low expected cash flows relative to the amount of invested capital (Smith & Watts, 1992; Gaver & Gaver, 1993). A low Q values can also be seen as a measure of managerial inefficiency or agency conflict within the firm (Lang, Stulz, and Walkling, 1991). A well-functioning bankruptcy process is able to alleviate the aforementioned firm problems by selecting the right firms – firm operating under productive potential—as well as allowing and guiding debt renegotiations and if necessary the change of management.

[36] The ATO metric is used to measure the efficiency of the firm's operating units in their ability to generate revenue, independent of the firm's capital structure, investment and other corporate strategy level variables (Klein, 2001). The ATO, unlike profitability, is also used as an efficiency metric of the firm's ability to generate revenue independent from any debt servicing obligations.

(ATO), Profitability (Prof)[37], Operating Margin (Ope)[38] , Return on Assets (ROA)[39], and Return on Equity (ROE)[40].

The specific empirical strategy for testing the industry convergence hypothesis is pictured below in Figure 3:

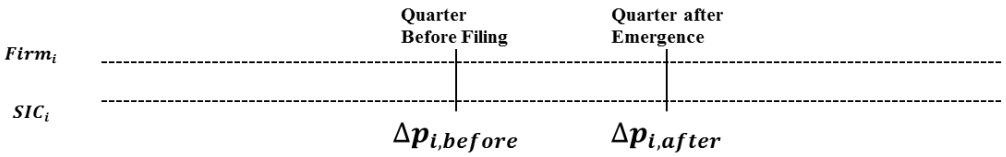

Figure 3: Illustration of convergence test.

We query the performance related values for each firm that is about to go bankrupt (one quarter before bankruptcy) and for firms that emerge out of bankruptcy (one quarter after bankruptcy). It is important to note that in the particular empirical strategy we test for the effects of bankruptcy firm selection as well as the effects of bankruptcy asset and liability restructuring. These effects on their own should lead to a reduction in the performance gap between firms and their matched industry , when we compare said performance gap right before and after bankruptcy. Indeed such strategy does not evaluate the effects of the quality of the bankruptcy process on the possible shrinking of the performance gap after bankruptcy. Such possible shrinking – being the result of the amelioration of managerial inefficiency , agency conflict and constrained investment possibilities can only become apparent in the years after the start of the reorganization plan. We

[37] Profitability is used to measure the efficiency of the firm's operating performance, independent of the firm's capital structure, investment and other corporate strategy level variables (Klein, 2001)
[38] Firms that experience a financial shock with a higher operating margin are more likely to continue to operate, as compared to firms with lower margins, as they are more likely to reduce their product offerings as a result (Greenlee & Trussel, 2000)
[39] Return on assets (ROA), as a ratio, is a measure of operating performance, which indicates a firm's efficiency in generating revenues from its capital assets (Epps & Cereola, 2008).
[40] Return on equity (ROE), as a ratio, is a measure of how efficient a firm is in generating profits from the capital invested from its shareholders (Epps & Cereola, 2008).

will pursue that empirical strategy in the next section, where we specifically test for emerged firm "catch-up" behavior. Now we turn the attention back to our current empirical strategy.

In order to compare bankrupt firms' performance values with their going concern counterparts in the same matching industry (denoted by the same SIC classification), we collect per bankrupt firm, *i*, all the performance values of all firms in the same industry as the bankrupt firm, X_j^k, in the same *quarter before* the matched firm bankruptcy as well as the same quarter *after* bankruptcy, that is, if a particular firm emerges.[41]

We subsequently average the matched going concern firms, and subtract those from the bankrupt firm observations, *both one quarter before and after bankruptcy*, to provide a firm - industry performance difference ΔX_{ik}, for both right *before* and *after* bankruptcy:

$$\Delta X_{ik} = X_i^k - \frac{\sum_{j=1}^{j} X_j^k}{n_k}$$

Where X_i^k is the bankrupt firm's own performance metric, and each X_j^k is a matched going concern firm's , *j*, performance metric in the same industry, *k*, as the bankrupt firm while n_k denotes the number of firms within that industry. Subsequently, all the bankrupt firm-industry difference values are collected for both time periods, one quarter *before* and one quarter *after* bankruptcy for all performance metrics (Q, ATO, Prof, Ope, ROA and ROE) [42] to yield two distributions per

[41] Time periods other than one period before and one period after bankruptcy could have been selected. We have examined that relatively short time frame to try to isolate the impact of bankruptcy filtering from other exogenous shocks from the larger economy that might have impacted the firm's performance.

[42] REFER TO APPENDIX TABLE OF ALL COMPARISONS FOR BEFORE We also tested comparatively the following distribution pairs: $F_{Q,firms(before)}$; $F_{Q,industry(before)}$ and $F_{Q,firms(after)}$; $F_{Q,industry(after)}$. We find that for both *before* and *after*: $F_{Q,firms} < F_{Q,industry}$. The mean values and std. deviation for the four distribution respectively: ($\mu_{TQ} = 0.7667$; ${\sigma^2}_{TQ} = 0.1828$); ($\mu_{TQ} = 1.198$; ${\sigma^2}_{TQ} = 0.3929$) and ($\mu_{TQ} = 0.637$; ${\sigma^2}_{TQ} = 0.096$); ($\mu_{TQ} = 1.060$; ${\sigma^2}_{TQ} = 0.257$). See Appendix C for the KS test summary statistics. The tests indicate that before and after bankruptcy , the industry in general has higher Q values compared to the population of matching firms.

performance metric; $F_{\Delta X_{ik,before}}$ and $F_{\Delta X_{ik,after}}$.

At this point we compare the distribution pairs in order to test the "industry convergence" hypothesis. To do so we use the Kolmogorov-Smirnov (KS) test to determine whether two empirical distributions come from different or the same continuous distribution (Kolmogorov 1933,1941 & Smirnov 1939). Furthermore the KS-test can be used to decide whether - if two distributions do not come from the same distribution - contain significantly larger or smaller values than the other distribution. The two sample version of the KS test generalizes to:

$$KS_{nn'} = \sqrt{\frac{nn'}{n+n'}} sup_x \left| F_{0,n}(x) - F_{1,n'}(x) \right|$$

Where $F_{0,n}(x)$ and $F_{1,n'}(x)$ are two empirical cumulative distributions consisting of values on x from two data sets of size n and n', sup is the supremum function and $KS_{nn'}$ is the KS statistic (see Massey 1951 for a table of critical values for the two sample KS-test). The possible testable hypotheses are $H_0: F_0 = F_1$ and $H_1: F_0 \left| \begin{matrix} > \\ \neq \\ < \end{matrix} \right| F_1$.

For the "Convergence" hypothesis to be fully confirmed, given our performance metrics, the following distribution comparisons generally have to be found: $H_1: F_{\Delta X_{ik,before}} < F_{\Delta X_{ik,after}}$.

Comparison	Outcome	KS-Stat	P-Value
$F_{firms-industry,TQ\ before(n=98)}$ & $F_{firms-industry,TQ\ after(n=98)}$	$F_{firms-industry,TQ\ before} \neq F_{firms-industry,TQ\ after}$	0.608	0.634
$F_{firms-industry,ATO\ before(n=98)}$ & $F_{firms-industry,ATO\ after(n=98)}$	$F_{firms-industry,ATO\ before} \neq F_{firms-industry,ATO\ after}$	0.105	0.355
$F_{firms-industry,Prof\ before(n=82)}$ & $F_{firms-industry,Prof\ after(n=82)}$	$F_{firms-industry,Prof\ before} < F_{firms-industry,Prof\ after}$	0.268	0.002

$F_{firms-industry,OPE\ before(n=82)}$ & $F_{firms-industry,OPE\ after(n=82)}$	$F_{firms-industry,OPE\ before} < F_{firms-industry,OPE\ after}$	0.222	0.015
$F_{firms-industry,ROA\ before(n=79)}$ & $F_{firms-industry,ROA\ after(n=79)}$	$F_{firms-industry,ROA\ before} \neq F_{firms-industry,ROA\ after}$	0.164	0.214
$F_{firms-industry,ROE\ before(n=79)}$ & $F_{firms-industry,ROE\ after(n=79)}$	$F_{firms-industry,ROE\ before} < F_{firms-industry,ROE\ after}$	0.228	0.014
$F_{firms-industry,Lev\ before(n=94)}$ & $F_{firms-industry,Lev\ after(n=94)}$	$F_{firms-industry,Lev\ before} > F_{firms-industry,Lev\ after}$	0.340	0.000

Table :… KS test results for the Industry adjusted Firm performance metrics distributions for one quarter before and after Bankruptcy (for emerged firms)

The KS-tests at first glance give a mixed view on the "convergence hypothesis". There is no convergence in terms of Tobin's Q, ATO and ROA industry adjusted firm values. That indicates that emerged firms did not converge as a result of Bankruptcy Filtering and the quality of the Reorganization plan, in terms of their Market to Book ratio (as a measure of constrained investment, agency conflict and managerial inefficiency), their ability to generate revenue (ATO) and the ability to generate profits from their capital assets (ROA). On the other hand, there is convergence in terms of Profitability, Operating Margins and the ROE. However, the latter results have to be taken with a grain of salt: Within Bankruptcy firms are sheltered from paying profits taxes[43] for a period, are able to cancel underfunded pension plans, don't make interest payments and are able to cancel unprofitable contracts at a low cost[44] (White, 1989). These subsidies that the emerged firm receives, reduces the costs of revenue without increasing the efficiency of the reorganized firm directly. Thus the KS comparisons that indicate "industry convergence" (see table..) for Profitability, Operating margins, Return on Assets and Return on Equity are biased in favor of Filtering Success. Moreover, the Return on Equity differences are further biased in favor

[43] Even when firms start to become profitable.
[44] Including collective bargaining agreements.

of Filtering Success because Bankruptcy overall reduces the leverage (see table…) of a firm as part of the reorganization plan; decreasing leverage results in increased ROE when the cost of debt is prohibitively high which is usually the case for a bankrupt firm.

To conclude the KS performance metrics test related to the "convergence" hypothesis, we cannot reject the possibility that the bankruptcy process does not facilitate within industry convergence. However, we cannot be sure to what extent the result is driven by bankruptcy filtering failure or the failure of debt renegotiation to alleviate financial distress or stakeholder conflict; in others words the quality of the reorganization plan of the emerged firm.[45]

3.2. Does Bankruptcy Produce Industry Catch-up by Alleviating Financial Distress?

Evidence on the relation between firm performance and financial distress indicates that firms under financial duress experience significant problems: Firms with higher leverage tend to lose market share and have lower profitability compared to their competitors in the same industry (Opler & Titman, 1994). Financial distress also impairs the firm's access to credit and raise the costs of stakeholder relations[46] as well as causing competitors to aggressively seize market share (see i.e; Bolton and Scharfstein (1990), Fudenberg and Tirole (1986)). The Chapter 11 bankruptcy process ideally relieves otherwise productive firms from financial distress such that these firms

[45] There is another reason to be cautious about the result. The caution is based on the possibility that the performance metrics reflect underinvestment caused by debt overhang. Hennessey (2004), for instance, argues that firms with debt overhang have both level and composition of investment distorted, with underinvestment more severe for long lived assets. Since more severe debt overhang, on average, is more likely to be a feature of firms *before* bankruptcy, not *after*, our conclusions concerning the industry convergence hypothesis can be distorted if it is based on the selected performance ratios. However, given the low variability of (dis)-investment *during* the bankruptcy process, (see Van Bergem et al., 2020; Lopucki & Whitford, 1993) underinvestment—as a feature of the bankrupt firm - is likely to carry over to the emerged firm one quarter after bankruptcy.

[46] See f.e.; Stulz, (1990) for relations between lenders and borrowers; Maksimovic and Titman (1991) for firm and non-financial stakeholders; between managers and shareholders see Novaes and Zingales (1993)).

can catch-up to their industry counterparts after being relieved from the problems related to such distress.[47]

Although the failure to catch-up to other industry firms does not provide direct evidence that a particular firm should have been liquidated instead of reorganized, it provides indirect evidence: It is expected from an emerged firm, especially after being relieved from financial distress, to be able to approach a normal rate of return comparable to its peers or go out of business. We similarly assume that rival firms cannot consistently overperform the market, so consistent underperformance—which we measure by the failure to catch-up—suggests the increased likelihood the firm should have been liquidated.

The relation between financial distress, firm performance, and the bankruptcy process as a filtering mechanism allows us a testable prediction: *If* bankruptcy is able to *select* the *economically viable but financially distressed firms* and allow for the *alleviation of distress* it would allow those firms to *catch-up* in performance to their *industry counterparts* after they emerge from bankruptcy.[48]

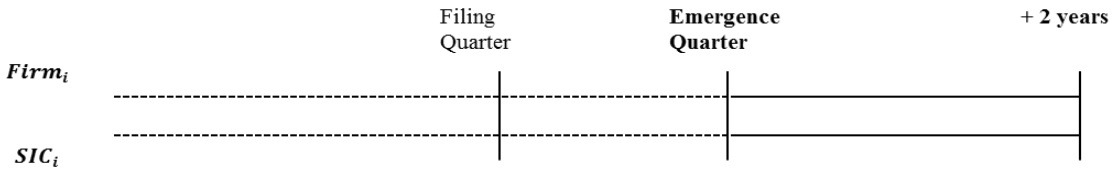

Figure 5: Illustration of catch-up analysis

[47] Indeed, financial distress can prompt firms to change strategies to raise efficiency. While it is possible that financial distress can both cause the firm to operate below productive potential and to change to more productive strategies (see, Brown, James and Ryngaert (1992), Gilson (1989), and Ofek (1993)) in the case of firms filing for bankruptcy the latter seems to be not likely. After all, if improved efficiency prompted by financial distress is sufficiently effective if would not result in firm bankruptcy.

[48] Financially distressed but viable firms are not reaching their productive potential before bankruptcy. The alleviation of financial distress should allow those firms to reach that potential after bankruptcy.

Figure 5 illustrates the empirical method for testing the "catch–up" hypothesis. We specifically query bankrupt firm financial data from the quarter bankrupt firms emerge (see figure 5: Emergence Quarter) as well as their 'going-concern' counterparts (firms that have never gone bankrupt in the 1980-2010 period) in the industry during the same time period. We examine a point 2 years from the emergence quarter as the time window to compile data necessary to test for firm catch-up behavior.

To test the industry the "Catch-up" hypothesis we use a number of performance metrics: Total Sales (TS), Operating income (OI), the Asset Turnover ratio[49][50] (ATO), Profitability (Prof)[51], Operating Margin (Ope)[52] , Return on Assets (ROA)[53], and Return on Equity (ROE)[54].

We collect the quarterly performance values for each firm that emerged from bankruptcy until two years later. For each emerged firm, we do same for all 'going-concern' firms in the same industry as well as in the same time period (see Figure 5).

Subsequently for each emerged firm in our data base we calculate the average quarterly change (AQC) values[55] in the 2 year period since case disposition of the mentioned performance metrics; the AQC values thus indicate how much on average a firm's performance metric changes per quarter in the two year period since the firm emerged from bankruptcy;

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[49] See section "methodology and data analysis" for more details on the quarterly Tobin's Q calculation, as well as the other metrics used.

[50] The ATO metric is used to measure the efficiency of the firm's operating units in their ability to generate revenue, independent of the firm's capital structure, investment and other corporate strategy level variables (Klein, 2001). The ATO, unlike profitability, is also used as an efficiency metric of the firm's ability to generate revenue independent from any debt servicing obligations.

[51] Profitability is used to measure the efficiency of the firm's operating performance, independent of the firm's capital structure, investment and other corporate strategy level variables (Klein, 2001)

[52] Firms that experience a financial shock with a higher operating margin are more likely to continue to operate, as compared to firms with lower margins, as they are more likely to reduce their product offerings as a result (Greenlee & Trussel, 2000)

[53] Return on assets (ROA), as a ratio, is a measure of operating performance, which indicates a firm's efficiency in generating revenues from its capital assets (Epps & Cereola, 2008).

[54] Return on equity (ROE), as a ratio, is a measure of how efficient a firm is in generating profits from the capital invested from its shareholders (Epps & Cereola, 2008).

[55] See appendix A for the exact methodology in data collection and data treatment.

$$AQC_i = \frac{X_{i.t_{e+8}} - X_{i.t_e}}{t_{e+8} - t_e}$$

Where $X_{i.t_e}$is the firm's first performance metric as an emerged firm, $X_{i.t_{e+8}}$ is the same value 8 financial quarters later, t_e is the firm's emergence quarter number[56].

We calculate the same AQC performance for the emerged firm's matching industry in the same period (see figure 5), for which we collected the emerged firm's data. The industry's financial performance AQC indicator is calculated as an average of all going concern firms in that industry during the same time period;

$$AQC_k == \frac{\sum_{j=1}^{J}\left(\frac{X^j_{i.t_{e+8}} - X^j_{i.t=e}}{t_{e+8} - t_e}\right)}{N_k}$$

Where AQC_k is the matched average going-concern industry AQC financial metric calculated per each emerged firm in our database; $X^j_{i.t_{e+8}}$ and $X^j_{i.t=e}$ are the quarterly financial performance metrics for each matched (with the emerged firm) going concern firm,j, in the relevant comparison quarters (first emerged quarter and the quarter two years later), N_k is the total number of firms active in the same industry, k , as the emerged firm in the same time period.

Now we collect (1) all the emerged firms AQC values for the chose performance metrics as well as (2) the matched industry average AQC values into two distributions per performance metric; $F_{firms,\Delta X}$; $F_{industry,\Delta X}$.

[56] The first financial quarter of 1980 is our database is quarter 0.

For the "Catch-up" hypothesis to be fully confirmed, given our performance metrics, the following distribution comparisons have to be found: $H_1: F_{firms,\Delta X} > F_{industry,\Delta X}$. In words: If generally financially troubled but viable firms are allowed to receive bankruptcy confirmation (and not economically failed firms), the removal of financial distress costs, would allow those firms to "catch-up" in terms of performance to their going-concern counter parts in the industry.

However, the KS-tests indicate that we cannot reject the possibility that the distribution pairs $F_{firms,\Delta X}$; $F_{industry,\Delta X}$ are mostly samples from the same distributions respective of the same performance metric (appendix B contain the KS test summary statistics).

Comparison	Outcome	KS-Stat	P-Value
$F_{firms,OI(n=85)}$ & $F_{industry,OI(n=85)}$	$F_{firms,OI} \neq F_{industry,OI}$	0.126	0.487
$F_{firms,Prof(n=85)}$ & $F_{industry,Prof(n=85)}$	$F_{firms,Prof} \neq F_{industry,Prof}$	0.117	0.582
$F_{firms,TS(n=102)}$ & $F_{industry,TS(n=102)}$	$F_{firms,TS} \neq F_{industry,TS}$	0.119	0.433
$F_{firms,ATO(n=102)}$ & $F_{industry,ATO(n=102)}$	$F_{firms,ATO} > F_{industry,ATO}$	0.206	0.019
$F_{firms,OPE(n=79)}$ & $F_{industry,OPE(n=79)}$	$F_{firms,OPE} < F_{industry,OPE}$	0.189	0.051
$F_{firms,ROA(n=75)}$ & $F_{industry,ROA(n=75)}$	$F_{firms,ROA} \neq F_{industry,ROA}$	0.120	0.625
$F_{firms,ROE(n=79)}$ & $F_{industry,ROE(n=79)}$	$F_{firms,ROE} < F_{industry,ROE}$	0.215	0.022
$F_{firms,Lev(n=91)}$ & $F_{industry,Lev(n=91)}$	$F_{firms,Lev} < F_{industry,Lev}$	0.220	0.001

Table :… KS test results for the Average Quarterly Change values of the performance metrics distributions for emerged firms and their matched industry counterparts, measured up to two years after firm emergence.

Firms emerging out of bankruptcy, as a group, do not exhibit catch-up (see Table..) to their respective industries in terms of measured performance metrics, except for the firm's ability to generate revenue from its assets (ATO). However, when incorporating the change in the cost of

generating these revenues (change in profitability), firms do not catch-up to their respective industry. In fact, firms diverge from their industry in terms of the operating margins, a measure of the efficiency by which the firm turns revenues into profits. That divergence in part explains why the Return on Equity (ROE) - as a measure of the firm's efficiency of turning shareholder investments into profits - diverges as well. Another factor in explaining the latter divergence in ROE is the observation that firms emerging out of bankruptcy are less able to build up new debt positions as compared to their industry (see table:.. ; leverage). Either prospective creditors are wary to lend to firms that recently went through bankruptcy or they indirectly deem the emerged firms to be unable to "catch-up" to the respective industry.

To be careful, we cannot be exactly sure to what extent the results are due to a filtering problem or that on average the reorganization plans are inadequate to alleviate debt problems for viable firms, thus not reducing the financial distress costs.[57] Also, firms during bankruptcy procedures are unable to react to demand and supply shocks during their stay in bankruptcy which can diminish their growth prospects emerging out of bankruptcy (Lopucki, 1993;Van Bergem, Zywicki and Jenkins, 2020). Whatever the exact mix of explanatory causes, the fact is that firms that emerge from bankruptcy do not exhibit the behavior of firms that are alleviated from their financial distress costs. The findings, as such, increase the likelihood that filtering failure is present in Chapter 11 bankruptcy cases.

[57] In our data sample, however, the relation between debt reduction (or reduction of leverage) – measured as the difference between leverage right before and after emergence- has no significant relation with the AQC values of profitability and the firm's ability to generate revenue (ATO) thereby reducing the probability of the explanation being true.

3.3 Is Judicial Bias A Source of Filtering Failure in Bankruptcy?

The tests so far indicate that the bankruptcy process results in filtering failure. After all, we would expect the bankruptcy process to facilitate industry convergence. Prior explanations of possible bankruptcy filtering failure have focused on some form of excess bargaining or control power of some of the constituencies in the bankruptcy process. We consider the possibility of another possible source of filtering failure, the role of the bankruptcy judge.

The ability and desire of bankruptcy judges to influence the outcome of cases has been contested. Experienced bankruptcy professionals and observers can often cite to examples of cases in which a judge has intervened heavily to promote a particular outcome. In other cases, however, bankruptcy judges are much more passive, serving a role more equivalent to a mediator pushing the parties toward agreement. In the absence of empirical evidence, it is not clear whether judges want to or even can significantly influence the outcomes of cases. Our goal, in part, is to address that question by determining whether there are indicia that suggest that bankruptcy judges influence the outcomes of cases in particular ways.

We focus particularly on the possibility that judges might be systematically biased toward inefficient reorganization in cases where the judge felt a personal interest.[58] Since the bankruptcy judge is not the residual claimant of a successful bankruptcy process, the judge can pursue personal goals, including nonpecuniary goals such as status or public regard, in the form of prestige, peer pressure from lawyers, bankruptcy professionals, prestige and media exposure (Lopucki & Doherty, 2007; Zywicki & Rajagopalan, 2017). The judge could also gain public acclaim and

[58] Note that the judicial knowledge problem discussed above could produce filtering failure as well, but that factor would be predicted to result in unbiased errors (relatively equal frequency of Type-I and Type-II errors) rather than systematically biased errors.

recognition to the extent that they pursue goals that aid the judge's local community, such as the preservation of jobs and tax revenues through reorganizing otherwise-failed companies. While the judge would get personal credit for saving jobs and the community, the costs of the policy—namely increased costs of capital for all firms in the future—would be externalized across the economy at large.[59]

Altogether, this suggests that a bankruptcy judge will be more likely to steer big bankruptcy cases, especially of firms with significant operations within the judge's district, towards reorganization. In other words, judges are more likely to be biased towards Type I errors when firms are large, and even more so if liquidation leads to large employment losses in the judge's district.[60]

We test the proposition that judicial bias might be one factor that influences filtering failure. The following analysis employs a logistic regression setup in which the likelihood of firm bankruptcy is predicted on the basis of data that proxies the suspected influence of the judge. Thus we first determine whether judicial influence is related to the bankruptcy decision to liquidate or reorganize a firm. Subsequently we determine (1) if the result hold after controlling for data that proxy for firm performance before bankruptcy, as well as (2) justifying which firms' performance controls have been used in the final logistic regression specification.

[59] In theory, bankruptcy judges are constrained by the possibility of an appeal and reversal by a higher court. On the other hand, it is common knowledge that appealing bankruptcy judge decision in most situations generates "excessive cost and delay" because of the traditional two-tier level of appeal, first to the relevant United States District Court and then to the Circuit Court of Appeals. (National Bankruptcy Review Commission 1997, 721). In light of the desire for speed and finality in bankruptcy cases in order to resolve the bankrupt firm's financial challenges, this lengthy and expensive process is rarely warranted. Moreover, many of the matters that we suggest might be affected by judicial bias, such as valuation decisions and determining the feasibility of the debtor's plan, are issues of fact that are subject to a highly-deferential standard of review on appeal. As a result, a bankruptcy judges are likely to have broad discretion to impose his or her views on the case if desired.

[60] It could be that judges as a result are more likely to neglect the smaller cases which therefore might results in more Type II errors.

First, the following logistic regression setup specifies whether there is, if at all, a presumption of judicial influence underlying bankruptcy filtering failure:

(1) $Log.\left(\frac{\widehat{p_i}}{1-\widehat{p_i}}\right) = \beta_1 x\ PrePack_i + \beta_2 x\ PreNeg_i + \beta_3 x\ log.DistCourt_i + \beta_4 x\ log.Employ_i + (\beta_3 x\ \log(\frac{Employ}{Distcourt})_i)$

The first two variables (Prepack and PreNeg) indicate whether the firm's bankruptcy was resolved as a pre-packaged or pre-negotiated bankruptcy.[61] Both bankruptcy types feature significant creditor agreement before bankruptcy filing about the future of the firm. Because these plans are largely negotiated outside court and brought to the judge for approval, the judicial role is largely passive and administrative pre-packaged and pre-negotiated bankruptcy cases; thus, we predict that if judicial bias is found with respect to bankruptcy reorganizations that bias will less prominent or absent in those cases.

The last three explanatory variables are proxy variables aimed as measuring possible judicial influence. The variables are: (1) the distance of a bankrupt firm's headquarters to the bankruptcy court where the case is held, (2) the number of workers employed by the firm one quarter before filing as well as (3) an interaction variable combining both distance and employment. The interaction variable is a ratio between employment and distance such that, as the distance to court is smaller and or the firm employs more workers before bankruptcy, the resulting ratio is larger.[62] In these more traditional bankruptcy cases, the judge has more authority and

[61] In a prepackaged bankruptcy, the debtor negotiates its bankruptcy reorganization plan with the firm's constituencies, arranges debtor-in possession financing (if necessary) and solicits votes on the plan before the filing for bankruptcy. A prenegotiated plan refers to a plan that is agreed to by the major constituents of the debtor. The soliciting of votes on the debtor's proposed plan starts after the firm has filed for bankruptcy. The prenegotiated plan is not as swift as a prepackaged bankruptcy but significantly shorter than a classic bankruptcy process.

[62] One commenter suggested to see if there is a relation between distance and employment loss for emerged firms. Judges might be incentivized to use their influence to minimize employment loss for firms that emerge out of bankruptcy. We have only found weak evidence for such a claim.

discretion with respect to guiding the development of the case and ruling on contested matters. Thus, we predict that if bias is present, it will be seen in these cases.

The regression specification results are listed in the column "bankruptcy type, distance and employment" (see table 2). The odds ratio for log distance is 0.86 ($p<0.10$) which, ceteris paribus, indicates that a decrease in the log distance of the court to the firm's head quarter is associated with an increase in the odds of reorganization by 1.16. The odds of reorganization increase as well, as a firm employs more workers before bankruptcy; an odds ratio of 1.28 for log employment ($p<0.05$) indicates that the chance of reorganization increases with the number of workers the firm employs before bankruptcy.

The interaction term that combines both employment and distance is also significant ($p<0.05$) and explains as much variance in data as regressing both variables individually. Therefore we choose to use the interaction term rather than the two independent variables individually.

Whether bankruptcy involved a pre-negotiation or prepackaging also significantly influences the chances of reorganization; the odds ratios are 2.87 ($p<0.05$) and 15.1 ($p<0.05$) respectively. The latter results are as expected: pre-agreement of creditors to reorganize the firm through bankruptcy cannot easily be overturned by the bankruptcy judge, even if it was the desire of the bankruptcy judge to do so.

With respect to cases that are not pre-packaged or pre-negotiated, the results indicate that firms that employ more workers and file in a court closer to their headquarters have a greater chance of emerging from bankruptcy, confirming the judicial bias hypothesis. To be surer about the result, we control for firm performance as measured one quarter before bankruptcy in the following logistic regression (see table 2).

Before we construct the final specification, we first construct three preliminary regression specifications to determine the impact of several firm performance metrics on the bankruptcy decision. The following specifications are used: "firm financials," "change in firm financials," and "industry adjusted firm financials." The three preliminary regression setups are aimed at uncovering significant non-collinear firm performance indicators with which to control the judicial influence findings.

The "firm financial" (see table 2) performance indicators[63] show the significance of a lower Tobin's Q ($p<0.05$), higher Leverage ($p<0.05$), bigger firm Asset Size ($p<0.05$) as well as a higher Net Worth ($p<0.10$) on the increased odds of firm reorganization; both firm size variables (Total Assets and Net Worth) are run separately since they are highly collinear.

Subsequently, we determine whether the average quarterly change[64] versions of the same firm financials contribute to the chance of reorganization. Perhaps firms that experience greater performance *deterioration* before they file for bankruptcy have a smaller chance of being reorganized. However, no such relations are found.

We also considered the possibility that the difference in firm performance with their respective industry average values could provide an indicator for firm reorganization.[65] After all, if the bankruptcy process facilitates the flow of resources from the less productive to the more productive firms – especially within industry given the lower subsumed resource adjustment costs

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[63]The following regression is specified: $Log.\left(\frac{\widehat{p_i}}{1-\widehat{p_i}}\right) = \beta_1 x\ ATO_{i,before(firm)} + \beta_2 x\ Prof_{i,before(firm)} + \beta_3 x\ T'q_{i,before(firm)} + \beta_4 x\ Leverage_{i(firm)} + \beta_5 x\ log\ TA_{i(firm)} + (\beta_5 x\ Std\ NW_{i(firm)})$

[64] The following regression is specified: $Log.\left(\frac{\widehat{p_i}}{1-\widehat{p_i}}\right) = \beta_1 aqcATO_{i,before(firm)} + \beta_2 aqcProf_{i,before(firm)} + \beta_3 aqcT'q_{i,before(firm)} + \beta_4 aqcLeverage_{i(firm)} + \beta_5 log.aqcTA_{i(firm)} + (\beta_5 Std.aqcTA_{i(firm)})$

[65] The following regression is specified: $Log.\left(\frac{\widehat{p_i}}{1-\widehat{p_i}}\right) = \beta_1 x\ ATO_{i,before(firm-industry)} + \beta_2 x\ Prof_{i,before(firm-industry)} + \beta_3 x\ T'q_{i,before(firm-industry)} + \beta_4 x\ Leverage_{i,(firm-industry)} + \beta_5 x\ log\ TA_{i(firm-industry)} + (\beta_5 x\ Std\ NW_{i(firm-industry)})$

– it seems more likely that a greater difference in operating performance indicators between firms and industry would predict liquidation. However, industry adjusted firm performance metrics have no significant influence on the likelihood of reorganization. These findings could be interpreted as indirect evidence of inefficient bankruptcy filtering failure.

The exercise is concluded thus: (1) we included firm performance metrics – instead of industry adjusted and AQC performance metrics to control the judge bias finding, (2) we select firm employment levels over the total assets of the firm as predictor, given that employment levels are more significant, as well as correlated with the size of the firm.

The final "full specification" regression can now be formulated:

$$(1)\ Log.\left(\frac{\widehat{p_i}}{1-\widehat{p_i}}\right) = \beta_1 x\ ATO_{i,before(firm)} + \beta_2 x\ Prof_{i,before(firm)} + \beta_3 x\ T'q_{i,before(firm)} + \beta_4 x\ Leverage_{i(firm)} + \beta_5 x\ PrePack_i + \beta_6 x\ PreNeg_i + \beta_7 x\ \log\left(\frac{Employ}{Distcourt}\right)_i$$

The first four variables measure firm performance in terms of the Asset Turnover Ratio, Profitability, Tobin's Q and Leverage. The last three variables indicate whether the bankruptcy was a prenegotiated or a prepackaged one as well as the interaction effect combining (1) the distance of the firm's HQ to the court and (2) the number of workers the firm employs. All but the ATO ratio, profitability and whether a bankruptcy is prenegotiated (significant at the p=0.1 level) are significant predictors of a bankruptcy reorganization. The odds ratios for the significant performance indicators, Tobin's Q and Leverage are 0.120 and 13.46 (both significant at $p<0.05$). In other words, the odds of a firm reorganizing through bankruptcy – ceteris paribus - increases as Tobin's Q falls and when leverage increases.

Emerge vs. Liquidation	Firm Financials	Quarterly Change in Firm Financials	Bankruptcy Type Court & Distance	Industry Adjusted Firm Financials	Full Specification
Asset Turnover Ratio	0.572 (0.404)	5.056 (44.11)		3.884 (3.505)	0.384 (0.324)
Profitability	1.16e-09 (1.96e-08)	2.52e-52 (3.4e-50)		1.56e-06*** (7.91e-06)	1.51e-08 (2.41e-07)
Tobin's Q	0.138** (0.118)	0.766 (0.966)		0.956 (0.203)	0.167** (0.122)
Leverage	26.36*** (20.11)	0.128 (0.611)		2.610** (1.261)	15.78** (12.05)
Log. Total Assets	1.319 (0.247)	0.678** (0.134)		1.014 (0.120)	
Operating Margin	1.114 (0.313)	0.161 (0.314)		1.026 (0.246)	1.144 (0.309)
ROA	2.69e+4 (6.56e+5)	3.06e+49 (5.05e+51)		2.26e+07** (1.95e+08)	13.42 (317.8)
Book Market Ratio	1.442 (0.356)	1.086 (1.593)		0.952 (0.171)	1.506* (0.368)
ROE	1.95e+6** (1.42e+7)	1.90e+17 (6.53e+18)		7.017 (32.91)	1.81e+07** (1.44e+08)
Log. Employment / Log. Distance			1.223** (0.084)		1.215** (0.102)
Observations	285	285	319	285	280
Adjusted R^2	0.11	0.03	0.08	0.06	0.15

Table ..: The dependent variable is a dichotomous variable indicating whether the firm emerged from bankruptcy or not. The odds ratios are as well as the robust standard errors in parenthesis. Odds ratios are interpreted as the increase in the odds of firm emergence from a one-unit increase in the independent variable. 1 indicates no change. Odds ratios lower than 1 indicate that increases in independent variables decrease the odds of emergence. * , ** and *** indicate variable significance at the 10% , 5% and 1% levels.

Overall, the regression results indicate that judicial influence can be an underlying factor in explaining bankruptcy filtering failure in cases in which judges might be thought to have a personal bias. The particular nature that this bias takes—reorganizing local firms with many workers—suggests that a plausible explanation for this bias is the bankruptcy judge's ability to gain prestige or favorable regard from media outlets, fellow bankruptcy professionals, and the

public. The ability and incentive for bankruptcy judges to use their influence to pursue those private benefits has largely been ignored in prior empirical research but seemingly deserves greater attention than it has received previously.

3.4 Does Jurisdiction matter for Filtering Failure in Bankruptcy?

Scholars have debated whether Delaware and New York bankruptcy courts have developed reorganization practices that are distinct from the rest of the country (see Zywicki (2006) for summarizing arguments). If reorganization practices are truly different, it should have implications for our results and shed light on the perennial debate on whether New York and Delaware are favored filing venues because of superior expertise and quality or not.

To shed empirical light on the debate we rerun our analyses - the "convergence" , "catch-up" and "judicial influence" analyses- for the courts of Delaware and New York (DeNY) , separately from all other courts . In terms of "convergence" we find that the results for DeNY differ from the overall results (see appendices E & G for the results): (1) the difference in Tobin's Q values between firms and industry is more negative after bankruptcy, meaning firms diverged in Market to Book value in DeNY, (2) instead of convergence in terms of operating margins, we find no difference between the before and after differences between firms and industry and (3) there is no convergence in terms of the return on equity (ROE) in the before and after differences. For all other courts, the results are similar to the overall results (both other courts and DeNY combined). The differing results seem to indicate that DeNY is doing worse in terms of "convergence" as compared to all other courts as a group.

In terms of industry "catch-up" (see appendix E) , we find that firms emerging from DeNY do differ from the overall results. The firms emerging from the other courts do differ in their

"catch-up" behavior from the overall results and thus from the DeNY results: (1) firms do not "catch-up" in terms of their ability to generate revenue (ATO), (2) there is no divergence in terms of operating margins, (3) no divergence in the Return on Equity (ROE), and (4) no divergence in terms of the value of debt (leverage). These results indicate that firms emerging from DeNY are doing better by catching - up in the ability to generate revenue, but worse in terms of divergence in terms of ROE which is partly explained by divergence in operating margins and leverage[66].

Striking is that leverage reduction - although significant for both firms emerging out of DeNY and the other courts - is significantly higher for firms emerging out of DeNY (see Appendix E). Recall that higher levered firms tend to lose market share, have lower profitability, impaired access to credit and higher agency costs as compared to their competitors. The implication is that *ceteris paribus*, one would expect firms emerging from DeNY to show more pronounced "catch-up" behavior as compared to firms from the rest of the courts. No such general evidence is found.

Lastly (see appendix G) we find that firm emergence likelihood in DeNY is not driven by the number of employees and the distance between the bankruptcy court and the firm's headquarter, as compared to the other bankruptcy jurisdictions. The DeNY bankruptcy courts, unlike most other major bankruptcy courts, are essentially "national" courts, in that large corporations from all over the country frequently file there. That is despite the fact that those firms

[66] Relevant is that the length of bankruptcy procedures is inversely related to the emerging firm's growth rate in some of the performance metrics measured (see Van Bergem, Zywicki & Jenkins(2020)). Especially, Delaware is known for relatively speedy bankruptcy procedures (Skeel, 1998), which means that firms emerging from Delaware and New York might be slightly better in "catching – up," due to the fact that these spent less time in bankruptcy stay, as compared to firms emerging from other courts.[66] Van Bergem, Zywicki & Jenkins (2020) argue that bankrupt firm governance becomes increasingly focused on dealing with legal matters, as opposed to dealing with matters of going-concern and recovery; legal limbo creates inertia, which lasts longer with increased bankruptcy stay.

are neither headquartered or maintain a substantial percentage of their employees in New York City or Delaware.[67]

The finding is relevant to a perennial debate in Congress on legislative proposals that amend the Bankruptcy Code to limit the venues in which firms can file bankruptcy (any citation?). Most notably, under current law, firms can file bankruptcy in the state in which they hold their corporate charter (usually Delaware) or where they have some degree of business operations (almost every firm has some presence or subsidiary in New York City). Various legislative proposals propose to restrict the available venues for bankruptcy to those locations where the firm is headquartered or has a substantial business presence of some sort (such as a manufacturing facility). Our findings suggest that *ceteris paribus* one effect of that legal change is to increase judicial bias in decision-making, leading to a greater number of reorganizations, especially for firms with a large labor force. Although that result might be economically problematic, it might be a result favored by local elected officials. Further discussions of these results deserve careful further investigations that are currently outside the scope of the current paper.

4. Conclusion

The institutions of the bankruptcy process arguably play an important part in business dynamics by filtering between economically failed enterprises that should be liquidated and financially distressed (but economically viable) firms that should be preserved as a going-concern. However, a number of reasons can be identified why the bankruptcy process may not filter

[67] For example, both Chrysler and General Motors filed bankruptcy in New York City, despite the fact that virtually all of their operations and employees were located in Detroit.

efficiently, including (1) The presumption of the "debtor in possession", (2) creditor conflict, and (3) judicial bias.

By combining firm financial data with data on large public company chapter 11 filings, we are able to test whether bankruptcy as a process performs its filtering task efficiently. We specifically test two hypotheses regarding possible filtering failure: we postulate that if bankruptcy filters correctly, we would predict the absolute performance differences between bankrupt firms and their industry to be larger, as compared to the performance differences between emerged firms and their industry after bankruptcy. Secondly we postulate that the performance of firms that are economically viable but financially distressed should converge to other firms in the same industry once the source of financial distress is removed during bankruptcy. We find no support for either hypothesis. The combined findings in fact suggest that filtering failure does in fact occur in bankruptcy.

We then examine one possible source of filtering failure: the role of judicial influence and particularly the ability and incentive of bankruptcy judges to pursue personal benefits such as prestige and public popularity by choosing to reorganize economically-failed firms. Employing a logistic regression analysis regarding the bankruptcy outcome to liquidate or reorganize we find that a greater chance of reorganization is associated with greater firm pre-bankruptcy employment levels, as well as a smaller distance between the firm's headquarters and bankruptcy court. This suggests that in deciding whether to reorganize a firm, a particular influence on the judge might be the impact that ordering liquidation of the firm might have on local workers and communities and that as a result judges will support reorganization of local firms at the expense of firm's creditors.

When we break down our analyses by comparing the results from the popular bankruptcy courts of New York and Delaware (DeNY) with the rest of the bankruptcy courts we find interesting differences. In terms of "industry convergence" we find that DeNY is doing worse in terms of the Market to Book ratio, Return on Equity (ROE) and operating margins as compared to the rest of the nation's courts. Regarding "Catch-up" DeNY is doing better in terms of the Ability to Generate Revenue (ATO) but worse in terms of operating margins, Return on Equity and leverage. Another interesting difference , is that emergence likelihood in DeNY is not driven by the number of employees and the distance between the bankruptcy court and the firm's headquarter, as compared to the other bankruptcy jurisdictions.

In this article we examined the presence of filtering failure and its potential causes. We did not attempt to examine the significance of the bankruptcy process within overall business dynamics; it could very well be that bankruptcy as institution affects the general flow of resources in an economy to significantly influence overall business dynamics and macroeconomic efficiency. Finally, our findings on filtering failure do not establish whether the results reflect a greater propensity for Type-I or Type-II errors except to the extent that we find a systematic bias among judges toward Type-I errors in cases that involve local firms with many workers.

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Appendix A.1: Data Collection and Methodogy [update with new data runs]

We compile data from two separate data sources – the UCLA-Lopucki Bankruptcy Research Database (BRD)[68] and the firm financial data from the Center for Research in Security Prices (CRSP)[69] From the BRD we compile data on large U.S. public corporate bankruptcies (firms which total assets are value higher than $100 million in 1980 dollars) ranging from the beginning of 1981 to the end of 2010 . We specifically obtain data on the firm's filing (*Filedindex*) and court disposition date (*Dispositionindex*), the number of workers the firm employed one quarter before filing (*Emp Before*) for bankruptcy, the distance of the firm head quarter (HQ) from court (*Dist Crt to HQ)*, whether the bankruptcy case was pre-negotiated or pre-packaged (*Pre-Neg or Pre-Pack*) ,whether the bankruptcy case resulted in liquidation or reorganization (*Emerge*), as well as the firm identification number; CUSIP[70]. The CRSP database provides the quarterly reported financial indicators of all publicly firms between 1981 and 2010 as well the CUSIP identifier and the industry identifier, SIC[71], to which the firm belongs. The quarterly firm financial values we use in this paper are; the value ($M) of Property, Plant and Equipment (*PPEGT*), the value ($M) of Totals Assets (*TA*), firm Net Worth (*NW*) ($M), the value ($M) of Total Sales (*Sale*), Operating Income before Depreciation (*OIBDP* in $M), stock price at fiscal-quarter (*PRCCQ* in $), number of common shares outstanding (*CSHPRI*), debt in current liabilities (*DLC* in $M), long-term debt (*DLTT* in $M) , preferred stock (*PSTKL*), deferred taxes (*TXDITC* in $M).

[68] The UCLA-Lopucki Bankruptcy Research Database is available from http://lopucki.law.ucla.edu/ upon request
[69] Data from the Center for Research in Security Prices (CRSP) is available from http://www.crsp.com/ upon subscription
[70] The CUSIP is a nine-digit security identification number to identify identifies most financial instruments, including: stocks of all registered U.S. and Canadian companies, commercial paper, and U.S. government and municipal bonds. Each U.S. firm that is publicly traded has a CUSIP identifier.
[71] The Standard Industrial Classification SIC is a system for classifying industries by a four-digit code.

The following variables are derived from the individual quarterly financial values: Profitability[72] (*Prof*) ,the Asset Turnover Ratio (*ATO*), Leverage (*Lev*), and Tobin's Q (*Q*). In both datasets we delete observations of financial firms, regulated firms as well as quasi-public firms[73]. To ensure consistency of firm size between the BRD and the CRSP we delete all firm financial observations that are under $100 million (in 1980 dollars) in the CRSP database[74]. All quarterly firm financial values are deflated to constant 1980 dollars using the GDP deflator provided by the Bureau of Economic Analysis.

A.2: Database matching between CRSP/CCM and BRD

We use a relational database and database management system (RDDMS) in which we merge the BRD and CRSP databases. The CUSIP , SIC and Financial Quarters (spanning the 1981 -2010 time period) are used as identifiers on the basis of which we query the data via a B-Tree data structure[75]. First, the CUSIP identifiers are used to match the firms in the BRD with the CRSP

[72] The elements from the financial ratios used are collected quarterly from CRSP and calculated thus:
The firm's **Profitability ($\boldsymbol{Prof_i}$)** is a ratio between the values of operating income before depreciation (OIBDP) and amortization and total assets (AT):
The firm's **Asset turnover Ratio ($\boldsymbol{ATO_i}$)** – the firm's ability to generate revenue – is a ratio between the values of net revenue (Sale) divided by the total assets (AT):
The firm's **Leverage ($\boldsymbol{Lev_i}$)** is the ratio between the value of total liabilities ($DLC + DLTT$) and total assets (TA):
The firm's **Tobin's ($\boldsymbol{Q_i}$)** value is defined as the sum of the share price multiplied by number of common shares outstanding (market value equity; MVE), value of debt in current liabilities (DLC) , value of long-term debt (DLTT) and the value of preferred stock minus (PSTKL) deferred taxes (TXDITC) , divided by the value of total assets (AT); the value of net revenues (Sale); and profitability (Prof) (operating income before depreciation divided by total assets):

$$\boldsymbol{Prof_i} = \frac{OIBDP_i}{AT_i}\ ;\ \boldsymbol{ATO_i} = \frac{Sale_i}{AT_i};\ \boldsymbol{Lev_i} = \frac{DLC_i + DLTT_i}{AT_i};\ \boldsymbol{Q_i} = \frac{MVE_i + DLC_i + DLTT_i + PSTKL_i - TXDITC_i}{AT_i + Sale_i + Prof_i}$$

[73] Excluded from our analyses are financial segments (SIC 6000–6999) and segments for regulated utilities (SIC 4900 and SIC 4999).
[74] Variables are deflated to constant 1980 dollars using the GDP deflator provided by the Bureau of Economic Analysis.
[75] A B-tree is a tree data structure that keeps data sorted and allows searches, sequential access, insertions, and deletions in minimal computation time. The B-tree is therefore ideal for dealing with large datasets.

.The result is two data structures; one contains firm financial information of firms that have never been bankrupt during the 1981-2010 time period, the other contains firm financial information of firms that are bankrupt, are going into bankruptcy as well as firms emerging out of bankruptcy.

The dates on firm bankruptcy filing and dates on firm case dispositions, obtained from the BRD, are converted into a financial quarter identifier. The financial quarter identifiers are subsequently used to further separate the firm quarterly financial data in the dataset containing data on firms that *ever* have been bankrupt: The data is separated into three categories: firm financial data on firms *during the period two years prior* to bankruptcy, data on firms *during bankruptcy* and data on firms *during the two years after emerging* from bankruptcy.

The procedure leaves us with four data structures; (1) firm financial data on firms that *never* have been bankrupt during the 1981-2010 period, (2) firm financial data on firms in the *two year period leading up* to bankruptcy, (3) firm financial data on firms *during bankruptcy*, and (4) firm financial data on firms in the *two year period after* bankruptcy.

A.3: Average Quarterly Change Metrics and Firms and Industry Comparisons

In the financial distress hypothesis testing , average quarterly change values are used for some of the financial indicators that have been collected. Also in the logistic regression ,predicting the likelihood of the bankruptcy decision, we use the AQC of some financial metrics.

In the RDDSM the metric can be calculated for each separate financial reporting for each firm category 'before', 'during' and 'after' and for each firm's matching industry during the same time period. We begin calculating the AQC values by collecting for each firm the first and last quarter for each category (see table A.1) ; 'before', 'during', and 'after' (we define a quarter span

from the period 1981 -2010 to start with quarter one at the 1st of January of 1981). For each category we separate the data into two periods; from the start quarter to the midrange quarter (excluding the midrange quarter) and from the midrange quarter to end quarter (including the midrange quarter).

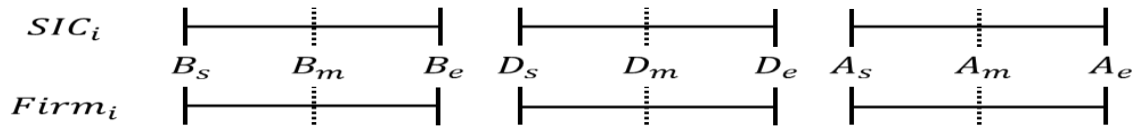

Table A.1: The determination of the data ranges for each category; 'before', 'during' and 'after': B_s = The start quarter of the before bankruptcy category (2 years prior to the last quarter before bankruptcy), B_m = the mid range quarter of the before bankruptcy category, B_e = the end quarter of the before bankruptcy category (the last quarter before bankruptcy). $D_{s,m,e}$ are the start (the filing quarter), mid and end quarters (the quarter of case disposition) for the during category and $A_{s,m,e}$ are the start (the first quarter out of bankruptcy), mid and end quarters (2 years after the first quarter out of bankruptcy) for the after category.

The six resulting time ranges (see table A.2), two per category 'before', 'during' and 'after', are used to collect the financial data separately such that an average can be calculated per financial attribute per one of the six time categories per firm in bankruptcy:

$$\sum_{i=0}^{n} \frac{X_i}{N} = Ave\ per\ time\ category$$

Where X_i= the ith quarterly financial attribute value X that includes all the values within a certain time category, and N = number of non-zero financial observations. Per firm the calculation results in two averages of the time series of a particular financial attribute per category; the average before midpoint and the average after midpoint. Now we calculate the AQC for every relevant financial value per firm, per category 'before', 'during' and 'after' bankruptcy:

$$\left(\frac{Ave_{i;after\ midpoint} - Ave_{i;before\ midpoint}}{N}\right) = AQC_i$$

Where i= i^{th} firm and N= number of quarters that span each bankruptcy time range category. The resulting database consists of AQC values per financial indicator per firm per three bankruptcy time ranges (‘before’, ‘during’, ‘after’).

To compare the firm AQC financial metrics with the industry equivalent, we want to control for time effects while comparing the particular firm with their respective industry. Thus, Per bankrupt firm we query the database for firms that have not been bankrupt during the 1981-2010 period using the bankrupt firm’s SIC identifier and collect all financial information of all firms in the same industry. We use the bankrupt firm’s time ranges for the three bankruptcy categories (‘before’, ‘during’ and ‘after’; see table A.1), by making use of the financial quarter identifier, to separate the data into three different datasets.

The three data sets contain firm financial information on *all firms in the same industry* as the bankrupt firm , per bankrupt firm, per three bankruptcy time categories. Next we calculate per bankrupty firm, per all time categories ,two industry averages of all firms in the same industry as the bankruptcy firm; average before midpoint and average after midpoint for all time categories. Subsequently, the matched industry average AQC values are calculated – for ‘before’, ‘during’ and ‘after’ - as an average of all the firms in the same industry per matched bankrupt firm in each bankruptcy category ‘before’, ‘during’ and ‘after’;

$$\frac{\sum_{i=o}^{n}\left(\frac{Ave_{i,after\ midpoint} - Ave_{i,before\ midpoint}}{N}\right)}{N_j} = AQC_j$$

Where i= the ith firm in the same industry as the bankrupt firm , N_j is the number of firms in the same industry (SIC) , j ,as the bankrupt firm, N = the number of quarters that span a bankruptcy category (before, during and after). The resulting database contains per bankrupt firm the

average industry's AQC value of all collected financial indicators for the three bankruptcy categories.

Besides, the AQC values for the firms and their matched industry averages, we also compare bankrupt firms with their industry counterparts, not in terms of their AQC , but their raw equivalent. For example if we want to compare the bankrupt firm with their respective industry , in terms of some financial indicator, we query the RDDMS per specific firm (CUSIP), per specific financial quarter, for all the firm financial values in the same industry (SIC) in the same quarter as the bankrupt firm. In fact, we are able to make any possible combination of queries in our data universe using the RDDMS based on the CUSIP, Financial Quarter, and SIC indentifiers.

Appendix B: AQC results for Firm vs. Industry CDF comparisons after Bankruptcy

Comparison	Outcome	KS-Stat	P-Value
$F_{firms,OI(n=85)}$ & $F_{industry,OI(n=85)}$	$F_{firms,OI} \neq F_{industry,OI}$	0.126	0.487
$F_{firms,Prof(n=85)}$ & $F_{industry,Prof(n=85)}$	$F_{firms,Prof} \neq F_{industry,Prof}$	0.117	0.582
$F_{firms,TS(n=102)}$ & $F_{industry,TS(n=102)}$	$F_{firms,TS} \neq F_{industry,TS}$	0.119	0.433
$F_{firms,ATO(n=102)}$ & $F_{industry,ATO(n=102)}$	$F_{firms,ATO} > F_{industry,ATO}$	0.206	0.019
$F_{firms,OPE(n=79)}$ & $F_{industry,OPE(n=79)}$	$F_{firms,OPE} < F_{industry,OPE}$	0.189	0.051
$F_{firms,ROA(n=75)}$ & $F_{industry,ROA(n=75)}$	$F_{firms,ROA} \neq F_{industry,ROA}$	0.120	0.625
$F_{firms,ROE(n=79)}$ & $F_{industry,ROE(n=79)}$	$F_{firms,ROE} < F_{industry,ROE}$	0.215	0.022
$F_{firms,Lev(n=91)}$ & $F_{industry,Lev(n=91)}$	$F_{firms,Lev} < F_{industry,Lev}$	0.220	0.001
$F_{firms,BM(n=94)}$ & $F_{industry,BM(n=94)}$	$F_{firms,BM} < F_{industry,BM}$	0.245	0.003

Table B : Summary table of empirical cumulative density functions comparisons by means of Kolmogorov-Smirnov test. Firm AQC distributions after bankruptcy are compared with industry average AQC values for Operating Income (IO), Profitability (Prof), Total Sales (TS) , and the Asset Turnover Ratio (ATO).

Appendix C: KS-Tests Results for Firm vs. Industry CDF Comparisons before Bankruptcy

Comparison	Outcome	KS-Stat	P-Value
$F_{\text{firms,TQ before(n=362)}}$ & $F_{\text{industry,TQ before(n=362)}}$	$F_{\text{firms,TQ before}} < F_{\text{industry,TQ before}}$	0.399	0.000
$F_{\text{firms,Prof before(n=354)}}$ & $F_{\text{industry,Prof before(n=354)}}$	$F_{\text{firms,TQ before}} < F_{\text{industry,TQ before}}$	0.267	0.000
$F_{\text{firms,ATO before(n=362)}}$& $F_{\text{industry,ATO before(n=362)}}$	$F_{\text{firms,ATO before}} < F_{\text{industry,ATO before}}$	0.158	0.000
$F_{\text{firms,OPE before(n=368)}}$& $F_{\text{industry,OPE before(n=368)}}$	$F_{\text{firms,OPE before}} < F_{\text{industry,OPE before}}$	0.535	0.000
$F_{\text{firms,ROA before(n=372)}}$& $F_{\text{industry,ROA before(n=372)}}$	$F_{\text{firms,ROA before}} < F_{\text{industry,ROA before}}$	0.575	0.000
$F_{\text{firms,ROE before(n=372)}}$& $F_{\text{industry,ROE before(n=372)}}$	$F_{\text{firms,ROE before}} < F_{\text{industry,ROE before}}$	0.473	0.000
$F_{\text{firms,Lev before(n=405)}}$& $F_{\text{industry,Lev before(n=405)}}$	$F_{\text{firms,Lev before}} > F_{\text{industry,Lev before}}$	0.605	0.000
$F_{\text{firms,MB before(n=407)}}$& $F_{\text{industry,MB before(n=407)}}$	$F_{\text{firms,MB before}} < F_{\text{industry,MB before}}$	0.349	0.000
$F_{\text{firms,BM before(n=407)}}$& $F_{\text{industry,BM before(n=407)}}$	$F_{\text{firms,BM before}} > F_{\text{industry,BM before}}$	0.349	0.000

Table C.1: Summary table of empirical cumulative density functions comparisons by means of Kolmogorov-Smirnov test. Distributions of Firm values one quarter before and bankruptcy are compared with the respective industry average values for various performance metrics.

Appendix D: KS-Tests Results for Firm vs. Industry after Bankruptcy

Comparison	Outcome	KS-Stat	P-Value
$F_{\text{firms−industry,TQ before(n=98)}}$ & $F_{\text{firms−industry,TQ after(n=98)}}$	$F_{\text{firms−industry,TQ before}} \neq F_{\text{firms−industry,TQ after}}$	0.608	0.634
$F_{\text{firms−industry,ATO before(n=98)}}$ & $F_{\text{firms−industry,ATO after(n=98)}}$	$F_{\text{firms−industry,ATO before}} \neq F_{\text{firms−industry,ATO after}}$	0.105	0.355
$F_{\text{firms−industry,Prof before(n=82)}}$ & $F_{\text{firms−industry,Prof after(n=82)}}$	$F_{\text{firms−industry,Prof before}} < F_{\text{firms−industry,Prof after}}$	0.268	0.002
$F_{\text{firms−industry,OPE before(n=82)}}$ & $F_{\text{firms−industry,OPE after(n=82)}}$	$F_{\text{firms−industry,OPE before}} < F_{\text{firms−industry,OPE after}}$	0.222	0.015

$F_{firms-industry,ROA\ before(n=79)}$ & $F_{firms-industry,ROA\ after(n=79)}$	$F_{firms-industry,ROA\ before} \neq F_{firms-industry,ROA\ after}$	0.164	0.214
$F_{firms-industry,ROE\ before(n=79)}$ & $F_{firms-industry,ROE\ after(n=79)}$	$F_{firms-industry,ROE\ before} < F_{firms-industry,ROE\ after}$	0.228	0.014
$F_{firms-industry,Lev\ before(n=94)}$ & $F_{firms-industry,Lev\ after(n=94)}$	$F_{firms-industry,Lev\ before} > F_{firms-industry,Lev\ after}$	0.340	0.000
$F_{firms-industry,MB\ before(n=95)}$ & $F_{firms-industry,MB\ after(n=95)}$	$F_{firms-industry,MB\ before} \neq F_{firms-industry,MB\ after}$	0.116	0.522
$F_{firms-industry,BM\ before(n=95)}$ & $F_{firms-industry,BM\ after(n=95)}$	$F_{firms-industry,BM\ before} \neq F_{firms-industry,BM\ after}$	0.109	0.617

Table D: Summary table of empirical cumulative density functions comparisons by means of Kolmogorov-Smirnov test. Paired Firm – Industry one quarter before and after values of firms filing for and emerging out of bankruptcy are compared for various performance metrics

Appendix E: KS-Tests Results for Delaware / New York and other courts

Comparison DE/NY	Outcome	KS-Stat	P-Value
$F_{firms-industry,TQ\ before(n=35)}$ & $F_{firms-industry,TQ\ after(n=35)}$	$F_{firms-industry,TQ\ before} > F_{firms-industry,TQ\ after}$	0.312	0.002
$F_{firms-industry,ATO\ before(n=38)}$ & $F_{firms-industry,ATO\ after(n=38)}$	$F_{firms-industry,ATO\ before} \neq F_{firms-industry,ATO\ after}$	0.102	0.887
$F_{firms-industry,Prof\ before(n=39)}$ & $F_{firms-industry,Prof\ after(n=39)}$	$F_{firms-industry,Prof\ before} < F_{firms-industry,Prof\ after}$	0.256	0.065
$F_{firms-industry,OPE\ before(n=38)}$ & $F_{firms-industry,OPE\ after(n=38)}$	$F_{firms-industry,OPE\ before} \neq F_{firms-industry,OPE\ after}$	0.184	0.497
$F_{firms-industry,ROA\ before(n=37)}$ & $F_{firms-industry,ROA\ after(n=37)}$	$F_{firms-industry,ROA\ before} \neq F_{firms-industry,ROA\ after}$	0.162	0.676
$F_{firms-industry,ROE\ before(n=37)}$ & $F_{firms-industry,ROE\ after(n=37)}$	$F_{firms-industry,ROE\ before} \neq F_{firms-industry,ROE\ after}$	0.216	0.314
$F_{firms-industry,Lev\ before(n=45)}$ & $F_{firms-industry,Lev\ after(n=45)}$	$F_{firms-industry,Lev\ before} < F_{firms-industry,Lev\ after}$	0.489	0.000
$F_{firms-industry,MB\ before(n=45)}$ & $F_{firms-industry,MB\ after(n=45)}$	$F_{firms-industry,MB\ before} \neq F_{firms-industry,MB\ after}$	0.200	0.295
$F_{firms-industry,BM\ before(n=45)}$ & $F_{firms-industry,BM\ after(n=45)}$	$F_{firms-industry,BM\ before} \neq F_{firms-industry,BM\ after}$	0.143	0.752

Table E.1: Summary table of empirical cumulative density functions comparisons by means of Kolmogorov-Smirnov test for the Bankruptcy districts of New York and Delaware . Paired Firm – Industry one quarter before and after values of firms filing for and emerging out of bankruptcy are compared for various performance metrics.

Comparison Rest	Outcome	KS-Stat	P-Value
$F_{\text{firms-industry,TQ before(n=43)}}$ & $F_{\text{firms-industry,TQ after(n=43)}}$	$F_{\text{firms-industry,TQ before}} \neq F_{\text{firms-industry,TQ after}}$	0.141	0.489
$F_{\text{firms-industry,ATO before(n=43)}}$ & $F_{\text{firms-industry,ATO after(n=43)}}$	$F_{\text{firms-industry,ATO before}} \neq F_{\text{firms-industry,ATO after}}$	0.172	0.253
$F_{\text{firms-industry,Prof before(n=43)}}$ & $F_{\text{firms-industry,Prof after(n=43)}}$	$F_{\text{firms-industry,Prof before}} < F_{\text{firms-industry,Prof after}}$	0.279	0.028
$F_{\text{firms-industry,OPE before(n=43)}}$ & $F_{\text{firms-industry,OPE after(n=43)}}$	$F_{\text{firms-industry,OPE before}} < F_{\text{firms-industry,OPE after}}$	0.348	0.004
$F_{\text{firms-industry,ROA before(n=42)}}$ & $F_{\text{firms-industry,ROA after(n=42)}}$	$F_{\text{firms-industry,ROA before}} \neq F_{\text{firms-industry,ROA after}}$	0.191	0.392
$F_{\text{firms-industry,ROE before(n=42)}}$ & $F_{\text{firms-industry,ROE after(n=42)}}$	$F_{\text{firms-industry,ROE before}} < F_{\text{firms-industry,ROE after}}$	0.333	0.007
$F_{\text{firms-industry,Lev before(n=45)}}$ & $F_{\text{firms-industry,Lev after(n=45)}}$	$F_{\text{firms-industry,Lev before}} < F_{\text{firms-industry,Lev after}}$	0.245	0.045
$F_{\text{firms-industry,MB before(n=50)}}$ & $F_{\text{firms-industry,MB after(n=50)}}$	$F_{\text{firms-industry,MB before}} \neq F_{\text{firms-industry,MB after}}$	0.166	0.508
$F_{\text{firms-industry,BM before(n=50)}}$ & $F_{\text{firms-industry,BM after(n=50)}}$	$F_{\text{firms-industry,BM before}} \neq F_{\text{firms-industry,BM after}}$	0.184	0.346

Table E.2: Summary table of empirical cumulative density functions comparisons by means of Kolmogorov-Smirnov test for all other court jurisdictions other than New York and Delaware. Paired Firm – Industry one quarter before and after values of firms filing for and emerging out of bankruptcy are compared for various performance metrics.

Appendix F: AQC after KS-Tests Results for Delaware / New York and other courts

Comparison DE/NY	Outcome	KS-Stat	P-Value
$F_{\text{firms,ATO after(n=31)}}$ & $F_{\text{industry,ATO after(n=31)}}$	$F_{\text{firms,ATO after}} > F_{\text{industry,ATO after}}$	0.323	0.033
$F_{\text{firms,Prof after (n=24)}}$ & $F_{\text{industry,Prof after(n=24)}}$	$F_{\text{firms,Prof after}} \neq F_{\text{industry,Prof after}}$	0.243	0.437
$F_{\text{firms,OPE after (n=35)}}$ & $F_{\text{industry,OPE after(n=35)}}$	$F_{\text{firms,OPE after}} < F_{\text{industry,OPE after}}$	0.264	0.072

$F_{firms,ROA\ after(n=33)}$ & $F_{industry,ROA\ after(n=33)}$	$F_{firms,ROA\ after} \neq F_{industry,ROA\ after}$	0.152	0.811
$F_{firms,ROE\ after(n=33)}$ & $F_{industry,ROE\ after(n=33)}$	$F_{firms,ROE\ after} < F_{industry,ROE\ after}$	0.278	0.051
$F_{firms,Lev\ after(n=42)}$ & $F_{industry,Lev\ after(n=42)}$	$F_{firms,Lev\ after} < F_{industry,Lev\ after}$	0.309	0.013
$F_{firms,BM\ after(n=43)}$ & $F_{industry,BM\ after(n=43)}$	$F_{firms,BM\ after} > F_{industry,BM\ after}$	0.302	0.015

Table F.1 : Summary table of empirical cumulative density functions comparisons by means of Kolmogorov-Smirnov test for the Bankruptcy districts of New York and Delaware. Firm AQC distributions after bankruptcy are compared with industry average AQC values for various performance metrics.

Comparison Rest	Outcome	KS-Stat	P-Value
$F_{firms,ATO\ after(n=39)}$ & $F_{industry,ATO\ after(n=39)}$	$F_{firms,ATO\ after} \neq F_{industry,ATO\ after}$	0.214	0.321
$F_{firms,Prof\ after\ (n=29)}$ & $F_{industry,Prof\ after(n=29)}$	$F_{firms,Prof\ after} \neq F_{industry,Prof\ after}$	0.243	0.335
$F_{firms,OPE\ after\ (n=43)}$ & $F_{industry,OPE\ after(n=43)}$	$F_{firms,OPE\ after} \neq F_{industry,OPE\ after}$	0.163	0.580
$F_{firms,ROA\ after(n=42)}$ & $F_{industry,ROA\ after(n=42)}$	$F_{firms,ROA\ after} \neq F_{industry,ROA\ after}$	0.167	0.564
$F_{firms,ROE\ after(n=42)}$ & $F_{industry,ROE\ after(n=42)}$	$F_{firms,ROE\ after} \neq F_{industry,ROE\ after}$	0.209	0.269
$F_{firms,Lev\ after(n=49)}$ & $F_{industry,Lev\ after(n=49)}$	$F_{firms,Lev\ after} \neq F_{industry,Lev\ after}$	0.247	0.083
$F_{firms,BM\ after(n=51)}$ & $F_{industry,BM\ after(n=51)}$	$F_{firms,BM\ after} < F_{industry,BM\ after}$	0.314	0.005

Table F.2 : Summary table of empirical cumulative density functions comparisons by means of Kolmogorov-Smirnov test for all other court jurisdictions other than New York and Delaware. Firm AQC distributions after bankruptcy are compared with industry average AQC values for various performance metrics.

Appendix G: Descriptive Statistics of Variables used in the Logistic Regression

The table includes the descriptive statistics of large public firms, one quarter before filing for bankruptcy. The industry adjusted firm performance values are derived by subtracting the industry matched average from the firm value one quarter before bankruptcy. Large values are logged, where necessary we standardized the values. Three binary variables are included: whether the bankruptcy was pre-negotiated, whether it was pre-packaged, and whether the bankruptcy case resulted in the firm emerging as a reorganized firm.

	N	**Mean**	**Std.Dev**	**Min**	**Max**
Asset Turnover Ratio	324	0.273	0.223	-0.045	2.034
Profitability	292	-0.007	0.068	-0.841	0.284
Tobin's Q	320	0.668	0.482	0.065	5.051
Leverage	318	0.679	0.435	0.021	5.159
Log. Total Assets ($M)	324	6.047	0.894	4.387	8.624
Std. Net Worth ($M)	324	0.000	1.000	-6.617	7.869
Log. Employment	322	8.059	1.405	3.634	11.39
Log. Distance	321	6.305	1.196	0.000	8.497
Log. (Employment x (1/Distance))	318	1.737	1.946	-4.131	7.447
Pre packaged Bankruptcy	324	0.078	0.267	0.000	1.000
Pre negotiated Bankruptcy	324	0.201	0.401	0.000	1.000
Firm Emergence	324	0.694	0.461	0.000	1.000
Asset Turnover Ratio (Firm – Industry Ave.)	324	-0.040	0.172	-0.668	0.943
Profitability (Firm – Industry Ave.)	292	-0.020	0.066	-0.777	0.255
Tobin's Q (Firm – Industry Ave.)	320	-0.399	0.769	-5.565	3.756
Leverage (Firm – Industry Ave.)	318	0.358	0.439	-0.417	4.971
Std. Total Assets ($M) (Firm – Industry Ave.)	324	0.000	1.000	-13.57	1.627
Std. Net Worth ($M) (Firm – Industry Ave.)	324	0.000	1.000	-11.47	2.584

Table F.1: Descriptive Statistics of Variables used in the Logistic Regression

Appendix H: Logistic Regression Results for Delaware / New York and other courts

Emerge vs. Liquidation	Full Specification (DE & NY)	Full Specification (Other Courts)
Asset Turnover Ratio	0.716 (0.832)	0.211 (0.365)
Profitability	5.04e+08 (2.25e+10)	3.29e-24** (7.07e-23)
Tobin's Q	0.189 (0.222)	0.078** (0.800)
Leverage	51.06*** (59.23)	38.82*** (42.88)
Operating Margin	2.130* (0.852)	0.302** (0.181)
ROA	8.14e-21 (4.25e-19)	1.04e+33** (4.01e+34)
Book Market Ratio	1.791 (1.136)	1.242 (0.365)
ROE	4.08e+08** (3.50e+09)	13.99 (173.4)
Log. Employment / Log. Distance	1.123 (0.138)	1.316** (0.181)
Observations	148	132
Adjusted R^2	0.14	0.15

Table H: The dependent variable is a dichotomous variable indicating whether the firm emerged from bankruptcy or not. The odds ratios are as well as the robust standard errors in parenthesis. Odds ratios are interpreted as the increase in the odds of firm emergence from a one-unit increase in the independent variable. 1 indicates no change. Odds ratios lower than 1 indicate that increases in independent variables decrease the odds of emergence. * , ** and *** indicate variable significance at the 10% , 5% and 1% levels.