THREE ESSAYS ON FINANCIAL DISTRESS AND CORPORATE BANKRUPTCY

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BY

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Abstract

This thesis explores three important issues in financial distress and corporate bankruptcy: bankruptcy venue choice and creditor recovery, the efficiency of Chapter 11 corporate bankruptcy and distressed exchanges, and the bankruptcy ripple effect on peer firms' investment policy.

In the first essay of the thesis, we consider the agency problem in corporate default. Agency conflict can manifest itself in bankruptcy venue "shopping", which is a heavily debated topic among legal researchers. We investigate the agency problem by examining the effect of bankruptcy venue choice on creditors' recovery rate, the adherence to absolute priority rule, and the bankruptcy duration. We find that the court of the Southern District of New York results in a longer processing time and lower recovery rates for pre-petition debtholders than other courts. Meanwhile, the court of the District of Delaware tolerates a larger deviation from the absolute priority rule. These negative court effects on creditors' welfare are consistent with the argument that conflicts of interest among stakeholders are facilitated by bankruptcy venue choice.

In the second essay, we study the efficiency of two different distress resolution mechanisms in the US - Chapter 11 bankruptcy and distressed exchanges. We examine and compare the outcomes of the two mechanisms. We also investigate if and how the performances of firms emerged from these two mechanisms differ. Ceteris paribus, we find that firms with more intangible assets, higher debt concentration, higher financial leverage, and less bank debt are more likely to workout distress privately. By comparing the post-emergence performance, we conclude that firms emerged from Chapter 11 are

performing no worse and, if anything, better than those from distressed exchanges. We find that Chapter 11 is effective in reducing the financial leverage of distressed firms while boosting their sales after emergence. In summary, even when compared with distressed exchanges that are generally considered to be highly cost effective, Chapter 11 is still found to be an efficient and effective approach to resolve financial distress.

In the third essay, we study how the bankruptcy contagion and competitive effect alter peer firms' investment policy. We find that, in general, the bankruptcy contagion effect dominates the competitive effect. On average, peer firms reduce their capital expenditures by around 4% of their total tangible assets when their competitors are undergoing the bankruptcy process. This represents a decline of about 12% of the average amount of capital expenditure. Consistent with the argument of increasing costs of financing for peers, we find that peer firms with a higher dependence on external funds for their investments have a significantly larger capital expenditure decline than others with a lower dependence during the bankruptcy period of their competitors. In addition, we find that industry concentration is an important factor in determining whether peers are likely to expand their investment programs so as to take advantage of the bankruptcy of their competitors. More importantly, we find that the significance of this bankruptcy competitive effect documented for concentrated industries is contingent upon the cash reserve level of the peer firm.

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Chapter 1

Introduction

This thesis focuses on three important issues in financial distress and corporate bankruptcy: the relation between bankruptcy venue choice and creditor recovery, the efficiency of Chapter 11 corporate bankruptcy, as compared to distressed exchanges, and the bankruptcy contagion and competitive effect on peer firms' investment policies. In this chapter, we will highlight the background and motivation of the research, as well as the main findings and contributions of the three essays.

The first essay investigates how bankruptcy venue choice affects the welfare of creditors. The control and governance structure of a firm, and thus the dynamics dictating the agency problems, during the bankruptcy process could be very different from those when it was still a going concern. The agency problems among managers, shareholders, and debtholders may become more pronounced during the bankruptcy process or when bankruptcy becomes an inevitable event (e.g., Ayotte and Morrison, 2009; LoPucki and Whiteford, 1993). The role played by another important agent in the bankruptcy process - the bankruptcy court judge - in affecting the welfare of shareholders and debtholders has been less studied in the literature. Bankruptcy judges serve as judicial officers of US district courts and constitute the bankruptcy court for their respective districts. The actions of the judge presiding over a bankruptcy case may shift the power between shareholders and debtholders and in turn may therefore either lessen or worsen the agency problem. Chang and Schoar (2009) and Evans (2003) classify motions adopted

by judges into pro-debtor actions and pro-creditor actions. Pro-debtor actions include granting an extension of the exclusivity period, denying a request for lifting the automatic stay, granting debtor-in-possession (DIP) financing, and granting the debtor's use of cash collateral. On the other hand, pro-creditor actions include denying the extension of the exclusivity period, granting the lift of the automatic stay, and denying a DIP financing request.

Although judges are randomly assigned to bankruptcy cases within each court (Chang and Schoar, 2009), the choice of bankruptcy court is far from random. Usually, it is the management of the company who decides where to file a bankruptcy petition. This flexibility of bankruptcy venue choice has bred a phenomenon in Chapter 11 bankruptcy filing, commonly known as "forum shopping". Forum shopping can be defined as the behaviour where a distressed company files a bankruptcy petition in a district outside of its principal business and assets locations. Chapter 11 bankruptcy forum shopping is prevalent in the U.S. bankruptcy system with the District of Delaware and the Southern District of New York capturing most of the "market share" of bankruptcy cases.

In the first study, we want to uncover whether the bankruptcy court judge affects the agency problem and in turn the welfare of creditors by examining the choice of bankruptcy venue (i.e., court location). More specifically, we examine the effect of jurisdiction location on three different aspects of creditors' welfare including creditor's recovery rate, APR violation, and time-in-bankruptcy. Our main finding is that the agency problem arisen from venue choice is more severe in New York than in Delaware and other courts, as manifested in lower recovery rates and longer processing times. On

the other hand, we find that the bankruptcy court of Delaware tolerates more intensive conflicts of interest by deviating further from APR than other courts.

The first essay contributes to our understanding of the economic implications of forum shopping, which can enrich the debate of the "corruption" vs. "efficiency" arguments for the U.S. bankruptcy system. Unlike most of the previous studies, we explicitly address the self-selection issue of bankruptcy venue choice in assessing its influence on the variables of interest. In testing our hypotheses using various econometric techniques, we can therefore arrive at a more accurate and comprehensive assessment of the influence of venue choice on creditors' welfare during the bankruptcy process.

In the second essay, we explore and compare different aspects of the two alternative resolution mechanisms for financial distress. Despite gaining popularity in recent years, we find that distressed exchange is, in general, not as efficient as Chapter 11. We do not find that the Chapter 11 procedure results in significantly lower recovery values for creditors, larger reductions of asset values, or more violations of APR among creditors. In addition, by analyzing the post-emergence operating performance from the two resolution mechanisms, we conclude that both formal bankruptcy and distressed exchange can lead to some degree of improvement in operations, as measured by the firms' earnings before interest, tax, depreciation and amortization (EBITDA). Nevertheless, given the lower interest expenses as a result of the reduction in their financial leverage, firms that emerged from Chapter 11 are able to attain a better operating performance in terms of their operating cash flow. The only shortcoming of Chapter 11 is that it tends to take

more time to complete the resolution process. In the end, this could be a necessary cost of negotiations to achieve an optimal capital structure for the emerged firm.

In the second essay, we focus on the post-emergence operating performance of firms who have emerged from Chapter 11 and distressed exchanges. Although operating performance has been studied extensively in assessing the efficiency of Chapter 11 reorganizations, to the best of our knowledge, we are the first to address the issue by comparing the post-emergence operating performance, which measures the long-run viability of emerged firms.[1] The focus of the existing literature has been on the operating performance of the bankrupted firms alone or by comparing them with their non-defaulted counterparts. We argue that it is more appropriate to examine the operating performance of firms emerged from Chapter 11 reorganizations against that of firms from out-of-court debt restructuring, which, in the U.S., are predominately in the form of distressed exchanges. If distressed exchanges could allow distressed firms to arrive at a superior level of operating performance, the efficiency and effectiveness of Chapter 11 are undermined even though previous studies suggest that firms' performance is enhanced after emerging from Chapter 11. Our study therefore contributes to the literature by gauging the efficiency of Chapter 11 against a benchmark that, from our knowledge, has not been systematically and comprehensively explored in prior empirical studies. Our study also provides a wide scope of criteria in comparing the cost of distress and the in-process efficiency of Chapter 11 versus distressed exchanges, as well as examining the

[1]To the best of our knowledge, there are only two studies on the post-emergence operating performance of private restructuring looking into the role and activities of venture investors and investment banks (Hotchkiss and Mooradian, 1997; Mooradian and Ryan, 2005).

determinants of the choice of distressed resolutions. By doing so, we depict a more holistic picture of the effectiveness of Chapter 11 in resolving corporate distress.

The third essay investigates how the bankruptcy contagion and competitive effect may alter peer firms' investment policies. The bankruptcy of a firm could have a positive (i.e., competitive) or negative (i.e., contagion) effect on its peers in the same industry. These effects could be the results of a change in investors' perception and their responses to the event. They may as well be the results of any fundamental changes in the business and operational environment of the industry. Although various aspects of these bankruptcy ripple effects are well documented, from our knowledge, the corporate response to a competitor's bankruptcy has not yet been investigated in the literature. We still do not know if and how the bankruptcy contagion and competitive effects may alter peer firms' corporate policies in the long run. In the this essay, we attempt to answer this question by examining the change (if any) in the investment policy of peer firms during the bankruptcy of their competitors.

To test the significance of the contagion versus the competitive argument, we study the effect of 60 bankrupted firms on the investments conducted by 1,881 industry peers around their corresponding bankruptcy periods. In general, we find that the bankruptcy contagion effect dominates in affecting peers' investment activities. Particularly, peer firms have significantly less capital expenditure during the bankruptcy period than during the pre-bankruptcy period of their defaulted competitors. Moreover, we find that those firms which have had historically higher comovements with the defaulted competitors suffer more from the contagion effect in terms of a larger reduction in investments during

the bankruptcy period.[2] We also find that the reduction in investments by financially constrained firms during a competitor's bankruptcy period is larger than those that are not financially constrained. This is consistent with the notion that financially constrained firms are less able to mitigate the adverse influence of the bankruptcy of their competitors. Due to the fact that external financing is more expensive during a competitor's bankruptcy period, peer firms that are more dependent on external funding for their investment programs will reduce their investments by a larger amount. We also find that firms with higher levels of external financing dependence consistently decrease their financing activities, in terms of the issuance of new debt and equity, during a competitor's bankruptcy period.

How important is the bankruptcy competitive effect in affecting peers' investment activities? Lang and Stulz (1992) argue that industry concentration and financial leverage are two important factors that dictate the significance of the competitive effect. Particularly, firms in a concentrated industry are more likely to take advantage of the competitive effect, while firms with lower financial leverage are more capable to expand their investment programs in a short time frame in order to capture the market share that is vacated as a result of a market leader's bankruptcy. According to our examination of peers' investments, we find that industry concentration is an important factor in determining the competitive effect. Firms in concentrated industry are prone to invest more than those in non-concentrated industries during the bankruptcy period of their

[2]We consider the comovement of the market-to-book (MTB) ratio of the peer firm and that of its defaulted competitor over time. Please refer to the Appendix 4.A for the detailed definition. Our finding is consistent with the evidence presented by Beatty, Liao, and Yu (2013) that peer firms with higher comovements have more investments during an industry competitor's account exaggeration periods than those with lower comovements.

competitors. In other words, higher industry concentration could alleviate the dominating contagion effect. Consistent with the same argument, we also find that internal cash reserves can weaken the influence of the bankruptcy contagion effect and thus facilitate the competitive effect. Nevertheless, we do not find any evidence suggesting that a firm's financial leverage can influence the impact of these two opposing effects on its investment activities.

This paper makes several contributions to the literature. It is the first time that peer response has been examined to determine whether or not they react to a competitor's bankruptcy by altering their investment activities. We conclude that peer firms proactively react to industry competitors' failure. Second, we identify a channel by which bankruptcy affects peers' investment policy. Specifically, it is the increasing cost of external financing that leads to the reduction of investment activities of its peers. Third, unlike the existing studies which focus on the short-run bankruptcy effects (e.g., on peers' stock price), we show that there could be a long term effect on a peer's corporate spending policy. In addition, we demonstrate that, contingent upon their cash reserve level, firms in concentrated industries can enjoy the competitive effect as a result of the failure of their competitors. The findings of the third essay exemplify the externalities of corporate bankruptcy that should not be taken lightly by bankruptcy courts and investors in general. Corporate bankruptcy is widely influential on industrial communities and in turn the economy as a whole.

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Chapter 2

Bankruptcy Venue Choice and Creditor Recovery

2.1. Introduction

Agency problems in corporations have been well studied (e.g., Berle and Means, 1932; Jensen and Meckling, 1976; Fama and Miller, 1972; and Harris and Raviv, 1991). There is agency problem in the relation between shareholders and managers of corporations. With the separation of ownership right and control right, the manager of a firm in maximizing his/her own private benefit could take actions that hurt its shareholders. One solution to this agency problem is the use of debt.[3] Another form of agency problem arises between shareholders and debtholders. The asset substitution problem (i.e., the exchange of lower-risk investments for higher-risk ones after debt is in place) as pointed out by Jensen and Meckling (1976) can be detrimental to the debtholders as it increases the probability of default and potentially lowers the recovery of debtholders if the firm subsequently defaults on its debt.

The control and governance structure of a firm, and thus the dynamics dictating the agency problems, during the bankruptcy process could be very different from those when it was still a going concern. Gilson (1990) presents evidence suggesting that corporate default leads to a substitution of monitoring by external blockholders and creditors for monitoring by directors. Aslan and Kumar (2012) theoretically and empirically address

[3] For example, the interest payment on debt can reduce the free cash flow of the firm and in turn lower the chance of the misuse of cash by managers (Jensen, 1986). The bankruptcy risk associated with the use of debt can also provide incentive for managers to adopt profit maximizing plans (Grossman and Hart, 1982). By allowing creditors the option of liquidating the firm at default and generating information on the firm, debt serves as a disciplining device for shareholders to control the actions of managers (Harris and Raviv, 1990).

the impact of control concentration on debtholders' welfare in post-default firm restructuring. By examining a 1991 legal ruling (Credit Lyonnais v. Pathe Communications bankruptcy case) that limits mangers' incentives to take actions that favor equity over debt for distressed firms, Becker and Strömberg (2012) show that the change in managers' fiduciary duties has important welfare implications.[4] The agency problems among managers, shareholders, and debtholders may become more pronounced during the bankruptcy process or when bankruptcy becomes an inevitable event (e.g., Ayotte and Morrison, 2009; LoPucki and Whiteford, 1993).

The role played by another important agent of the bankruptcy process - the bankruptcy court judge - in affecting the welfare of shareholders and debtholders has been less studied in the literature. Bankruptcy judges serve as judicial officers of the US district courts and constitute the bankruptcy court for their respective districts. Based on the website maintained by the Administrative Office of the U.S. Courts, there are currently (May 2010) about 350 bankruptcy judges authorized for the district courts. The actions of the judge presiding a bankruptcy case may shift the power between shareholders and debtholders and in turn may either lessen or worsen the agency problem. Chang and Schoar (2009) and Evans (2003) classify motions adopted by judges into pro-debtor actions and pro-creditor actions. Pro-debtor actions include granting extension of exclusivity period, denying the request of lifting the automatic stay, granting debtor-in-possession (DIP) financing, and granting debtor's use of cash collateral. On the other hand, pro-creditor actions include the denying of the extension of exclusivity period,

[4] A number of studies document a trend of strengthening creditors' rights in the U.S. Chapter 11 process (Bharath et al., 2007; Ayotte and Morrison, 2009; Adler et al., 2012).

granting the lift of automatic stay, and denying DIP financing request. Moreover, the threats of liquidating the distressed company can also restrain the power of managers/shareholders over their creditors.

In this study, we want to find out if and how bankruptcy court judge may affect the agency problem and in turn the welfare of creditors by examining the choice of bankruptcy venue (i.e., court location). Although judges are randomly assigned to bankruptcy cases within each court (Chang and Schoar, 2009), the choice of bankruptcy court is far from random. Usually, it is the management of the company who decides where to file a bankruptcy petition. Under the current bankruptcy venue provision, a corporate entity can file bankruptcy petition in any one of four places: (i) the district where the entity is incorporated; (ii) the district where its principal assets are located; (iii) the district where the debtor's principal place of business is located; and (iv) any district where a debtor's affiliate has already filed for bankruptcy. This flexibility of bankruptcy venue choice has bred a phenomenon in Chapter 11 bankruptcy filing, commonly known as "forum shopping". Forum shopping can be defined as the behavior where a distressed company files bankruptcy petition in a district outside of its principal business and assets locations. Chapter 11 bankruptcy forum shopping is prevalent in the U.S. bankruptcy system with the District of Delaware and the Southern District of New York capturing most of the "market share" of bankruptcy cases. [5]

[5] Although Delaware is the second smallest and the sixth least populous state with a gross domestic product ranking 41st (in 2010) out of the 51 States, its bankruptcy court (the District of Delaware) has been processing a disproportionate amount of bankruptcy cases. In 1996, at its peak of dominance of the bankruptcy venue, it processed about 87% of the largest bankruptcy cases according to LoPucki (2006b). It is still the most popular bankruptcy venue processing 63% of the bankruptcy cases in 2006 based on our sample of defaulted companies.

Unlike the court of appeals judges and district court judges who are nominated by the President and have the protections of life tenure under Article III of the Constitution, bankruptcy judges are appointed for a (renewable) term of fourteen years by the majority of judges of the court of appeals for the circuits in which the districts are located under the provisions of the Bankruptcy Amendments and Federal Judgeship Act of 1984. LoPucki (2006b) points out that bankruptcy judges, in order to be reappointed, need the support of the lawyers who practice before them. They are therefore under substantial pressure to attract large and profitable bankruptcy cases (i.e., the so-called "mega cases") to be filed in their courts in order to serve the interest of their local legal communities.[6] He suggests that some judges have changed substantive rules and rulings to attract cases. Some of these changes, such as fewer trustee appointments, deference to debtors on issues related to executive compensations, and greater tolerance for conflicts of interest, are catered to the interest of the debtors and/or case placers. A number of studies suggest that the District of Delaware (for brevity hereafter referred to as "Delaware") and the Southern District of New York (for brevity hereafter referred to as "New York") are the winners in a race-to-the-bottom competition among bankruptcy courts to attract large cases (LoPucki and Eisenberg, 1999; LoPucki and Kalin, 2001; LoPucki and Doherty, 2002, 2006).[7] LoPucki (2006a) claims that the competition results in a higher rate of refiling of bankruptcy for companies emerged from Delaware.

[6] It is quite common that local lawyers and law firms are hired to assist debtors, creditors, and other related parties in the legal process. A large bankruptcy case can generate substantial and profitable business opportunities for the local legal professionals.

[7] The majority of public companies are incorporated in Delaware given its corporate-friendly laws and its well-developed body of case precedents. These companies can therefore choose to file for bankruptcy at the District of Delaware even though it may be far from where their principal businesses are located. On

In deciding on a bankruptcy venue, the management of a distressed company may be influence by the expected behavior of the courts. If there is no agency problem, it is rational for the manager to choose the court that is expected to be able to maximize the value of the company when it emerges from the bankruptcy process (or to maximize its liquidation value if the company is liquidated). The existence of agency problem may however distort the decision process. Based on the assumption that the interests of managers and shareholders are well aligned, manager's decision of bankruptcy venue may be suspected to be serving debtor's interest, while sacrificing the stakes of its creditors.[8] The existence of agency problem may therefore manifest itself in bankruptcy venue choice in the form of forum shopping to a debtor-friendly court. To the extent that the presiding judge can influence the outcome of the case, forum shopping may therefore result in a negatively effect on the welfare of the creditors of the defaulted company.

In this study, we want to contribute to our understanding of the agency problem of distressed companies by examining the determinants of bankruptcy venue choice and its effect on creditor welfare in the bankruptcy process. We consider three different aspects of creditor welfare, namely, creditor recovery, the adherence to absolute priority rule (APR), and the time in bankruptcy. The welfare of creditors is enhanced by higher recovery values on their debts and a shorter bankruptcy process. On the other hand, the degree of adherence to APR is a crucial measure of the wealth transfer among creditors.

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the other hand, the affiliation rule of the current bankruptcy venue provision opens the door to filing in a district that is neither the principal business location nor the location of incorporation of a defaulting company. Given that many of the largest companies have affiliates located in New York City, the Southern District of New York is another potential venue choice for many of the largest defaulting companies.

[8] It is also possible that there is conflict of interest between managers and shareholders. However, even if it is the case, we can still question whether managers are serving their own and shareholders' interest first while ignoring the welfare of their creditors.

Specifically, we want to answer the following questions: What are the characteristics of those distressed companies that choose to file bankruptcy petition in Delaware and New York? Does filing bankruptcy in Delaware (New York) hurt creditor in general? Does filing in Delaware (New York) have similar impact on the recovery of different creditors? Is there any wealth transfer among creditors or to equity holders in Delaware (New York) bankruptcy court?

Our main finding is that the agency problem raised from venue choice is more severe in New York than Delaware and other courts, which is supported by the lower recovery rates and longer process time. Meanwhile, the Delaware court tolerates more intensive conflict of interest by deviating more from the APR than others.

The outline of the rest of this paper is as follows. In Section 2, we review the current literature and highlight the contributions of the present study. We also develop a number of hypotheses for our empirical analysis. In Section 3, we describe our data sources, explain how we construct our variables of interest, and provide an overview of our sample of creditor recovery data. In Section 4, we examine the determinants of bankruptcy filing in Delaware and New York. We then investigate the effect of bankruptcy venue choice on different measures of creditor welfare in Section 5. We conduct a number of robustness tests in Section 6 and finally conclude with a few remarks in Section 7.

2.2 Literature Review, Hypotheses, and Contributions

There is an extensive literature on bankruptcy court and judge, not only in legal journals but also in finance journals. In examining the effect of bankruptcy chapter

choice, i.e., Chapter 11 versus Chapter 7, Bris et al. (2006) find that bankruptcy expenses and indirect cost of bankruptcy are significantly related to the location of the bankruptcy court. Their sample consists of data from only two bankruptcy courts. The empirical study of Chang (2009) suggests that the outcomes of the bankruptcy process and court behaviors in Chapter 11 bankruptcy cases are related to a judge effect.[9] In recognizing the significance of the bankruptcy court effect, it has become a common practice of controlling for the court effect (e.g., by incorporating court dummy variables) in empirical research on bankruptcy related issues (e.g., Ayotte and Morrison, 2009; Bharath et al. 2009; Weiss and Capkun, 2007; Jiang et al., 2012; Adler et al., 2012).

Our study is specifically related to the strand of literature on the behavior, biasness, and efficiency of the bankruptcy judge/court (in particular that of Delaware and New York). First of all, the U.S. Chapter 11 bankruptcy system is deemed to be *debtor-friendly* by international standards (Skeel, 2003). More importantly, the degree of debtor-friendliness seems to vary with the court location. For example, Weiss (1990) notices that the Southern District of New York is much more debtor-friendly than other courts. The "shopping" for debtor-friendly courts has attracted a lot of attention from both practitioners and academics. LoPucki and Eisenberg (1999) criticize the behavior of filing bankruptcy outside of the company's principal location as "shopping for judges". They conclude that judges in Delaware and New York have incentive to attract managers to file their bankruptcy cases in Delaware and New York (LoPucki, 2006b). LoPucki

[9] Rachlinski et al.(2006), based on a survey on bankruptcy judges, examine how some famous psychological phenomena work in bankruptcy judge's mind. They find that judges' ruling decision could be biased by not only psychological factors, like anchoring, framing and omission bias, but also by their gender and political stance.

(2006a) states that the "competition" among the courts for big cases is "corrupting" the bankruptcy system. The findings of LoPucki and Kalin (2001) and LoPucki and Doherty (2002) suggest that the bankruptcy process of Delaware and New York is inefficient. Companies emerged from Delaware and New York usually have higher post-petition financial leverages and worse operational performances. Moreover, they are more likely to refile for bankruptcy after emerging from the bankruptcy process.

By constructing an efficiency-based model, Ayotte and Skeel (2003, 2006) counter the "corruption" argument and defend the validity of the *Delawarelization* of bankruptcy. They argue that Delaware is in fact more efficient in providing a faster and cheaper (though less thorough) workout process, compared to other courts' more thorough, but costly and longer restructuring process. Weaker companies with bad prospects therefore rationally select Delaware so as to avoid the unnecessarily expensive restructuring processes of other courts. The efficiency argument for New York is quite different from that of Delaware. New York is famous for its expertise and efficiency in handling large and sophisticated bankruptcy cases. Based on the efficiency argument, choosing New York can therefore ensure the speedy processing of complicated cases which will benefit all the stakeholders (including the creditors) of the defaulted companies. To contribute to this debate, we first examine the self-selection effect in bankruptcy venue choice by using a comprehensive dataset that is much larger and comprehensive than those examined in the previous research. To verify the efficiency argument, we posit our first hypothesis as follows:

H1a: Companies filing for bankruptcy in Delaware are weaker and perform worse than those filed in other courts.

H1b: Companies filing for bankruptcy in New York are larger and more complicated than those filed in other courts.

Any evidence leading us to accept our first hypothesis will be consistent with the *ex-ante* behavior of companies being attracted by the perceived efficiency of Delaware and New York. However, even if the first hypothesis is accepted, we cannot refute the "corruption" charge laid by LoPucki and his co-authors. Noting that the conflicts of interest among debtors and creditors are typically more pronounced in large and complicated cases, there is more incentive for the debtors of these cases to file in a debtor-friendly court. Thus, by simply observing the fact that larger and more complicated cases being filed in Delaware or New York, we cannot readily disentangle the motive of shopping for efficiency versus that of shopping for a debtor-friendly court. To have a better understanding of the motive, we need to examine the (*ex-post*) outcomes of cases filed in different courts. In this study, we assess the case outcome by examining the economic impact on the creditors as a result of the choice of venue.

If Delaware and New York are truly inefficient, debtor-friendly and catering to the interest of case placers, the process in these two courts should hurt the welfare of the creditors given the existence of agency problem between debtors and creditors. We can therefore gauge the economic impact of venue choice by examining the welfare of creditors of different defaulted companies filing their cases in different courts. Previous research on court efficiency has been focused on refiling rate and the performance of

emerged companies. By examining the impact on creditors' welfare, this study contributes to the literature by demonstrating the potential impact of venue choice on an important, though easily overlooked, class of corporate "investors", i.e., the debt- and bond-holders. Our study is therefore related to two other strands of literature: (i) the determinants of creditor recovery during the bankruptcy process; and (ii) the determinants of APR, which can serve as a measure of creditors' welfare.

Recovery values of defaulted debt instruments have been well studied in the literature. Not surprisingly, the recovery rates of secured (senior) creditors are usually higher than those of unsecured (junior) ones (Altman and Kishore, 1996; Weiss, 1990; Altman and Arman, 2002).[10] The recovery rate of a debt instrument can also be explained by the aggregate default rate (Altman et al., 2005), industry-wide distress effect (Acharya et al., 2007), firm size (Baird et al. 2007), any hedge fund's involvement (Jiang et al., 2012), macroeconomic factors (Zhang, 2009), and the share of bank loan in the debt structure (Carey and Gordy, 2007). To the best of our knowledge, none of the existing studies has explicitly considered the impact of litigation location on recovery rate. If the bankruptcy courts of Delaware and New York are indeed biased and debtors choose bankruptcy venue in order to benefit from the agency problem, creditor recovery rates of those companies filing in these debtor-friendly courts should be lower than those not doing so. This leads us to arrive at our second hypothesis:

H2: Delaware (New York) results in debtholders recovering less from the bankruptcy process.

[10] The recovery rate of a defaulted debt instrument can be loosely defined as the total amount of recovery value during the workout process divided by the principal default amount. See Section 3 for more details.

In order to isolate the court effect, we have to control for any self-selection effect of venue choice (as mentioned above) when we conduct this hypothesis test. If H2 is accepted, we will be able to confirm the negative impact of forum shopping. Otherwise, we cannot rule out the possibility that any benefits derived from the higher efficiency of these two courts (due to perhaps their special expertise in processing specific cases) may have more than offset any negative effects brought about by forum shopping.

Any forum shopping effect may also manifest itself in APR violation, which represents a wealth transfer among stakeholders during the bankruptcy process. To our knowledge, none of existing literature on APR violation (e.g., Eberhart et al., 1990; Weiss, 1990; Betker, 1995; Bharath et al., 2009; Weiss and Capkun, 2007) has yet formally examined the role played by bankruptcy venue choice. There could potentially be two different types of APR violation: (i) APR violation between shareholders and debtholders; and (ii) APR violation among debtholders of different seniority. A number of researchers (e.g., Bharath et al., 2009; Weiss and Capkun, 2007; Ayotte and Morrison, 2009) examine the determinants of the first type of APR violation, where shareholders realize non-zero payouts even when some or all of the debtholders cannot recover the full amount owed. In the second type of ARP violation, junior debtholders realize non-zero payouts before their senior counterparts recover the full amount owed. Given the conflict of interest among different creditors, forum shopping may also result in a wealth transfer from the senior/secured debtholders to the junior/unsecured ones. If the shareholders, as the residual claimants, benefit from a debtor-friendly court and are paid before the senior/secured debtholders have fully recovered their claims, it is quite likely that the

junior/unsecured debtholders will also benefit in the process before such distribution plan can be approved by the unsecured creditor committee. In this study, we focus on the APR violation among debtholders based on the recovery rates of debt instruments of different seniority. To examine the forum shopping effect, we posit that:

H3: Delaware (New York) results in a higher chance of APR violation among debtholders and a larger extent of APR violation among debtholders.

Same as the testing of H2, we need to control for any self-selection effect of venue choice when we conduct our test on H3. Any empirical evidence in support of our third hypothesis will therefore be consistent with the argument that bankruptcy venue choice can influence the wealth transfer among creditors. It should however be noted that it is sometime necessary to deviate from APR and to provide incentives to the junior claimholders in order to accelerate the bankruptcy process thus benefiting all the stakeholders involved (Weiss and Capkun, 2007). Thus, any violation of APR, by itself, does not necessarily imply that the welfare of the senior/secured creditors is being exploited. We need to interpret the evidence of APR violation together with the recovery rates of different types of creditors before we can draw our conclusion regarding the impact on their welfare.

Finally, we consider the length of time spent in the bankruptcy process as a (negative) proxy for the efficiency of the court. Time-in-bankruptcy is commonly used as a measure of the cost of bankruptcy (Hotchkiss et al., 2008; Franks and Torous, 1994). Both debtors and creditors benefit from a short bankruptcy process that can reduce the chance of asset deterioration. Besides, the shorter the process, the smaller the

opportunity cost of the capital being locked up by the process. Creditors can more quickly redeploy their assets in other profit generating opportunities. To look for evidence to support the argument that debtors are simply shopping for efficiency when they choose to file their cases in Delaware and New York rather than shopping for a debtor-friendly court, we therefore conjecture that:

H4: Delaware (New York) takes less time to process bankruptcy cases than other courts.

It should be noted that a faster processing time in Delaware may simply be the result of the fact that those cases (e.g., prepackaged cases) that take less time to be resolved tend to choose to file in Delaware. It therefore does not necessarily imply that Delaware is indeed more efficient. To test H4, we therefore need to control for any self-selection effect of venue choice in order to have a more accurate assessment of efficiency.

In summary, this study contributes to our understanding of the economic implications of forum shopping, which can enrich the debate of the "corruption" vs. "efficiency" arguments for the U.S. bankruptcy system. Specifically, we examine the effect of jurisdiction location on three different aspects of creditors' welfare, namely creditor's recovery rate, APR violation, and time-in-bankruptcy. In doing so, unlike most of the previous studies, we directly address the self-selection issue of bankruptcy venue choice in assessing its influence on the variables of interest. In testing our hypotheses using various econometric techniques, we can therefore arrive at a more accurate and comprehensive assessment of the influence of venue choice on creditors' welfare during the bankruptcy process.

2.3. Data and Summary Statistics

2.3.1. Recovery Rate

We construct our sample of defaulted companies by merging the recovery rate data of the Standard & Poor's (S&P's) LossStats database with the company financial data from Compustat. The LossStats database represents one of the most comprehensive set of credit loss information on defaulted loans and bonds issued by large corporations. Public and private companies, both rated and non-rated, that have bank loans and/or bonds of more than $50 million are analyzed and included in the database.[11] To be included in the database, a company must have fully completed its restructuring and all recovery information must be available.[12] We use the version of the LossStats database containing recovery rates of a total of 3,682 defaulted debt instruments issued by 790 separate companies from a variety of industries which defaulted from 1985 to 2007. There are a total 1,412 bank debts, 341 senior secured bonds, 957 senior unsecured bonds, 506 senior subordinated bonds, 413 subordinated bonds, and 53 junior subordinated bonds.

Among other instrument-specific information, the LossStats database records the *ultimate recovery value* of each defaulted instrument. The ultimate recovery value is the eventual repayment a pre-petition creditor would have received had he/she has held onto his/her claim from the time of default through the emergence date of the restructuring event.[13] They are measured in *nominal values* at different points in time at or after

[11] Financial, real estate, and insurance companies are excluded.
[12] Recovery information on bankruptcies, distressed exchanges, and other reorganization events, is included.
[13] Ultimate recovery values of the defaulted debts are calculated in the LossStats database by one of three methods: (i) *emergence pricing* - trading price of the defaulted instrument at the point of emergence from default; (ii) *settlement pricing* - trading price at emergence of those instruments received in the workout process in exchange for the defaulted instrument; and/or (iii) *liquidity event pricing* - values of those instruments received in settlement at their respective liquidity events (e.g., suppose creditors receive newly

emergence. In the main analysis of this empirical study, in order to account for the time value of money, we focus on the *discounted value* of ultimate recovery, which is also the common practice in the literature (e.g., Acharya et al., 2007; Liu et al., 2012; Zhang, 2009, Khieu et al., 2012).[14] Discounted recovery rate, expressed as dollar amount recovered per $1,000 of notional principal default amount of the debt instrument, is obtained by discounting the ultimate recovery values back to the time of default by using the instrument's pre-petition interest rate. In the rest of this paper, unless otherwise stated, any reference to recovery rate is meant to be the discounted recovery rate rather than the corresponding nominal value. In addition to the instrument-level recovery rates, LossStats also provides information on instrument type, collateralization, bankruptcy court, whether the case is prepackaged or not, and various dates related to the bankruptcy event.[15] We manually collect Compustat's GVKEYs for the sample of defaulted companies in the LossStats database so that we can cross reference with the company financial information obtained from Compustat. We ignore those companies that we cannot clearly identify their GVKEYs. Our final sample consists of a total of 2,396 defaulted instruments issued by 507 defaulted companies. Table 2.1 presents the summary statistics of recovery rates by various categories.

INSERT TABLE 2.1 ABOUT HERE

issued bonds during the settlement process; liquidation event prices are the liquidation values of these bonds at their respective maturity dates). When possible, all three methods are considered in the calculation of the recovery value of each instrument. Then, based on additional information, the method expected to be most representative of the recovery experience of the prepetition creditors was used to arrive at the recovery value.

[14] As robustness check, we repeat our analysis using nominal discount rates and the results are consistent with our main findings (see robustness checks conducted in Section 6).

[15] For example, instrument original issue date, maturity date, bankruptcy date, and emergence date.

As can be observed from Table 2.1 Panel A, more than one third (35.5%) of the 507 defaulted companies file for bankruptcy in Delaware, while about one fifth (20.7%) file in New York. Meanwhile, all other bankruptcy courts together process less than half of total number of cases in our sample. Delaware and New York are by far the two dominating bankruptcy venues. In processing only 4.1% of our sample of defaulted companies, the Southern District of Texas is a distant third, while the Northern District of Texas (3.6%) and the Northern District of Illinois (3.0%) being the fourth and fifth most popular court, respectively. The debt instruments of companies that filed in Delaware and New York recover significantly less on average than those in other courts. Based on a notional principal amount of $1,000, debtholders on average recovered $109 ($94) less if the case is filed in New York (Delaware) rather than in other courts, which is significant at 1% level from the t tests in Panel A. The overall average recovery rate is around 52%, which is similar to that documented by Acharya et al. (2007).

In Panel B, we present the statistics for different types (i.e., seniority) of debt instruments. The statistics are very similar to those reported in previous studies (e.g., Acharya et al., 2007; Bris et al., 2006). Among the different types of instruments, bank loans have the highest average recovery rate.[16] It can be attributed to the fact that they are more likely to be secured and more senior than bonds.[17] As seniority decreases, the mean (median) recovery rate decreases from 76% (92%) to 10% (2%) across the different types of debt. Being instruments with the lowest priority, about half of all subordinated

[16] In fact, 43.5% of our sample of bank loans fully recover during the bankruptcy process.
[17] Theoretically, it is appropriate to assert that bank debts are more senior than any other bonds. Welch (1997) constructs a theory of conflict and absolute priority violation to explain the seniority of bank debts.

and junior subordinated bonds recover essentially nothing. The effect of collateralization is demonstrated in Panel C. About 44% of the instruments are secured or collateralized by some types of assets.[18] Not surprisingly, on average secured debts recover $393 (per $1,000 notional principal amount) more than unsecured ones. This difference is statistically significant at the 1% level. Finally, the large standard deviations reported throughout Panels A to C suggest that none of these three categorizations (i.e., based on bankruptcy court, seniority, and security), can by itself fully explains the variations of observed recovery rates.

2.3.2. APR compliance

To study the implications of bankruptcy venue choice on APR compliance, we follow the method employed by Bris et al. (2006) and construct an *APR violation dummy variable* together with an *APR adherence index* for each defaulted company using discounted recovery rates of all of its defaulted instruments. In doing so, we follow the literature and define the priority of repayment based on whether the debt instrument is secured or not (e.g., Jiang et al., 2012; Bris et al., 2006). Specifically, we assign the value of 1 to the APR violation dummy variable if the unsecured debtholders recover something before the claims of the secured debtholders are 100% satisfied; otherwise, the value of 0 is assigned. On the other hand, the APR adherence index is a continuous variable that measures how close the distribution of the recovery values between secured and unsecured debts resembles a full compliance of APR. It equals to 1.0 if secured debtholders fully recover before any distribution to unsecured ones, while it takes on a value of 0.0 if the distribution is exactly proportional to the principal default amount of

[18] For example, current assets, fixed assets (e.g., real estates, plants, properties, or equipments), or all assets.

each debt instrument. Lying between these two situations are cases where, although secured debtholders recover proportionally more than unsecured ones, the distribution does not fully adhere to APR. These cases are assigned values between 0.0 and 1.0 based on the extent of adherence as determined by interpolation between the case of proportional distribution and the case of full APR compliance respectively. Though uncommon, a number of the default cases in our sample have negative index values. It represents the situation where the unsecured creditors recover proportionally more than the secured ones.

To demonstrate the construction of the APR adherence index, consider the following numerical examples. Suppose a bankrupted company has a total of $100 of debt outstanding: $60 secured and $40 unsecured. Through the bankruptcy process, a total of $70 is recovered. If, out of this $70, the secured debtholders are distributed $60 and the unsecured ones $10, we have full compliance of APR and the APR adherence index equals to 1.0. However, if the distribution is exactly proportional to the principal default amount, i.e., secured and unsecured getting $42 and $28 respectively, the APR adherence index equals to zero. If the distribution is such that the secured recovers $45 and the unsecured recovers $25, the APR adherence index can be calculated by interpolation between the above two scenarios. The resulting index value therefore equals to 0.167(=(45-42)/ (60-42)). Finally, if the secured and unsecured both recover $35, the outcome is even worse than the proportional distribution scenario in terms of APR compliance. The resulting APR adherence index is negative and equals to -0.389(=(35-

42)/ (60-42)). Compared with the APR violation dummy variable, this index gives us a more refined measure of APR compliance.

We construct the APR violation dummy variable and the APR adherence index based on the discounted recovery values. Discounted recovery value is considered to be a better economic measure than nominal (*undiscounted*) recovery value, which ignores the time value of money. Nevertheless, judges' perception of adherence to APR is more likely to be formulated in terms of nominal values rather than discounted values. To ensure the robustness of our findings, we therefore also construct the *nominal* versions of the APR violation dummy variable and the APR adherence index using nominal recovery values rather than the discounted ones, but otherwise following the same procedures and approaches as outlined above.

In Table 2.2, we present the summary statistics of both the discounted and nominal versions of the APR adherence index and the APR violation dummy variable for our sample of defaulted companies. It seems that APR is closely adhered to in most of the defaulted cases. Based on the average values of the ARP adherence indices, the distribution of recovery value is on average much closer to the fully adhered case than the uniformly distributed scenario. According to the discounted (nominal) version of the APR violation dummy variable, only about 36% (26%) of the bankruptcy cases have some kind of APR violation. Nevertheless, the dispersions of the ARP adherence indices suggest that cases of significant deviation from APR are not uncommon.

INSERT TABLE 2.2 ABOUT HERE

2.3.3. Firm- and Industry-Level Characteristics

We compile, for our sample of defaulted companies, a number of firm-specific variables from the financial information obtained from Compustat that have been shown by previous research to be able to explain bankruptcy outcomes, bankruptcy venue choice, and/or recovery rate. Consistent with the literature, we extract these financial variables from the last available annual financial statement before the company filed for bankruptcy (Acharya et al., 2007; LoPucki and Eisenberg, 1999; LoPucki and Doherty, 2006; Ayotte and Skeel 2003). Following Acharya et al. (2007), we also construct industry-level variables to capture the condition of the industry-wide effect, which has been shown to be a determinant of firm-level recovery rates. Industry-level financial variables are defined as the median values of the respective financial variables of all the companies in Compustat with the same three-digit SIC code as the defaulted company under consideration and observed during the calendar year when the company defaults.[19] Table 2.3 presents the summary statistics of various firm-, case-, and industry-specific variables.

INSERT TABLE 2.3 ABOUT HERE

Total Assets (*AT*): We use the total asset value of the defaulted company as a proxy for the complexity of the bankruptcy case. A company with more assets tends to have more claimholders leading to potentially more intensive conflicts of interest that needs more time to be resolved. Our sample consists of defaulted companies of diverse firm size and with total asset value ranges from about $1 million to more than $100 billion. The

[19] In calculating the industry median value, we exchange the defaulted company under consideration.

distribution of asset value is positively skewed with a median value of $421 million. The findings from existing empirical studies regarding the effect of firm size on recovery rates are not conclusive (Acharya et al., 2007; Jiang et al., 2012). Most of the studies however only consider a single linear relation for firm size in their regression analyses. To capture the potentially nonlinear relation between firm size and bankruptcy outcomes, we adopt an approach similar to that of Bris et al. (2006) by categorizing companies into three different size groups: small, medium and large companies. The small-size group is made up of companies with total asset values less than the 30th-percentile (i.e., $230 million). The medium-size ones are with asset values between the 30th- and 70th-percentile (i.e., $967 million). Finally, the large-size group consists of companies with asset values exceeding the 70th-percentile. With these size groupings, we consider piece-wise linear relation in our subsequent regression analysis by constructing three firm-size variables, *LogATS*, *LogATM*, and *LogATL* for the small-size, medium-size and large-size companies respectively. These firm-size variables are calculated by multiplying the natural logarithms of the asset values of the defaulted companies with the respective size dummy variables. For example, for a company belonging to the small-size group, its *LogATS* equals to Log(*AT*), while both of its *LogATM* and *LogATL* equal to zero. We expect larger companies are more likely to file in Delaware or New York, no matter whether they are shopping for efficiency or a debtor-friendly court.

Number of Employees (*EMP*): Ayotte and Skeel (2003) suggest that the number of employees is a proxy for the complexity of the bankruptcy case. The number of employees of our sample of defaulted companies ranges from one to 234,000, thus

suggesting that our sample covers cases of significant different size and degree of difficulty. Companies with larger number of employees are expected to be more likely to file in Delaware or New York, no matter whether they are shopping for efficiency or a debtor-friendly court.

Tangibility is the ratio of the combined value of property, plant, and equipment to the total asset value of the defaulted company. On average, about 37% of the total assets of our sample of defaulted companies are made up of tangible assets. We expect the more tangible the assets of a defaulted company, the higher is its recovery rate. Meanwhile, companies with more intangible assets, which lead to a more intensive conflict of interest, are more complicated, thereby likely to file their bankruptcy petitions in Delaware or New York.

Profit Margin is defined as the gross profit scaled by the amount of sales. We expect a higher profit margin leads to a higher recovery rate. Not surprisingly, the profit margin of our sample of defaulted companies is in general quite low. About 7.5% of the companies report a negative profit margin.

Financial leverage is defined as total amount of liabilities divided by the total asset value. Not surprisingly, our sample of defaulted companies generally has high financial leverage based on their last annual financial statements. The average book equity value is close to zero and the mean (median) financial leverage is 1.173 (0.998). There is, however, substantial cross-sectional variability and it is not uncommon to have book liabilities that are two or even three times that of total asset value. According to Acharya

et al. (2007), the effect of financial leverage on the recovery of defaulted companies is difficult to be anticipated ex ante.

Return on Assets (*ROA*) is defined as the earnings before interest, tax and amortization (EBITDA) divided by the total asset value. As expected, most of companies are not profitable close to their respective default dates. The average *ROA* is about -29%. Nevertheless, a number of defaulted companies are still quite profitable based on their last income statements. The maximum *ROA* is just slightly less than 6%. Like profit margin, *ROA* is expected to be positively related to recovery rate.

Industry Median Tobin's Q (*IndQ*): Following Acharya et al. (2007), we include industry median Tobin's Q as one of our control variables. Industry median Tobin's Q is usually regarded as a proxy for the growth prospect of the assets of the industry. It should be positively related to the asset values of companies (including defaulted ones) within the industry. It is therefore expected to be positively related to recovery rate. From Table 2.3, the mean (median) value of *IndQ* is 1.361 (1.277).

Industry Distress Dummy Variable (*IndDis*): Acharya et al. (2007) find that, due to the fire-sale effect, the recovery rate of a defaulted company is lower when the industry it belongs to is also in distress. Following Gilson et al. (1990) and Acharya et al. (2007), we construct a dummy variable (*IndDis*) for each defaulted company of our sample, which equals to 1 (0) if the median stock return of the industry of the same three-digit SIC code is lower (higher) than -30% during the calendar year when the company under consideration defaults.

Time in Bankruptcy Court is defined as the time from the date of bankruptcy filing to the date of emergence or liquidation.[20] Time-in-bankruptcy usually is regarded as an important measure of bankruptcy cost (Bris et al. 2006) and is thus expected to be negatively related to recovery rate. The distribution of time-in-bankruptcy is positively skewed with a median value of slightly more than one year (371 days). However, within our sample, a company could have spent as short as 20 days or as long as 2,278 days (i.e., more than 6 years) in the bankruptcy process.

Delaware and New York Filing Dummy Variables: We construct a Delaware filing dummy variable that equals to 1 if the company files its bankruptcy case in Delaware and equals to 0 otherwise. Similarly, we construct a New York filing dummy variable that equals to 1 if the company files its bankruptcy case in New York and equals to 0 otherwise. They serve as our dependent variables in our subsequent analysis of the determinants of bankruptcy venue choice. Bankruptcy court information is from the LossStats database.

Bank Creditor Dummy Variable: We construct a dummy variable to indicate whether the defaulted company has any outstanding bank loans. The dummy variable is assigned the value of 1 (0) if there is at least one (no) outstanding bank loan. Carey and Gordy (2007) demonstrate that the existence of bank creditors, who take sides with other creditors, can improve the overall recovery rate of defaulted company. It can be attributed to the efficient monitoring role and the significant bargaining power of bank

[20] Ayotte and Skeel (2003) define the time-in-bankruptcy as the number of days to confirmation of the reorganization plan. We adopt a slightly different definition and measure the duration up to the date of emergence or liquidation, thus capturing the full length of the time in bankruptcy. The correlation between our variable of time-in-bankruptcy and the time-to-confirmation of reorganization plan is 0.96, thus confirming that they are essentially capturing the same information.

creditors in bankruptcy courts. Given the strong bargaining power of bank creditors, we also expect that debtors are more prone to file in debtor-friendly courts in the presence of bank creditors. As can be observed from Table 2.3, the majority of the defaulted companies in our sample (82%) have some forms of pre-petition bank loans.

Prepackaged Dummy Variable: If a case is prepackaged, this variable equals one; otherwise, it is zero. Around 25% of cases are prepackaged. Usually, prepackaged cases take significantly less time to process and thus potentially enhance the recovery rates.

Delaware and New York Incorporation Dummy Variables: Company incorporation locations are obtained from Compustat.[21] Close to 72% of the defaulted companies in our sample incorporated in the State of Delaware, while only about 2% incorporated in the State of New York.[22] Since the location of incorporation is one of the four location choices allowed for under the current bankruptcy venue provision, the fact that a company incorporated in the State of Delaware (State of New York) will of course increase the likelihood of it filing its bankruptcy at the District of Delaware (Southern District of New York).

Distance to Delaware and New York: Using Google map, we measure the travelling distance (in miles) from the location of the headquarter of each defaulted company to Delaware and New York respectively. According to Ayotte and Skeel (2003), the

[21] Compustat records only the current state of incorporation of the company that may be different from the incorporation location at the time of default if the company has reincorporated. Nevertheless, Daines (2001) confirms that the most common time that companies change their locations of incorporation (typically to Delaware) is during their initial public offerings (IPO). Companies rarely reincorporate after their first listings. We also confirm the incorporation location information from Compustat with the available incorporation information in the respective SEC filings.

[22] The popularity of Delaware as the location of incorporation is well-documented in the literature (e.g., Daines, 2001; Armour et al. 2012; Moscow,1995) Attractiveness of Delaware is mainly due to its quick and effective process of corporate litigation.

distance to the bankruptcy court could affect the decision of venue choice. Travelling cost and convenience considerations are expected to reduce the likelihood of filing in a court far away from the headquarter of the company.[23]

Finally, in explaining the observed recovery rates, we also control for the prevailing level of aggregated default rate of all speculative-grade U.S. companies. According to Altman et al. (2005), the excessive supply of defaulted debts during periods of high aggregated default rates can exert a negative pressure on the recovery values of defaulted instruments.

2.4. Determinants of Bankruptcy Venue Choice

In Table 2.4, we present the number of companies in our sample filing their bankruptcy in Delaware, New York, or other courts from 1987 to 2007. Not surprisingly, the number of bankruptcy cases peaked during the bursting of the internet bubble from 2000 to 2003. That four-year period accounts for about 45% of all the bankruptcy cases within our sample. There has been no filing in Delaware until 1990. Delaware has, however, substantially increased its market share in the early 1990's. Since 1995, the majority of the cases filed in each calendar year are filed in either Delaware or New York. Consistent with the findings of LoPucki and Eisenberg (1999), during this period, Delaware has been replacing New York as the dominating court of Chapter 11. Delaware dominates New York as the most popular venue choice in nine out of the 13 years from 1995 to 2007. The market share of Delaware peaked in 2000 when it presided over 72%

[23] Our sample consists of a number of foreign companies with headquarters located overseas. For this small subset of companies, Google map cannot provide very useful information regarding the travelling distances to the two courts. We therefore assign a notional travelling distance of 7,000 miles for these foreign companies.

of all the new cases filed in that year. Nevertheless, when compared with other courts, New York is almost as popular as Delaware, especially during the last few years of our sample period.

INSERT TABLE 2.4 ABOUT HERE

Before we conduct any regression analysis to find out the determinants of bankruptcy venue choice, we first examine the mean values of various firm- and case-specific variables based on bankruptcy venue (see Table 2.5). For Delaware filing, three factors are significantly different between Delaware and other courts: tangibility, profit margin, and prepackage or not. Firms filed in Delaware are less tangible, with higher profit margins, and more likely to be prepackaged case. Lopucki and Eisenberg (1999) suggests that large firms are more capable of shopping for Chapter 11 filing locations. Based on the total asset value and the number of employees, companies filing in New York are indeed of larger size than those filing in Delaware and other courts. The differences are also statistically significant at least at the 5% level. The results of this preliminary examination lend support to H1b regarding the *ex-ante* behavior of companies shopping for efficiency in New York. The case for H1a is, however, less supportive. It is more profitable companies, rather than weaker and worse performing ones, that file in Delaware.

INSERT TABLE 2.5 ABOUT HERE

To formally investigate the determinants of bankruptcy venue choice, we conduct a total of five different probit regressions to explain the incidence of: (i) filing in Delaware as opposed to filing in New York or other courts; (ii) filing in Delaware as opposed to

filing in other courts (excluding New York); (iii) filing in New York as opposed to filing in Delaware or other courts; (iv) filing in New York as opposed to filing in other courts (excluding Delaware); and (v) filing in Delaware or New York as opposed to other courts. The results are presented in Table 2.6.

INSERT TABLE 2.6 ABOUT HERE

Consider the regression results for Delaware filing (i.e., regressions (i) and (ii) of Table 2.6). We cannot find any empirical support for H1a and thus the efficiency argument. Based on regression (ii), the bankruptcy cases filed in Delaware as opposed to other courts (excluding New York) tend to be larger, with less tangible asset, and of higher pre-petition profit margin. These effects are statistically significant (at least at the 5% confidence level). Their larger size and less tangible asset suggest a more complicated case to process. On the other hand, based on their higher profitability, they tend to have stronger financial performance than their peers that file in other courts (but excluding New York). These results are therefore inconsistent with the implications of the model of Ayotte and Skeel (2003, 2006), which suggest weaker companies with bad prospects rationally select Delaware so as to avoid the unnecessarily expensive restructuring process of other courts. These findings are actually more consistent with the "corruption" argument. That is, the conflict of interest between creditor and debtor and thus the agency problem could be exacerbated when assets are less tangible, resulting in more incentive for the debtor to choose Delaware, which is perceived to be a debt-friendly court. Nevertheless, the profitability, size, and asset tangibility effects disappear in regression (i) when we include cases filed in New York with those of other courts. In

other words, when also compared with the cases filed in New York, companies filing in Delaware are not larger or more profitability anymore.

Prepackaged cases are more likely to be filed in Delaware than in other courts whether the New York cases are excluded or not. This finding is consistent with the observation of LoPucki and Eisenberg(1999) that most prepackaged cases go to Delaware because of its reputation of expertise in prepackaged cases. On average, a prepackaged case is 12% more likely to be filed in Delaware than a non-prepackaged one after controlling for other factors (marginal effects are not reported in the tables). Not surprisingly, the fact that a defaulted company incorporates in the State of Delaware significantly increases its chance of filing bankruptcy in Delaware by about 17% according to the corresponding marginal effect of regression (i). Relating to the incorporation location effect, the further the corporate headquarter is from Delaware, the less likely the company files in Delaware. As pointed out by Ayotte and Skeel (2003), travelling cost is a concern and thus a disincentive for filing in a court far away from a company's headquarter location.

Although the incorporate location and distance effects are still present in the regression results of New York filings (see regressions (iii) and (iv) of Table 2.6), the other determinants of choosing New York are different from those for Delaware. First of all, the size effect is found to be much stronger than that documented for Delaware. Based on the estimated results of regression (iii), a defaulted company of asset value that is twice of that of another company is about 9% (=0.29*log(2)) more likely to file in New York than the other company. Note that this size effect is even stronger if we exclude the Delaware cases from those of other courts (see regression (iv)). Second, companies filing

in New York tend to have higher financial leverage. Given the size effect documented above and noting that a bankruptcy case with higher financial leverage tends to be more difficult to be processed in the court, it seems that New York is indeed attracting large and complicated bankruptcy cases. This finding therefore lends support to H1b and is consistent with the efficiency argument, which suggests that New York is the choice of mega bankruptcy cases because these defaulting companies are looking for an efficient court with the expertise of handling sophisticated cases involving large amount of assets. However, we cannot rule out the possibility of a less noble motive. With the capability to shop for bankruptcy venue, large companies have the incentive to look for debtor-friendly courts that tend to offer extra and potentially undeserved protection towards debtors. Such protection is of particular importance for companies with a substantial amount of liabilities and thus a potentially significant conflict of interest with creditors. If this is in fact the motive, creditors' welfare is likely to be exploited in the bankruptcy process. On the other hand, all the stakeholders (including creditors) could be benefited if a company manager rationally chooses New York for its perceived expertise and efficiency in handling complicated cases. By examining the impact on creditors' welfare in the next section, we attempt to find out which of these two motives is more supported by the empirical evidence.

Finally, in regression (v) of Table 2.6, we presents the probit regression results with the dependent variable being the incidence of companies filing in either Delaware or New York. We want to find out if there are any common determinants of filing in these two most popular venues. Similar to the probit regression results of the two individual courts,

company size, incorporation location, and prepackaged case or not are the common driving factors for both courts. Consistent with the results for Delaware, asset tangibility is also a statistically significant variable. In addition, we also run a multi-logit regression with three separate court identifiers, namely Delaware, New York, and all other courts. Confirming the robustness of our conclusions, the results (not reported) are qualitatively the same as those documented above.[24]

To summarize, the choice of bankruptcy forum is far from a random process. The empirical evidence supports the notion that venue choice is a strategic decision made by companies based on their company- and case-specific features. Companies with less tangible assets but higher pre-petition profit margin tend to file in Delaware, while larger companies and companies with higher financial leverage tend to file in New York. Given these findings, we reject H1a (the efficiency argument for filing in Delaware) but cannot reject H1b (the efficiency argument for filing in New York).

After recognizing the determinants of venue choice, we can now examine the impact of venue choice on creditors' welfare by controlling for these underlying drivers. By studying the ex-post wealth effect of venue choice, we can provide further evidence to address and disentangle the two possible motives, namely shopping for efficiency vs. shopping for debtor-friendliness, of filing in Delaware and New York.

2.5. Bankruptcy Venue Choice and Creditor Welfare

We consider the impact of venue choice on three different measures of creditors' welfare, namely their recovery rates, the degree of APR compliance, and the duration in bankruptcy process. In our examination of recovery rates, we consider the impact on the

[24] The results of the multi-logit regression are available upon request from the authors.

recovery rates of individual debt instruments. We can therefore investigate if the courts are, and to what extent, biased in protecting different types of debtholders. Together with finding out the court effect on APR compliance, we can thus have a better understanding of the possible wealth transfer among different types of debtholders that could be a result of the conflict of interest between debtor and creditors in the bankruptcy process, in which the court plays a pivotal role.

The third measure of creditors' welfare is the duration spent in bankruptcy process. In general, with a reduced chance of asset deterioration, creditors are benefited from a quick process. The shorter the process, the lower is the opportunity costs of the creditors. They can quickly redeploy their reinvestments in other profitable uses. There could even be a trade-off between a short process and the amount to be recovered. For example, there is a higher probability of distribution to shareholders in prepackaged cases, which typically have very short processing time. In these cases, debtholders are willing to give up some of their recovery values in order to save time and to avoid the uncertainty inherent in otherwise a process that can drag on for a number of years. Note that the right to delaying the distribution to different claimants is one of the sources of the bargaining power of the debtor in the bankruptcy process (Betker, 1995). Nevertheless, a longer process might not necessarily be a bad thing for the debtholders. A longer processing time allows the debtor to come up with a more delicate and thoughtful restructure plan, which will benefits all the stakeholders of the company. Thus, in order to understand the overall economic impact on creditors, we need to interpret the implication on the time-in-bankruptcy together with that on recovery rates.

2.5.1. Preliminary analysis and proposed econometric methodology

As a first step, we compare the mean values of the three measures in cases filed in Delaware, New York, and other courts respectively. We tabulate the results in Table 2.7. The average recovery rate of all the debt instruments processed by Delaware (New York) is 0.489 (0.475) which is significantly lower than the average of 0.583 of those processed by other courts at the 1% significant level. For most types of debt instruments, the average recovery rates in Delaware and New York are always lower than those in other courts and many of the differences are also statistically significant. The only exception is the average recovery rate of the senior secured bonds processed in Delaware, which is higher than that of the same type of bond processed in other courts. Besides, the average recovery rates of both the secured and unsecured debts in Delaware and New York are significantly lower than those in other courts. From the perspective of recovery rate, it seems that Delaware and New York are *unfriendly* to creditors, which is therefore consistent with the suggestion in the literature that they are *debtor-friendly* courts.

INSERT TABLE 2.7 ABOUT HERE

Based on the results reported in Table 2.7, both Delaware and New York perform worse than other courts in terms of APR compliance. The average values of their APR adherence indices (APR violation dummy variables) are lower (higher) than those of other courts. A majority of the differences is also statistically significant. Between the two courts, New York is worse than Delaware in all measures of APR compliance resulting in the largest transfer of wealth from secured debtholders to unsecured ones.

But even that the unsecured debtholders of New York still on average recover less than their counterparts in other courts.

With the lower recovery rates, are the debtholders somehow compensated by realizing a shorter duration in the bankruptcy process? On average, creditors indeed spend less time in the bankruptcy process of Delaware (see the last row of Table 2.7) than their counterparts in other courts. We therefore cannot rule out the possibility of a trade-off between the amount of recovery and a quick process for cases filed in Delaware. However, given the significantly longer processing time in New York, it seems that debtholders are in a *lose-lose* situation when a case is filed in New York.

The above findings based on simple comparison analyses are, however, far from conclusive. To formally examine the court effect, we need to control for other variables that can also affect our measures of creditors' welfare. The most commonly-used method of multivariate analysis is ordinary least square (OLS) regression. We can conduct OLS regressions by using the different measures of creditors' welfare as dependent variables and try to explain them with the location of bankruptcy court together with other independent variables. However, OLS regression will not be able to give us informative results given the fact that bankruptcy venue is far from an exogenous variable. As documented in Section 4, the choice of bankruptcy venue is far from random and are found to be governed by a number of firm- and case-specific factors, which may at the same time exert their own influences on creditors' welfare that are independent of the court effect. The findings from OLS regressions are expected to suffer from this self-selection problem.

The impact of venue choice on the measures of creditors' welfare can potentially be the outcome of two different effects. First of all, there could be a *pure selection effect*, where the actions of the court have no implication on the resulting creditors' welfare. Thus, the observed relation between creditors' welfare and bankruptcy venue is completely due to the fact that companies of certain characteristics select to file for bankruptcy in certain bankruptcy courts. For example, if more profitable companies tend to file in Delaware, the resulting recovery rate from Delaware may be higher. But it has nothing to do with the actions (or inactions) of the court. Suppose companies with more complicated bankruptcy cases tend to file in New York and of course a more complicated case will take a longer time to be resolved. The selection effect will ensure a positive New York-court effect on the duration in bankruptcy process, which has nothing to do with the court. Second, there could be a *pure treatment effect*, whereby the actions of Delaware and New York indeed exert an independent effect on creditor recovery rate, APR compliance, and the time spent in bankruptcy court, even if defaulting companies select bankruptcy venue randomly. The treatment effect may be a result of the pro-debtor vs. pro-creditor motions adopted by the courts as pointed out by Chang and Schoar (2009) and Evans (2003) that we examined earlier in the paper. Through those motions and together with the final distribution decision, the court can exert its influence on the recovery rate of each debtholder and the time in bankruptcy. It is this treatment effect we want to focus on in order to address our research questions regarding the efficiency vs. "corruption" arguments for Delaware and New York.

We examine the selection effect by considering the following model.[25]

$$Court_i^* = X_{1,i} \cdot \beta_1 + Z_i \cdot \beta_2 + \varepsilon_i \quad (2.1)$$

where $\begin{cases} Court_i = 1 & \text{if } Court_i^* > 0 \\ Court_i = 0 & \text{if } Court_i^* \leq 0 \end{cases}$

$$CW_i = X_{1,i} \cdot \alpha_1 + X_{2,i} \cdot \alpha_2 + Court_i \cdot \alpha_3 + \xi_i \quad (2.2)$$

Equation (2.1) is a probit regression where $Court_i$ is the dummy variable for the choice of bankruptcy venue by company i. For example, in the choice between Delaware vs. all other courts (including New York), $Court_i$ equals to 1 if company i chooses Delaware while equals to 0 if otherwise. There is another probit regression for the choice between New York vs. all other courts. There could be two groups of explanatory variables in the probit regressions. Not only can explain the incidence of venue choice, the variables in vector $X_{1,i}$ can also independently exert their own influences on the different measures of creditors' welfare as denoted by CW_i in Equation (2.2). On the other hand, the variables in vector Z_i (i.e., our instrumental variables as discussed below) can only affect venue choice but not CW_i. Equation (2.2) is an OLS regression to assess the court effect on CW_i, where $X_{2,i}$ is the vector consisting of the second set of explanatory variables of CW_i. These variables are not expected to influence venue choice. Thus, there are three different versions of Equation (2.2) each for one of the three measures of creditors' welfare. Any selection effect will result in a non-zero correlation coefficient, i.e., $\rho = corr(\varepsilon_i, \xi_i)$, between the residuals of Equations (2.1) and (2.2).

[25] This is a commonly-used approach in addressing the selection effect (see, e.g., Jiang et al., 2012; Bris et al., 2006).

Specifically, a negative (positive) correlation suggests a downwardly (upwardly) biased estimation of α_3 in Equation (2.2).

Following the approach of Ayotte and Skeel (2003), we choose the incorporation location and the distance from the company's headquarter to bankruptcy court as our instrumental variables (Z_i), which are deemed to satisfy the *relevance* and *exclusion* conditions for an appropriate instrumental variable as pointed out by Roberts and Whited (2011). First of all, incorporation location, which is the outcome of a decision usually made at the time of IPO and thus a long time before the bankruptcy event, is expected to be exogenous to the economic condition and financial performance of the company at the time of default.[26] Thus, incorporation location is unlikely to have any direct effect on creditors' welfare. Any effect on creditors' welfare is expected to be indirect and through its influence on bankruptcy venue choice. It is quite clear that the distance between the company's headquarter and the court location is exogenous and thus fulfill the criteria of instrumental variable. Meanwhile, these two instrumental variables (IVs) are definitely important in the decision of court selection as evident by the findings as documented in Section 4.

To examine the court effect, we run two different regressions for each of the three measures of creditors' welfare: (i) a simple OLS or probit regression without instrumentation for $Court_i$ (i.e., Equation (2.2)); and (ii) a treatment regression with the binary endogenous independent variable of venue choice obtained with the probit

[26] Although Daines (2001) finds that incorporating in Delaware has a positive influence on the evaluation(Tobin's Q) of the company, this Delaware premium cannot be confirmed by the findings of Subramanian (2004).

regression of Equation (2.1).[27] One of the creditors' welfare measures, APR violation dummy, is a binary variable. The treatment regression therefore becomes a bi-probit regression with a binary dependent variable (APR violation dummy) and a binary endogenous independent variable of venue choice. To estimate this type of treatment regression, we follow the method suggested by Wooldridge (2010, Section 15.7.3). Whether the dependent variable is continuous or binary, the treatment regressions are estimated by maximum likelihood estimation.

Besides estimating the coefficients, we also estimate the correlation coefficient ρ and conduct a likelihood ratio test for the null hypothesis of $H_0: \rho = 0$. An estimated value that is significantly different from zero will lend support to the selection effect of venue choice. In the subsequent analysis, we focus on the treatment regression results, especially if we have to reject the exogeneity of venue choices. By comparing the results from the simple OLS/probit regressions with the corresponding results of the treatment regressions, we can also gauge the economic significance of the selection effect.

Given the fact that a single defaulted company typically has several defaulted instruments, we need to account for the company-level clustering effect. We use the method suggested by Williams (2000), which is also adopted by Acharya et al. (2007). In addition, we also adjust for any heteroscedasticity in the regressions.

[27] This approach is commonly used in the literature to address the selection effect (see. e.g., Jiang et al., 2012; Bris et al., 2006).

2.5.2. Bankruptcy venue choice and creditor recovery rate

First of all, consider the results for the effect of Delaware as presented in Table 2.8. Panel A reports the OLS regressions of Equation (2.2) (i.e., without instrumentation for $Court_i$) for:

- Full sample of defaulted debt instruments (regression (1));
- Subsample of bank loans (regression (2));
- Subsample of senior secured and senior unsecured bonds (regression (3));
- Subsample of subordinated and junior subordinated bonds (regression (4));
- Subsample of secured debts (regression (5)); and
- Subsample of unsecured debts (regression (6)).

In the full sample regression, we control for both the instrument types and security. The Delaware court dummy variable is assigned a value of 1 (0) if the issuing company of the defaulted debt files for bankruptcy in Delaware (any other courts including New York).

From the full sample OLS results (i.e., regression (1) of Panel A), we find that recovery rate is significantly positively related to company size.[28] Moreover, based on the decreasing magnitude of the coefficients from *LogATS* to *LogATM* and then *LogATL*, it seems that the marginal effect is decreasing with the company size. Not surprisingly, the better operational performance of the defaulting company (as measured by ROA), the higher are the recovery rates of all of its debt instruments. The estimated coefficient of the bank creditor dummy is significantly positive, which is consistent with the findings of Carey and Gordy (2007) that the existence of bank creditors with significant monitoring

[28] Bris et al. (2006), however, do not find a significant size effect using a different sample of (smaller) companies.

and bargaining power in the bankruptcy process can improve the recovery rates for all the defaulted debt instruments. The significantly negative coefficients for the industry distress dummy (*IndDis*) and for the aggregate speculative-grade default rate confirm the fire-sale effect suggested by Acharya et al. (2007) and the effect of excessive supply of defaulted debts suggested by Altman et al. (2005), respectively. Debtholders also tend to recover more in prepackaged case, which may be the direct result of the shortening of the bankruptcy process. But the effect is only weakly statistically significant. Our focus, however, is on the Delaware dummy variable. The estimated coefficient is negative but it is far from statistically significant. However, since selection effect is not controlled for in the OLS regression, we cannot conclude that Delaware does not exert any independent influence on recovery rates simply based on the OLS results. The fact that we cannot find any court effect in OLS regression (1) may be the results of any one of the following three possible scenarios:

Scenario A: Companies with lower recovery rates tend to choose to file in Delaware, which is efficient and thus able to exert a positive impact on recovery rates. This positive court effect will therefore lead us to reject our second hypothesis (H2). The degree of the enhancement of recovery rates is, nevertheless, such that it exactly offsets the lower recovery rates of the self-selecting companies and thus results in an unobservable court effect in the OLS regression.

Scenario B: Companies with higher recovery rates tend to choose to file in Delaware, which is biased against creditors and thus exert a negative impact on recovery rates. This negative court effect will therefore lead us to accept H2. The amounts of reductions in recovery rates as a result of the actions of the court, nevertheless, are exactly offset by the higher recovery rates of the self-selecting

companies and thus again result in an unobservable court effect in the OLS regression.

Scenario C: Companies choose to file in Delaware tend to have average recover rates and the courts have no systematic influence on recovery rates.

INSERT TABLE 2.8 ABOUT HERE

To find out which of the above scenarios is actually driving the OLS results, we conduct the treatment regression as outlined in Section 5.1. The results are presented in Table 2.8 Panel B. Same as in the OLS regressions, we run treatment regressions for both our full sample of debt instruments and different subsamples of instruments corresponding to those presented in Panel A. Rather than using the raw Delaware dummy variable, we use the endogenous independent variable of venue choice obtained with the probit regression of Equation (2.1) when we run our treatment regressions. To conserve space and given the fact that they are similar to the results already presented in Table 2.6, we do not report the full probit regression results in Panel B.[29] We only present the estimated coefficients of our two instrumental variables at the bottom of the panel. The results of the likelihood ratio tests for exogeneity of venue choice are also reported at the bottom of Panel B.

Same as in the OLS regression, the coefficient of the *instrumented* Delaware dummy is not statistically significant in regression (1) of Panel B. In other words, for the full sample of debt instruments, we cannot find any court effect even after correcting for the selection problem. It seems that we are conforming to Scenario C and thus we cannot

[29] Due to the difference in the number of observations, the coefficient estimates could be slightly different from those presented in Table 2.6.

reject our second hypothesis (H2) of Delaware exerting any negative influence on recovery values of creditors in general. Neither there is any evidence that may lead us to say that Delaware is more efficient and thus enhancing the recovery rates of creditors in general. The absence of a significant selection effect is also confirmed by the fact that we cannot reject the null hypothesis of $H_0: \rho = 0$.

The absence of any court effect in the full sample regressions, however, does not necessarily imply that there is no court effect on the recovery rates of different types of debt instruments. The subsample regressions of Table 2.8 actually suggest a non-uniform court effects on instruments of different seniority and degree of security that may suggest the role played by the court in handling the conflict of interest among different creditors. First of all, consider the results of regressions (2)-(4) for debt instruments of different seniority. Typically, bank loans are the most senior, while subordinated bonds are the most junior. Senior bonds are in the middle. The OLS regression suggests that, per $1,000 default principal amount, bank loans tend to recover $93 less if the case is filed in Delaware (see regression (2) in Panel A). The effect is statistically significant at the 5% level. After controlling for the selection effect, the court effect is even more negative with bank loans recovering on average $424 less if the case is filed in Delaware (see regression (2) in Panel B)).[30] The effect is exactly the opposite for subordinated bonds which can recover on average $351 more if the case is filed in Delaware after correcting for the selection effect (see regression (4) in Panel B). Thus, although we cannot

[30] Note that this negative impact on the recovery rate of bank loans is in fact *unobservable*. It will only be realized if venue choice were random, which we know is far from reality given the significant selection effect. We can only *observe* the end result as presented in Panel A where the selection effect has partly offset the independent effect exerted by the court.

document any court effect for the overall recovery rate, it seems there is an independent effect exerted by Delaware resulting in a transfer of wealth from the most senior debtholders to the most junior ones. Given that the priority of shareholders is even lower than that of the most junior debtholders, any transfer of wealth from the senior claimants is also expected to benefit the shareholders.

Another way to interpret the situation is by recognizing the difference in the *sign* of the selecting effect on bank loans and subordinated bonds. The selection effect is positive for the former, while negative for the latter (see the sign of ρ and the corresponding likelihood ratio test results of regressions (2) and (4) at the bottom of Panel B). Both are statistically significant. It therefore suggests that those defaulting companies, in which the most senior debtholders (most junior debtholders) are expected to recover more (less), are more likely to file in Delaware. Given that debtors, as shareholders, are even more junior than the junior debtholders, they are entitled to recover even less than the junior debtholders (or even nothing at all). Not surprisingly, under such a disadvantage situation, debtors have lots of incentive to file the case in a court (i.e., Delaware) that they believe can offset the power of the senior claimants and thus resulting in a transfer of wealth to the more junior claimants on the residual assets. Based on the results of Table 2.8 Panel B, it seems that Delaware does not let the debtors down. It indeed delivers the desired wealth transfer and thus fulfilling the wish of the debtors.

The above wealth transfer argument can also be made by comparing the court effect on secured vs. unsecured debts (i.e., regressions (5) and (6) in Panel A and B of Table

2.8). After correction for the selection effect, it seems that Delaware results in a negative (positive) impact on the recovery rate of secured (unsecured) debts, again suggesting a transfer of wealth from the senior to the junior claimants.

To conclude, we document a significant and non-uniform selection effect on the recovery rates of debts of different seniority that is consistent with the motive of debtors shopping for a debtor-friendly court. After correcting for the selection effect, there is evidence to suggest that Delaware results in a transfer of wealth from senior to junior debtholders that we will examine in more details when we study the court effect on APR adherence in the subsequent subsection.

How does New York perform in terms of debtholders' recovery rates? The corresponding OLS and treatment regression results for New York are presented in Table 2.9 Panel A and B respectively. We again conduct the regressions on the full sample of debt instruments and different subsamples based on seniority and security. Now, the New York court dummy variable is assigned a value of 1 (0) if the issuing company of the defaulted debt files for bankruptcy in New York (any other courts including Delaware).

INSERT TABLE 2.9 ABOUT HERE

Our focus is on the court effect as captured by the sign, magnitude, and the degree of statistical significance of the coefficient of the New York court dummy as reported in Panel A and B.[31] It seems that, unlike Delaware, New York could be a nightmare for

[31] As for other explanatory variables of recovery rates, Table 2.9 documents a very similar pattern as the results reported in Table 2.8. Specifically, based on the full sample results of regression (1) of Table 2.9, recovery rate is found to be positively related to company-size and ROA, while negatively related to the

most, if not all, kinds of debtholders. First of all, after correcting for the selection effect, the full sample regression results (see regression (1) of Panel B) suggest a negative court effect that is both statistically and economically significant. Per $1,000 principal default amount, a debtholder can expect to recover on average $358 less solely due to the New York court effect. From the sign and significance of ρ, there is a strong positive selection effect. In other words, defaulting companies, of which their debtholders are expected to recover more, are more likely to file in New York. But this positive characteristic of the debts is more than offset by the strong and negative court effect. The net effect still translates into a lowering of the average recovery rate by $96 (see results of regression (1) of Panel A). According to the results of regressions (2)-(6) reported in Panel B, unlike the court effect of Delaware, the negative court effect of New York can be felt by all types of debtholders being considered. But similar to Delaware, there is indication that the effect is not uniform on debts of different seniority. It seems that senior debtholders are penalized more than their junior counterparts. For example, the court effect results in a lowering of the average recovery rate of senior bonds by $647 that is statistically significant at the 1% level (see regression (3) of Panel B). The corresponding average reduction in recovery rate for subordinated bonds is not only more moderate, but the effect is also not statistically significant (see regression (4) of Panel B).

Unlike the selection effect of Delaware that is non-uniform for different types of debts, the selection effect of New York is always positive for all types of debts (see likelihood

industry distress dummy and aggregate speculative-grade default rate. Recovery rates also tend to be higher if there exists a bank creditor or if the case is prepackaged.

ratio test results in Table 2.9 Panel B). But, judging from the difference in the p-values of the likelihood ratio tests, it seems that the positive selection effect is stronger for senior debtholders than junior ones. Together with the observation that senior debtholders are penalized more by the court effect than their junior counterparts in terms of their average recovery rates as documented above. It again points to the possible motive of debtors shopping for a debtor-friendly court in order to constrain the power of the senior creditors and thus facilitate a transfer of wealth from senior to junior claimants. The effect is however much weaker than that documented for Delaware. We will revisit this issue when we examine the court effect on APR adherence in the subsequent sub-section.

To conclude, compared with Delaware, the performance of New York depicts a much more troubling picture for all kinds of debtholders of defaulting companies. The negative court effect is more than able to offset the positive selection effect resulting in a net negative impact on recovery rates. This empirical finding therefore lends support to our second hypothesis (H2) that debtholders of companies filing in New York recover less from the bankruptcy process. The finding is more consistent with the conjecture that debtors are looking for debtor-friendly courts as opposed to efficient ones that can benefit all the stakeholders in the process.

2.5.3. Bankruptcy venue choice and APR compliance

In Table 2.10, we present our results of the regression analysis for the court effect on our APR adherence index and APR violation dummy variable of the defaulted companies. In the analysis conducted in this subsection, we use the *discounted* versions of the APR adherence index and APR violation dummy. Unless otherwise stated, when we mention

these two variables in this subsection, we are referring to their *discounted* versions rather than their *nominal* ones. In Panel A, we report the OLS regression results when the APR adherence index is the dependent variable and the probit regression results when the APR violation dummy is the dependent variable. The corresponding treatment regression results are presented in Panel B, where we also report the results of the likelihood ratio tests on the exogeneity of venue choice. In running the treatment regressions, rather than using the raw court dummy variable, we use the endogenous independent variable of venue choice obtained with the probit regression of Equation (2.1). To conserve space, we do not report the full probit regression results in Panel B, which are similar to those already presented in Table 2.6. We only present the estimated coefficients of our two instrumental variables at the bottom of the panel.

INSERT TABLE 2.10 ABOUT HERE

First of all, consider the results for the effect of Delaware on the left hand side of Table 2.10 Panel A. They are the regression results where we do not control for the selection effect. In these regressions, the Delaware court dummy variable is assigned a value of 1 (0) if the issuing company of the defaulted debt files for bankruptcy in Delaware (any other courts including New York). To examine the impact on APR compliance in detail and to ensure the robustness of our conclusion, we conduct four different regressions.

- *Regression (1):* We use the full sample of defaulted companies and APR adherence index as our dependent variable.
- *Regression (2):* We exclude those defaulted companies that do not have both secured and unsecured debts, since it is impossible to observe any APR violation

from these companies. We run the regression with this subsample of companies using the APR adherence index as our dependent variable.

- *Regression (3):* To focus our attention on explaining the extent of APR violation, we conduct the regression on only the subsample of companies that violate APR. In other words, we only consider those companies with an APR violation dummy value of 1. APR adherence index is the dependent variable in this regression.
- *Regression (4):* Unlike in regression (3) where we examine the *extent* of APR violation, we focus on the *incidence* of APR violation in this regression. We conduct a probit regression on our full sample using the APR violation dummy as our dependent variable.

From the results of regressions (1)-(4) of Panel A, it seems that there is a size effect where the larger the size of the defaulted company, the higher the chance of APR violation and the larger the degree of deviation from a distribution that completely adhere to APR. A possible explanation is that larger companies tend to have more creditors and are thus subject to more intensive conflict of interest, which lead to more APR violation. This size effect is, however, weaker when we exclude companies that cannot and/or do not violate APR (see regressions (2) and (3)). Besides, based on the degree of statistical significance of the estimated coefficients of *LogATS*, *LogATM*, and *LogATL*, it seems that the size effect is stronger for larger companies. We also document a positive relation between APR adherence and the number of employees. A possible reason of this effect is that, with more employees, companies are more likely to get debtor-in-possession financing, which increases the chance of upholding the secured creditor's claim (Capkun and Weiss, 2008). Consistent with the argument of Carey and Gordy (2007) that the presence of bank creditor increases the bargaining power of secured creditors, we find a

positive (negative) impact of the presence of bank creditor on our APR adherence index (our APR violation dummy).

The focus of our analysis is, however, on the court effect as captured by the Delaware court dummy variable. Without controlling for the selection effect, we cannot find any significant court effect on both the APR adherence index and the APR violation dummy (see results of regressions (1)-(4) in Panel A). It however does not necessarily imply that the court of Delaware does not exert any independent influence on APR compliance. As pointed out in the previous subsection, the selection effect could be offsetting any independent influence of the court resulting in an unobservable net effect as documented in Panel A (see the discussions of Scenario A, B, and C in Section 5.2). We disentangle these two effects by conducting the treatment regressions and present the corresponding results in the left hand side of Table 2.10 Panel B. The *instrumented* Delaware dummy variable is found to be strongly statistically significance in explaining APR adherence regardless of whether we use the full sample (regression (1)) or the subsample consisting of companies that can/do deviate from APR (regression (2)/(3)). After correcting for the selection effect and controlling for other explanatory variables, we find that Delaware results in a larger extent of deviation from APR compliance than other courts. The average amount of deviation is considered to be economically significant. The estimated values of the coefficient of the Delaware dummy in regressions (1)-(3) are all larger than the unconditional standard deviation of the APR adherence index as reported in Table 2.2. We arrive at the same conclusion by using the APR violation dummy as the explanatory variable (see regression (4) in Panel B). These findings therefore lead as to accept our

third hypothesis (H3) regarding the negative influence of Delaware on APR compliance. It seems that Delaware results in a wealth transfer from secured to unsecured debtholders.

The sign and significance of ρ at the bottom of left hand side of Panel B confirms the strong but offsetting selection effect of Delaware. It seems that defaulting companies that are expected to be more adhering to APR have a higher chance to file in Delaware than in other courts, while Delaware exerts an independent influence resulting in a deviation of APR adherence that more or less offset selection effect. Consistent with the findings in the previous subsection regarding recovery rate, it therefore lends support to the argument that, by filing in Delaware, debtors are looking for a debtor-friendly court that can constrain the power of the senior creditors and, through the bankruptcy process, Delaware indeed results in a wealth transfer from the secured to unsecured debtholders. However, it should be noted that, although APR adherence is a measure of economic and contractual fairness, it is not the only and final goal of a bankruptcy court. According to Harner (2008) and the observation of the practices adopted by courts, fully protecting the interest of the most secured or the most senior creditor is not the objective of the Chapter 11 bankruptcy process. Instead, if a distressed firm is deemed to be more valuable as a going concern than being liquidated, APR violation, to the extent that the case could be successfully emerged, is necessary.

The regression results of the effect of New York are presented on the right hand side of Table 2.10 Panel A and B. Same as in our study of the effect of Delaware, we run four pairs of regressions using different subsamples, different dependent variables, and with and without controlling for any potential selection effect. Regressions (5)-(8) correspond

to regressions (1)-(4) respectively. Unlike the Delaware results, the selection effects are insignificant according to the likelihood ratio tests. Besides, based on the insignificant coefficients of the instrumented New York court dummy in Panel B, there is also a general absence of any independent effect exerted by New York on APR compliance. We therefore cannot accept our third hypothesis (H3) that New York exerts any negative influence on APR compliance.[32] This finding is consistent with the results documented in the previous subsection that New York has a more uniform impact on the recovery rates of secured vs. unsecured debholders than Delaware. Regardless of their seniority and security, all kinds of debtholders are hurt by New York in terms of their average recovery rates and there is not much wealth transfer going on among them that can be attributed to the court. The across-the-board reduction in recovery rates can actually be a result of a wealth transfer from debtholders to shareholders. Alternatively, it may simply be the result of the fact that New York is more likely to approve inefficient and ineffective reorganization plans that finally hurt both debtholders and shareholders.[33]

Based on the results of the empirical analyses conducted up to this point, the performances of both Delaware and New York are far from desirable from the perspective of debtholders. For the case of Delaware, it seems that we have sufficient circumstantial evidence supporting the argument of debtors shopping for a debtor-friendly court instead of a court that is efficient in processing cases of specific

[32] Although the estimated coefficient of the New York court dummy is negative and weakly (moderately) statistically significant in regression (5) (regression (6)) in Table 2.10 Panel A, they are not considered to be economically significant based on the magnitude of the point estimates.

[33] This argument is supported by the evidence provided by LoPucki and Eisenberg (1999) that large bankruptcy cases presided in Delaware and New York are more likely to refile bankruptcy again after they emerge from bankruptcy.

characteristics. Although the overall recovery rate is not negatively affected, secured and senior debtholders are hurt by a transfer of wealth to more junior claimants (that may as well include shareholders). The negative influence of New York is of a different characteristic. Although we cannot find any strong evidence that allows us to refute the conjecture that debtors filing in New York are actually looking for an efficient court in processing cases that require specific expertise, New York exerts an independent and significant negative impact not only on the overall recovery rate but also the recovery rates of almost all kinds of debtholders. Can these negative influence of the courts on creditors be somehow compensated by a shorter bankruptcy process so creditors can redeploy their assets more readily? That is the research question we will address in the subsequent subsection.

2.5.4. Bankruptcy venue choice and duration in bankruptcy process

Bankruptcy duration is another important measure of creditor welfare. Creditors may be willing to make some compromise, such as sacrificing some of their recovery values and providing some economic incentives to the shareholders and other junior claimants, if it can facilitate the negotiation and thus shorten the bankruptcy process. In Table 2.11, we present the OLS regression (Panel A) and the matching treatment regression (Panel B) results in explaining the length of the time (in days) the case spent in bankruptcy process. The dependent variable is the logarithmic transformation of the number of days. Regressions (1) and (4) represent the full sample regressions for Delaware and New York court effect respectively. In regression (1), the Delaware court dummy variable is assigned a value of 1 (0) if the issuing company of the defaulted debt files for bankruptcy

in Delaware (any other courts including New York). In regression (4), the New York court dummy variable is assigned a value of 1 (0) if the issuing company files in New York (any other courts including Delaware).

INSERT TABLE 2.11 ABOUT HERE

First of all, consider the full sample regression results of Delaware (i.e., regression (1) of Panel A and B). The bankruptcy duration in Delaware seems to be positively related to the number of employees and the pre-petition ROA of the defaulted company, while negatively related to the presence of a bank creditor. As expected, pre-packaged cases have significantly shorter duration. The OLS regression results of Panel A suggest a significantly shorter duration for cases filed in Delaware. Based on the estimated coefficient of -0.125 for the Delaware court dummy, the durations of cases filed in Delaware are on average 12% (= exp^(-0.125) - 1) shorter than cases filed in other courts. With the unconditional mean duration of 462 days for the overall sample (see Table 2.3), this 12% reduction is equivalent to a saving of about 55 days. Unfortunately, when we look at the corresponding treatment regression results (i.e., regression (1) in Panel B), we notice that the shorter duration is completely the result of a negative and significant selection effect.[34] After correcting for the selection effect, the processing time of cases filed in Delaware is actually significantly longer than those filed in other courts. Based on the estimated coefficient of 0.335 for the instrumented Delaware court dummy, Delaware results in, on average, about 40% (= exp^(0.335) - 1) more time to process a

[34] A negative selection effect means that those cases that are expected to be processed quickly tend to select Delaware as opposed to other courts. One possible reason for this negative selection effect is that Delaware attracts a lot of prepackaged cases that are expected to be processed quickly.

case. Although this effect is *unobservable,* it measures the independent influence of the processing in Delaware. With respect to the argument that Delaware has special expertise in processing prepackaged cases, we conduct regression analysis separately on the subsamples of only prepackaged cases (regression (2)) and only non-prepackaged cases (regression (3)). The selection effect is still negative but not statistically significant in these two subsample regressions. Nevertheless, we can still find a strong and positive influence of the court effect on bankruptcy duration in the prepackaged subsample. These empirical findings lead us to reject our fourth hypothesis (H4) that Delaware takes less time to process bankruptcy cases than other courts.

In terms of time in bankruptcy, the performance of New York is even worse. After correcting for the selection effect, the estimated coefficient of the instrumented New York court dummy variable is positive and statistically significant (see regression (4) in Panel B). The magnitude is larger than that of Delaware. Based on the point estimated of the coefficient (0.459), New York takes about 58% (= exp^(0.459) - 1) more time to process a case than other courts. Although part of it is offset by the negative selection effect, the OLS regression results (see regression (4) in Panel A) suggest we can still observe a lengthening of the duration by about 20% (= exp^(0.180) - 1) for cases filed in New York. We therefore also reject our fourth hypothesis (H4) for New York. On the contrary, New York actually takes longer to process cases whether we control for the selection effect or not.

It seems that the overall verdict in terms of bankruptcy duration is not favorable for either Delaware or New York. One straightforward explanation is that they are simply

inefficient. Alternatively, debtors are *actively* exercising their options of delaying the process in order to gain more bargaining power in their negotiations with other stakeholders and, at the same time, these tactics do not encounter too much resistance in Delaware and New York. Either explanation does not cast a favorable light on the efficiency argument claimed by some researchers. Nevertheless, we cannot rule out the possibility of a third explanatory that the courts of Delaware and New York are being more careful and thoughtful in liberating on the reorganization plans and thus naturally take more time to process the cases. This argument, however, is inconsistent with the higher refiling rates of cases processed by Delaware and New York as documented by LoPucki and Doherty (2006) and LoPucki and Eisenberg (1999). Even if it is indeed the intention of Delaware and New York to facilitate a more thorough process, we cannot find any substantial benefit to most of the debtholders based on our previous findings on the court effect on recovery rates.

2.6. Robustness tests

To gauge the robustness of our conclusions, we conduct a number of additional analyses. The first two analyses are related to the two alternative definitions of recovery rate, namely discounted vs. nominal recovery rates. In the existing literature on recovery rate, it is quite common to use discounted rather than nominal recovery. The former has the benefit of being able to cater for the time value of money and it is also risk adjusted. We follow this practice and use discounted recovery rates in the empirical analyses conducted in Section 5. However, it is more common in the literature on APR violation for researches to assess the final distributions approved by the bankruptcy courts in terms

of nominal recovery rates. It is also more likely the case that judges/stakeholders conduct their assessment and exercise their judgment based on nominal terms, whether it is during the negotiation process or in the approval of the distribution plan.

Our APR violation dummy variable could be very sensitive to the alternative definitions of recovery rates. To demonstrate this issue, we present the nominal and discounted recovery values of the debt instruments of two defaulted companies in our sample in Panel A of Table 2.12. Note that based on nominal recovery values, both cases have not violate any APR and thus both are assigned a value of 0 for their APR violation dummies. However, we have to conclude that both cases violate APR and thus assign value of 1 to their dummy variable if we measure APR according to discounted recovery values. It is unlikely that we can convince any judges or legal professionals that these two cases actually demonstrate any deviate from APR for any practical purposes. In using discounted recovery rates, we therefore run into the risk of misclassifying APR adherence vs. violation cases. To ensure our conclusions are not sensitive to this problem, we rerun our regressions analyses for the court effect on recovery rates (i.e., in Section 5.2) and the court effect on APR compliance (i.e., in Section 5.3) using the nominal version of recovery rate rather than its discounted version in constructing all the related variables involved.

INSERT TABLE 2.12 ABOUT HERE

The regression results (not reported) of the court effect on nominal recovery rates are essentially the same as those using discounted recovery rates as documented in Section

5.2.[35] It seems that, although the alternative definition can affect the absolute level of recovery rates, it is of secondary importance in terms of their (cross-sectional) relative values. It is the latter that dictates the results of the regression analysis.

We conduct a second set of regressions to assess the court effect on APR compliance in parallel to those performed in Section 5.3, but now using nominal recovery rates instead to construct the APR violation dummy and APR adherence index. To conserve space, we only report the results of the treatment regressions in Panel B of Table 2.12.[36]

The statistical significance of the court effect of Delaware on the APR adherence index and the APR violation dummy remains as strong (if not slightly stronger) as that documented in Table 2.10 Panel B. We can still find a strong and positive selection effect in terms of APR adherence index. For New York, the results are again qualitatively the same as those documented in Section 5.3. There is however an indication of a slightly stronger court effect on APR adherence index (comparing regression (6) of Table 2.12 Panel B with the same regression in Table 2.10 Panel B). Our previous conclusions regarding the court effect are therefore robust to alternative definitions of recovery rate.

In the third set of robustness test, we consider the impact of alternative definition of the time in bankruptcy. In our previous analysis of court effect on bankruptcy duration (Section 5.4), we define the time in bankruptcy as the time from the date of filing for

[35] These results and other unreported results of robustness tests mentioned below are available from the author upon request.

[36] The OLS regression results are essentially the same as the corresponding results presented in Table 2.10 Panel A. In Table 2.12 Panel B, we only present the estimated results of the court dummy variables of the treatment regressions. To conserve space, we do not report the estimated values of the coefficients of other explanatory variables, which are similar to those of Table 2.10 Panel B. The unreported results are, however, available from the author upon request.

bankruptcy to the date when the case emerges. An alternative definition that is also common used in the literature is from the date of filing to the date when the plan is confirmed. We rerun all the regressions of Section 5.4 using this alternative definition. The results (not reported) are again similar to those presented in Table 2.11, and thus confirming the robustness of our pervious conclusions.

2.7. Conclusion

Using a comprehensive data of 507 firms' recovery rates, we investigate the effect of bankruptcy venue choice on the recovery rates, APR adherence and bankruptcy duration. We find Delaware leads to higher APR violation and New York lowers recovery of all creditors; further these two courts need more time to process case once self selection is adjusted. These empirical findings suggest that the agency problem is very severe when defaulted firms are filed in Delaware and New York.

Indeed, as pointed out by Beranek et al. (1996) , APR violation is allowed in bankruptcy code. Additionally, the philosophy of bankruptcy protection could be to generate an economic consequence or a survivable new corporation, which could benefit all stakeholders, instead of protecting secured and senior creditors alone. Junior and unsecured claimholders as the collectors of residual values have a substantial part of interest from the time value, which cannot be captured in present value in bankruptcy court (Casey, 2011). Meanwhile, the fiduciary duty of managers and directors, who are case placers and usually also in control of the distressed company before it emerges from the court, remains ambiguous during bankruptcy.

This kind of ambiguity and uncertainty does, however, exaggerate the agency problem around default, thereby leading to a higher ex ante cost of debt. Meanwhile, our results are the strong evidence to disproof the unification of the corporate bankruptcy system. The question how to divide the par is up to the judge's discretion and claim holders' bargaining, instead of being disciplined by any code or theory. Under such a circumstance, from the perspective of creditors, a significantly shrunken recovery rate could lead to an accusation of 'corruption'.

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Table 2.1 Summary statistics of discounted recovery rates (in dollar per $1,000 of principal default amount) by various categories

This table reports summary statistics of recovery rates by bankruptcy court, seniority, and security, respectively. Recovery rate (expressed as dollar amount recovered per $1,000 of principal default amount of the debt instrument) is obtained from S&P's LossStats database. It is calculated by discounting the ultimate recovery value back to the time of default. S&P's LossStats database also provides information on the instrument type, collateralization, bankruptcy court, and other information regarding the default event. We run the t test to compare the mean of recovery rates in Delaware (New York) and those in other courts in Panel A. We run the t test to compare the mean of recovery rates for the secured creditors and those of the unsecured in Panel c. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A: Recovery rate by bankruptcy court

Court	No. of instruments	No. of companies	Average no. of instruments per company	Recovery rate		
				Mean	Median	Std. deviation
Delaware	812	180	4.51	$489.03***	$425.79	$389.46
New York	627	105	5.97	$474.81***	$432.13	$367.89
Others	957	222	4.31	$583.47	$627.51	$379.48
All	2,396	507	4.73	$523.03	$516.12	$382.99

Panel B: Recovery rate by seniority

Type	No. of instruments	Mean	Median	Std. deviation
Bank loan	915	$760.18	$921.44	$310.25
Senior secured bond	217	$628.58	$678.80	$335.21
Senior unsecured bond	669	$449.06	$400.93	$333.26
Senior subordinated bond	309	$241.47	$126.11	$310.39
Subordinated bond	254	$168.77	$66.52	$241.72
Junior subordinated bond	32	$103.50	$24.83	$166.73

Panel C: Recovery rate by security

Security	No. of instruments	Mean	Median	Std. deviation
Unsecured debt	1,322	$346.98***	$237.22	$340.08
Secured debt	1,074	$739.74***	$882.95	$315.93

Table 2.2 Summary statistics of discounted and nominal versions of APR adherence index and APR violation dummy variable

This table presents the summary statistics of absolute priority rule (APR) adherence indices and APR violation dummies. We follow the method employed by Bris et al. (2006). Specifically, we assign the value of 1 to the APR violation dummy variable if the unsecured debtholders recover something before the claims of the secured debtholders are 100% satisfied; otherwise, the value of 0 is assigned. The APR adherence index is a continuous variable that measures how close the distribution of the recovery values between secured and unsecured debts resembles a full compliance of APR. It equals to 1.0 if secured debtholders fully recover before any distribution to unsecured ones, while it takes on a value of 0.0 if the distribution is proportional. Lying between these two situations are cases where, although secured debtholders recover proportionally more than unsecured ones, the distribution does not fully adhere to APR. These cases are assigned values between 0.0 and 1.0 based on the extent of adherence. To ensure the robustness of our findings, we construct two sets of APR adherence indices and two sets of APR violation dummy based on the discounted and nominal recovery values, respectively.

	No. of companies	Mean	Median	Minimum	25th percentile	Std. deviation
APR adherence index (discounted)	507	0.862	1.000	-0.075	0.866	0.271
APR adherence index (nominal)	507	0.896	1.000	-0.387	0.976	0.258
APR violation dummy (discounted)	507	0.363	0.000	0.000	0.000	-
APR violation dummy (nominal)	507	0.264	0.000	0.000	0.000	-

Table 2.3 Summary of Firm and Case Characteristics

This table presents summary statistics for the variables of firm and case characteristics. We manually collect the Compustat GVKEY information for each company and merge the LossStats data with company financial information from Compustat. After mergence, we arrive at a total of 2,396 defaulted instruments issued by 507 defaulted firms. Assets (AT) and the number of employees (EMP) are directly from Compustat. Tangibility is the total of property, plant and equipment to assets (ppent/at). Profit Margin is defined as the gross profit scaled by the amount of sales. Book leverage is total liabilities scaled by total book assets. Return on Assets (ROA) is defined as EBITDA over total book assets. Industry Distressed Dummy (Distressed) equals to 1 (0) if the median stock return of the industry (by 3-digit SIC code) it belongs to is lower (higher) than -30% during the default calendar year. Industry Median Stock Return is the median annual stock return of each industry in the default year. Time in Bankruptcy Court is defined as the time from the date of bankruptcy filing to the date of emergence or liquidation. Delaware and New York: Dummies for Delaware and New York filing are created from LossStats. Bank Creditor Dummy is assigned the value of 1 (0) if there is at least one (no) outstanding bank loan. Prepackaged equals one if a case is prepackaged; otherwise, it is zero. Delaware or New York Incorporation: Incorporation location is obtained from Compustat. Distance to Delaware or New York, in miles, is manually collected from Google map by inputting every location of headquarter.

Variable	No. of obs.	Mean	Median	Std. deviation	Minimum	Maximum
Total asset value (*AT*) [in $ million]	502	1,831	421	7,061	1	103,914
No. of employees (*EMP*)	476	7,556	2,959	16,042	1	234,000
Tangibility	497	0.371	0.331	0.239	0.000	0.959
Profit margin	500	0.189	0.238	0.511	-3.497	1.000
Financial leverage	501	1.173	0.998	0.672	0.249	4.578
Return on assets (*ROA*)	502	-0.288	-0.133	0.455	-2.618	0.059
Industry median Tobin's Q (*IndQ*)	467	1.361	1.277	0.355	0.763	3.728
Industry distress dummy (*IndDis*)	507	0.247	0.000	0.431	-	-
Time in bankruptcy court [in days]	507	462	371	388	20	2,278
Delaware filing dummy	507	0.355	0.000	0.479	-	-
New York filing dummy	507	0.207	0.000	0.406	-	-
Bank creditor dummy	507	0.825	1.000	0.381	-	-
Prepackaged dummy	507	0.249	0.000	0.433	-	-
Delaware incorporation dummy	507	0.716	1.000	0.451	-	-
New York incorporation dummy	507	0.024	0.000	0.152	-	-
Distance to Delaware [in miles]	507	1,040	750	959	6	7,000
Distance to New York [in miles]	507	1,077	815	981	2	7,000

Table 2.4 Bankruptcy Filing by Court and Year

This table reports the number of bankruptcy filing in different bankruptcy courts over time. Bankruptcy year is the calendar year of filing. All information is from S&P's LossStats database.

	Delaware		New York		No. of filings	Total
Bankruptcy Year	No. of filings	% of total	No. of filings	% of total	in all other courts	no. of filings
1987	0	0%	1	33%	2	3
1988	0	0%	2	29%	5	7
1989	0	0%	2	18%	9	11
1990	1	5%	4	18%	17	22
1991	1	3%	11	37%	18	30
1992	5	19%	6	22%	16	27
1993	5	21%	3	13%	16	24
1994	3	27%	2	18%	6	11
1995	5	38%	3	23%	5	13
1996	10	71%	0	0%	4	14
1997	5	33%	3	20%	7	15
1998	11	61%	1	6%	6	18
1999	23	55%	5	12%	14	42
2000	33	72%	2	4%	11	46
2001	27	40%	14	21%	27	68
2002	29	41%	20	28%	22	71
2003	11	26%	12	28%	20	43
2004	3	14%	6	29%	12	21
2005	2	20%	5	50%	3	10
2006	5	63%	2	25%	1	8
2007	1	33%	1	33%	1	3
Total	180	36%	105	21%	222	507

Table 2.5 Firm characteristics by bankruptcy court

This table presents the mean values of different firm- or case-specific variables based on the court of filing. First two columns are for the comparison of Delaware and Non-Delaware filing. The middle two columns are for the comparison of New York and Non-New York filing. The last two columns are comparing the bankruptcy filing in Delaware or New York to that in other courts. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	Filing in Delaware		Filing in New York		Filing in Delaware or New York	
	No	Yes	No	Yes	No	Yes
Log(*AT*)	6.199	6.273	6.094***	6.718***	5.948***	6.437***
Log(*EMP*)	0.929	1.100	0.925**	1.249**	0.779***	1.153***
Tangibility	0.384*	0.346*	0.372	0.365	0.394**	0.353**
Profit margin	0.154**	0.249**	0.186	0.197	0.134**	0.230**
Financial leverage	1.188	1.146	1.157	1.234	1.166	1.178
ROA	-0.293	-0.278	-0.288	-0.287	-0.296	-0.282
Bank creditor dummy	0.813	0.844	0.823	0.829	0.806	0.839
Prepackaged dummy	0.207***	0.322***	0.246	0.257	0.184***	0.298***
Delaware incorporation dummy	0.666***	0.805***	-	-	-	-
New York incorporation dummy	-	-	0.007**	0.086**	-	-
Distance to Delaware	6.531**	6.282**	-	-	-	-
Distance to New York	-	-	6.505**	5.011**	-	-

Table 2.6 Determinants of bankruptcy venue choice

This table reports the coefficient estimates of five different probit regressions of bankruptcy venue choices. They explain the incidence of: (i) filing in Delaware as opposed to filing in New York or other courts; (ii) filing in Delaware as opposed to filing in other courts (excluding New York); (iii) filing in New York as opposed to filing in Delaware or other courts; (iv) filing in New York as opposed to filing in other courts (excluding Delaware); and (v) filing in Delaware or New York as opposed to other courts. The corresponding standard errors are presented in parentheses. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Variable	(i) Delaware vs. New York and other courts	(ii) Delaware vs. other courts	(iii) New York vs. Delaware and other courts	(iv) New York vs. other courts	(v) Delaware and New York vs. other courts
LogATS	0.114	0.387**	0.291**	0.465***	0.284**
	(0.130)	(0.162)	(0.142)	(0.154)	(0.126)
LogATM	0.104	0.352***	0.287**	0.446***	0.277***
	(0.108)	(0.135)	(0.120)	(0.130)	(0.106)
LogATL	0.054	0.286**	0.296***	0.429***	0.242***
	(0.088)	(0.113)	(0.098)	(0.105)	(0.087)
Log(*EMP*)	0.054	0.007	-0.024	-0.054	0.007
	(0.057)	(0.065)	(0.071)	(0.080)	(0.057)
Tangibility	-0.389	-0.626**	-0.182	-0.505	-0.649**
	(0.276)	(0.310)	(0.333)	(0.370)	(0.273)
Profit margin	0.274	0.400**	-0.169	-0.122	0.174
	(0.175)	(0.214)	(0.144)	(0.155)	(0.131)
Financial leverage	-0.127	-0.070	0.300**	0.343**	0.064
	(0.129)	(0.157)	(0.142)	(0.163)	(0.124)
ROA	-0.169	-0.283	0.183	0.084	-0.069
	(0.193)	(0.222)	(0.231)	(0.279)	(0.189)
Bank creditor dummy	0.077	0.101	0.198	0.190	0.174
	(0.171)	(0.191)	(0.209)	(0.235)	(0.168)
Prepackaged dummy	0.332**	0.443***	0.155	0.447**	0.407***
	(0.141)	(0.158)	(0.170)	(0.205)	(0.144)
Delaware incorporation	0.447***	0.532***			0.616***
	(0.144)	(0.158)			(0.145)
Log of distance to Delaware	-0.135**	-0.274***			
	(0.062)	(0.066)			
New York incorporation			1.207***	1.632**	1.909***
			(0.442)	(0.732)	(0.576)
Log of distance to New York			-0.251***	-0.336***	
			(0.041)	(0.056)	
Constant	-0.442	-0.811	-1.730**	-1.641**	-2.073***
	(0.757)	(0.924)	(0.773)	(0.835)	(0.676)
No. of observations	465	376	465	297	465
Pseudo R2	0.057	0.121	0.174	0.255	0.100

Table 2.7 Mean comparison on creditor's welfare

This table presents the preliminary analysis results, comparing means of response variables by different bankruptcy courts. Recovery rate is expressed as dollar amount recovered per $1,000 notional value of the defaulted debt instrument, is obtained by discounting the ultimate recovery values back to the time of last cash payment. Variable definitions are provided in Table 2.3. We run the t test to compare the mean of the interest variables in Delaware (New York) to that in other courts. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	Delaware	New York	Other courts	Overall
Average recovery rate by instrument type (in $ per $1,000 principal default amount)				
Bank loan	$723.26***	745.25**	$805.38	$760.18
Senior secured bond	$699.54*	$562.53	$614.18	$628.58
Senior unsecured bond	$345.99***	397.58***	$584.33	$449.06
Senior subordinated bond	$185.53***	$286.47	$288.51	$241.47
Subordinated bond	$173.14	82.19***	$217.33	$168.77
Junior subordinated bond	$101.60	$73.07	$130.45	$103.50
Average recovery rate by collateralization (in $ per $1,000 principal default amount)				
Unsecured debt	$264.16***	$330.65***	$427.25	$346.98
Secured debt	$724.1*	$725.35*	$760.95	$739.74
Overall average recovery rate (in $ per $1,000 principal default amount)				
	$489.03***	$474.81***	$583.46	$523.03
Average value of APR adherence index and APR violation dummy variable				
APR adherence index (discounted)	0.870	0.792**	0.887	0.862
APR adherence index (nominal)	0.900	0.830***	0.923	0.896
APR violation dummy (discounted)	0.383*	0.438**	0.311	0.363
APR violation dummy (nominal)	0.300**	0.333**	0.203	0.264
Average value of log of number of days in bankruptcy court				
	5.592***	5.968*	5.836	5.777

Table 2.8 Bankruptcy Venue Choice and Creditor Recovery (Delaware)

This table presents the effect of Delaware Bankruptcy Court on the recovery of creditor recovery. The dependent variable is the discounted recovery rate. Industry dummies are generated for the first three digit of SIC codes. Seniority and security dummies are controlled for the full sample regression, and not for the following five subsample regressions. Panel A shows coefficient estimates from an OLS regression. Panel B presents results from a treatment regression model with the binary endogenous bankruptcy court variable. Instrumental variables (IV) in the selection equation are the Delaware Incorporation and the distance from the company's headquarter to the Delaware Bankruptcy Court. We do not show the whole result from the selection regression of venue choices repeatedly since they are the same or similar to results in table 2.6, instead only reporting the coefficient estimates of two IVs. The estimated signs of the correlation coefficient ρ and the Chi-square statistic and the associated p-value from a likelihood ratio test for the null $H_0: \rho = 0$ are also reported at the bottom of panel B. Variable definitions are provided in Table 2.3. Numbers in brackets are standard errors. *, **, *** correspond to statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: OLS without Self Selection						
Sample	(1) Full Sample	(2) Bank Loans	(3) Senior Bonds	(4) Subordinated Bonds	(5) Secured debts	(6) Unsecured debts
Time-to-maturity	0.005	-0.06***	0.0055	0.0196***	-0.005	-0.008
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
LogATS	112.0***	172.3***	121.0***	-13.740	101.9**	138.3***
	(31.49)	(53.42)	(41.55)	(62.87)	(51.20)	(37.27)
LogATM	90.10***	128.8***	101.2***	-14.770	70.390	125.4***
	(27.05)	(48.67)	(35.61)	(55.55)	(44.91)	(32.76)
LogATL	75.09***	112.7***	83.76***	-27.320	65.14*	102.0***
	(22.33)	(41.48)	(28.34)	(46.26)	(38.08)	(27.54)
Log(*EMP*)	-23.900	-24.200	-33.740	27.250	-24.510	-16.400
	(20.57)	(28.93)	(24.81)	(24.56)	(25.11)	(25.76)
Tangibility	-56.780	3.966	-104.300	2.73	-11.300	0.698
	(82.14)	(111.40)	(120.00)	(125.30)	(101.80)	(97.21)
Profit margin	-15.580	126.700	-16.400	-122.4**	70.550	-53.960
	(42.33)	(112.50)	(49.18)	(49.73)	(61.96)	(40.98)
Financial leverage	31.910	-69.510	129.0***	-1.272	-26.820	70.110
	(38.65)	(42.92)	(46.85)	(32.80)	(43.46)	(47.42)
ROA	106.6**	38.250	179.0**	138.0**	47.660	144.7***
	(47.88)	(65.82)	(71.69)	(53.63)	(71.23)	(55.58)
Industry median Tobin's Q	-18.420	-2.316	-100.600	-34.690	20.960	13.890
	(59.47)	(56.70)	(101.70)	(78.21)	(57.68)	(73.57)
Industry distress dummy	-197***	-118.9*	-260.2***	-46.150	-115.3*	-235.8***
	(51.58)	(71.60)	(67.07)	(57.53)	(69.05)	(57.80)
Log of days in bankruptcy	17.030	-35.130	31.450	-27.230	6.945	26.080
	(26.28)	(36.25)	(38.94)	(28.34)	(30.45)	(33.12)
Bank creditor dummy	130.0***		188.3***	106.400	170.7**	142.6***
	(42.26)		(59.28)	(65.08)	(81.55)	(46.87)
Speculative Default Rate	-1569***	-1,614**	-1253.0	-753.900	-1,519**	-1,723**
	(581.00)	(696.60)	(875.80)	(881.90)	(704.10)	(688.80)
Prepackaged dummy	93.16*	63.580	57.030	46.680	51.180	108.700
	(53.48)	(66.72)	(81.09)	(64.11)	(56.63)	(66.42)
Delaware court dummy	**-30.330**	**-92.90****	**56.850**	**23.150**	**-47.020**	**-30.630**
	(31.26)	**(45.49)**	**(51.77)**	**(39.51)**	**(43.00)**	**(38.47)**
Constant	27.810	-99.530	336.400	760.4**	-52.510	10.820
	(272.90)	(494.60)	(355.40)	(294.20)	(335.10)	(314.90)
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Seniority and Security Dummy	Yes	-	-	-	-	-
N	1,529	369	711	200	513	1,016
R-squared	0.458	0.28	0.382	0.252	0.194	0.342

Panel B: Self Selection Models for Delaware Filing						
Sample	(1) Full Sample	(2) Bank Loans	(3) Senior Bonds	(4) Subordinated Bonds	(5) Secured debts	(6) Unsecured debts
Time-to-maturity	0.005	-0.064***	0.006	0.0153***	0.006	-0.001
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
LogATS	107.1***	176.4***	129.7***	-40.520	113.3**	151.3***
	(40.12)	(52.33)	(45.01)	(66.34)	(50.57)	(43.32)
LogATM	85.99**	118.6**	108.6***	-45.780	63.300	126.5***
	(34.70)	(47.39)	(39.32)	(58.09)	(44.36)	(35.96)
LogATL	71.08**	98.22**	90.47***	-53.320	55.030	102.2***
	(30.24)	(39.18)	(32.13)	(47.64)	(34.83)	(30.71)
Log(*EMP*)	-22.430	-1.541	-36.610	38.850	-14.500	-15.890
	(22.12)	(32.21)	(24.87)	(25.05)	(26.62)	(24.74)
Tangibility	-63.060	-38.900	-94.100	62.730	-74.660	-38.660
	(87.09)	(119.30)	(121.60)	(138.00)	(108.70)	(100.50)
Profit margin	-11.300	180.1*	-19.270	-195.3***	71.120	-67.83*
	(47.12)	(107.00)	(47.89)	(63.34)	(70.33)	(40.28)
Financial leverage	29.300	-94.13**	137.7***	20.690	-49.320	77.96*
	(39.69)	(40.38)	(47.69)	(32.37)	(48.19)	(46.70)
ROA	103.9**	84.130	182.7***	198.3***	118.900	180.6***
	(48.35)	(68.73)	(70.60)	(66.09)	(81.29)	(63.97)
Industry median Tobin's Q	-17.590	1.800	-103.100	-62.100	-6.845	-3.529
	(58.78)	(50.39)	(99.72)	(75.94)	(51.15)	(72.63)
Industry distress dummy	-197.3***	-120.4*	-260.3***	-40.460	-124.6**	-234.6***
	(50.87)	(64.88)	(65.78)	(46.15)	(63.46)	(57.27)
Log of days in bankruptcy	17.650	-36.860	30.870	-37.400	-10.630	10.670
	(26.04)	(37.43)	(38.23)	(26.09)	(32.77)	(31.33)
Bank creditor dummy	131.0***		188.4***	93.330	70.390	128.8**
	(41.99)		(58.00)	(63.66)	(107.60)	(53.25)
Speculative Default Rate	-1,570***	-1,458**	-1188.00	-1108.000	-1,683**	-1,449**
	(574.00)	(679.30)	(859.30)	(711.10)	(707.30)	(656.00)
Prepackaged dummy	98.20*	90.090	53.020	-56.220	98.270	73.220
	(59.61)	(71.69)	(79.61)	(71.18)	(62.98)	(67.66)
Delaware court dummy	**-74.310**	**-424.2*** **	**88.330**	**351.0*** **	**-429.1*** **	**244.000**
	(228.90)	**(136.10)**	**(109.50)**	**(71.54)**	**(147.70)**	**(188.20)**
Constant	63.990	801.2**	274.400	914.5**	146.800	-290.900
	(331.60)	(388.30)	(376.70)	(376.60)	(336.50)	(301.30)
IV:						
Delaware Incorporation	0.602***	0.430*	1.081***	0.462**	0.292	0.676***
	-0.207	-0.239	-0.262	-0.208	-0.196	-0.236
Log dist to DE	-0.0732	-0.242***	0.129	-0.135*	-0.138**	0.0469
	-0.134	-0.0815	-0.121	-0.0802	-0.0638	-0.0732
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Seniority and Security Dummy	Yes	.	.	.	.	.
Sign of ρ	+	+	-	-	+	-
LR test of ρ=0	0.0394	5.799**	0.162	26.84***	6.485**	2.157
P-value	0.843	0.016	0.687	2.21E-07	0.0109	0.142
N	1,529	369	711	200	513	1,016

Table 2.9 Bankruptcy Venue Choice and Creditor Recovery (New York)

This table presents the effect of New York Bankruptcy Court on the recovery of creditor recovery. The dependent variable is the discounted recovery rate. Industry dummies are generated for the first three digit of SIC codes. Seniority and security dummies are controlled for the full sample regression, and not for the following five subsample regressions. Panel A shows coefficient estimates from an OLS regression. Panel B presents results from a treatment regression model with the binary endogenous bankruptcy court variable. Instrumental variables (IV) in the selection equation are the Delaware Incorporation and the distance from the company's headquarter to the Delaware Bankruptcy Court. We do not show the whole result from the selection regression of venue choices repeatedly since they are the same or similar to results in table 2.6, instead only reporting the coefficient estimates of two IVs. The estimated signs of the correlation coefficient ρ and the Chi-square statistic and the associated p-value from a likelihood ratio test for the null H_0: $\rho = 0$ are also reported at the bottom of panel B. Variable definitions are provided in Table 2.3. Numbers in brackets are standard errors. *, **, *** correspond to statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: OLS without Self Selection						
Sample	(1) Full Sample	(2) Bank Loans	(3) Senior Bonds	(4) Subordinated Bonds	(5) Secured debts	(6) Unsecured debts
Time-to-maturity	0.006	-0.0652***	0.003	0.0209***	-0.008	-0.006
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
LogATS	133.1***	180.4***	140.7***	11.030	123.3**	157.2***
	(31.16)	(54.54)	(38.87)	(58.80)	(50.94)	(37.27)
LogATM	109.4***	140.1***	121.3***	7.254	92.33**	141.3***
	(27.03)	(49.66)	(33.82)	(52.11)	(44.94)	(33.03)
LogATL	93.28***	125.4***	104.2***	-8.186	86.12**	117.0***
	(22.55)	(42.31)	(27.09)	(43.38)	(38.33)	(27.96)
Log(*EMP*)	-29.800	-30.490	-42.86*	21.860	-29.680	-22.660
	(19.84)	(28.02)	(23.40)	(23.51)	(24.63)	(24.94)
Tangibility	-63.590	24.710	-148.400	-31.220	-8.899	-10.740
	(81.54)	(114.50)	(119.90)	(125.20)	(103.90)	(95.33)
Profit margin	-8.435	132.400	-3.183	-106.7**	70.100	-44.310
	(35.56)	(104.20)	(38.12)	(46.63)	(56.48)	(36.59)
Financial leverage	41.250	-51.830	124.3***	14.340	-10.450	73.99*
	(37.05)	(45.90)	(41.63)	(30.21)	(43.61)	(44.55)
ROA	97.47**	17.410	137.9*	136.7***	29.210	137.2**
	(46.54)	(70.61)	(71.20)	(51.89)	(71.46)	(53.84)
Industry median Tobin's Q	-8.849	20.410	-83.790	-45.070	42.250	15.680
	(59.99)	(64.61)	(102.60)	(77.90)	(62.34)	(72.77)
Industry distress dummy	-196.5***	-145.4**	-223.4***	-48.220	-132.0*	-228.1***
	(48.17)	(72.50)	(61.80)	(57.90)	(68.30)	(53.67)
Log of days in bankruptcy	28.750	-25.260	43.160	-10.230	16.810	39.060
	(25.25)	(36.16)	(36.20)	(28.83)	(29.33)	(31.92)
Bank creditor dummy	123.7***		175.8***	103.800	170.1**	137.6***
	(40.61)		(57.25)	(63.48)	(76.23)	(46.56)
Speculative Default Rate	-1,800***	-1,655**	-2,057***	-809.200	-1,562**	-1,976***
	(542.60)	(705.00)	(779.80)	(855.00)	(707.90)	(651.50)
Prepackaged dummy	114.5**	71.320	89.900	69.080	63.900	128.9**
	(50.35)	(69.66)	(70.85)	(66.83)	(56.43)	(62.61)
New York court dummy	**-95.50****	**-59.070**	**-162.9*****	**-106.4****	**-89.38***	**-87.68***
	(42.28)	**(51.66)**	**(55.75)**	**(49.11)**	**(51.51)**	**(46.96)**
Constant	-170.200	-337.300	219.900	540.4*	-297.700	-147.700
	(280.40)	(534.80)	(336.50)	(280.50)	(347.90)	(306.90)
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Seniority and Security Dummy	Yes	-	-	-	-	-
N	1,529	369	711	200	513	1,016
R-squared	0.466	0.268	0.407	0.279	0.199	0.35

Panel B: Self Selection Models for New York Filing						
Sample	(1) Full Sample	(2) Bank Loans	(3) Senior Bonds	(4) Subordinated Bonds	(5) Secured debts	(6) Unsecured debts
Time-to-maturity	0.005	-0.0691***	0.001	0.0207***	0.003	0.001
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
LogATS	183.0***	216.8***	269.9***	15.220	242.8***	165.7***
	(37.76)	(60.33)	(53.85)	(58.67)	(54.88)	(40.00)
LogATM	155.6***	177.2***	240.3***	10.890	201.6***	147.5***
	(32.80)	(53.92)	(44.94)	(51.91)	(49.12)	(34.89)
LogATL	136.8***	169.9***	217.2***	-4.979	190.6***	122.0***
	(28.21)	(45.60)	(37.91)	(43.11)	(42.75)	(30.25)
Log(*EMP*)	-46.05**	-48.610	-101.1***	21.550	-73.12***	-26.570
	(20.77)	(29.72)	(28.96)	(21.86)	(24.67)	(25.12)
Tangibility	-100.800	32.500	-253.300	-33.320	-43.830	-106.400
	(91.25)	(130.60)	(157.80)	(118.50)	(114.40)	(98.66)
Profit margin	29.850	240.9**	51.040	-104.3**	52.900	19.000
	(35.30)	(106.90)	(52.10)	(43.78)	(53.98)	(38.67)
Financial leverage	64.720	-0.811	163.2***	17.980	49.090	80.44**
	(37.45)	(63.92)	(43.83)	(33.51)	(55.98)	(35.58)
ROA	73.810	-4.477	26.390	137.9***	-2.874	113.0**
	(52.42)	(89.67)	(90.38)	(49.31)	(80.16)	(52.67)
Industry median Tobin's Q	-15.900	13.250	-133.300	-44.350	4.029	-5.337
	(59.92)	(64.43)	(87.61)	(72.39)	(57.56)	(72.84)
Industry distress dummy	-196.9***	-136.9**	-178.6***	-48.380	-119.8**	-230.7***
	(44.32)	(60.95)	(64.28)	(54.36)	(57.89)	(49.95)
Log of days in bankruptcy	36.790	-8.122	60.18*	-9.492	22.860	31.650
	(24.16)	(34.22)	(35.25)	(27.36)	(25.88)	(30.14)
Bank creditor dummy	103.0**		130.0*	100.900	60.160	107.5**
	(44.18)		(74.53)	(61.39)	(74.86)	(51.13)
Speculative Default Rate	-1,850***	-1,803***	-2,707***	-776.200	-2,275***	-1,662***
	(521.60)	(671.20)	(858.40)	(802.40)	(673.50)	(618.90)
Prepackaged dummy	150.7***	165.1*	159.4**	68.620	147.8**	147.7**
	(50.80)	(85.64)	(66.81)	(62.91)	(62.39)	(57.85)
New York court dummy	**-357.7*** **	**-421.0*** **	**-646.9*** **	**-127.400**	**-508.9*** **	**-299.0*** **
	(116.40)	**(150.50)**	**(100.00)**	**(98.58)**	**(124.30)**	**(106.20)**
Constant	-460.200	49.850	-434.900	514.1*	-1,057***	-414.900
	(317.20)	(464.00)	(349.60)	(284.70)	(363.90)	(325.00)
IV:						
New York Incorporation	1.329**	1.475*	1.001**	1.952***	1.071	1.350***
	-0.52	-0.877	-0.434	-0.633	-0.671	-0.513
Log dist to New York	-0.227***	-0.188***	-0.179**	-0.334***	-0.173***	-0.229***
	-0.0536	-0.0658	-0.0694	-0.0931	-0.0609	-0.0661
Industry Dummy	Yes	Yes	Yes	Yes	Yes	Yes
Seniority and Security Dummy	Yes	.	.	.	.	.
Sign of ρ	+	+	+	+	+	+
LR test of ρ=0	6.549**	5.848**	18.21***	0.073	9.723***	6.758***
P-value	0.0105	0.0156	1.98E-05	0.787	0.00182	0.00933
N	1,529	369	711	200	513	1,016

Table 2.10 Bankruptcy Venue Choice and APR Adherence

This table presents the effect of different bankruptcy courts on the Absolute Priority Rule (APR) Adherence. The first four equations are for Delaware and the last four for New York. The dependent variable for regression (1) to (3) and (5) to (7) is the APR adherence index. The dependent variable of regression (4) and (8) is the APR violation dummy. Regression (1) and (5) include all firms. Regression (2) and (6) exclude those defaulted companies that do not have both secured and unsecured debts, since it is impossible to observe any APR violation from these companies. In regression (3) and (7) we conduct the regression on only the subsample of companies that violate APR. In other words, we only consider those companies with an APR violation dummy value of 1. Panel A shows coefficient estimates from an ordinary least square regression (and probit regressions for regression (4) and (8)). Panel B presents results from a treatment regression model with the binary endogenous bankruptcy court variable (and bi-probit regressions for regression (4) and (8)). Instrumental variables (IV) in the selection equation are the Delaware (New York) Incorporation and the distance from the company's headquarter to the Delaware (New York). We do not show the whole result from the selection regression of venue choices repeatedly since they are the same or similar to results in table 2.6, instead only reporting the coefficient estimates of two IVs. The estimated signs of the correlation coefficient ρ and Chi-square statistic and the associated p-value from a likelihood ratio test for the null H_0: $\rho = 0$ are also reported at the bottom of panel B. Variable definitions are provided in Table 2.3. Numbers in brackets are standard errors. *, **, *** correspond to statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: OLS (or Probit)

	Delaware				New York			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	APR adherence index				APR adherence index			
Sample	Full Sample	Exclude firms that cannot violate APR	Exclude firms that do not violate APR	APR violation dummy	Full Sample	Exclude firms that cannot violate APR	Exclude firms that do not violate APR	APR violation dummy
LogATS	-0.0596**	-0.0553	-0.063	0.269*	-0.0546**	-0.0455	-0.0576	0.249
	(0.03)	(0.04)	(0.05)	(0.16)	(0.03)	(0.04)	(0.06)	(0.16)
LogATM	-0.0613***	-0.0611*	-0.0569	0.327**	-0.0565**	-0.0515*	-0.0502	0.308**
	(0.02)	(0.03)	(0.04)	(0.13)	(0.02)	(0.03)	(0.05)	(0.13)
LogATL	-0.0620***	-0.0584**	-0.0555	0.307***	-0.0571***	-0.0487*	-0.0475	0.287**
	(0.02)	(0.03)	(0.04)	(0.11)	(0.02)	(0.03)	(0.04)	(0.11)
Log(*EMP*)	0.0298**	0.0281*	0.0427	-0.0774	0.0287**	0.0243	0.0383	-0.0685
	(0.01)	(0.02)	(0.03)	(0.07)	(0.01)	(0.02)	(0.03)	(0.07)
Tangibility	-0.0227	-0.0105	-0.0339	-0.211	-0.0314	-0.0245	-0.0292	-0.178
	(0.06)	(0.08)	(0.13)	(0.32)	(0.06)	(0.08)	(0.13)	(0.32)
Profit margin	-0.0134	-0.0146	0.0344	0.104	-0.0123	-0.0168	0.0265	0.113
	(0.03)	(0.04)	(0.06)	(0.16)	(0.03)	(0.04)	(0.06)	(0.16)
Financial leverage	-0.0457*	-0.0423	0.0211	0.474***	-0.0411	-0.0327	0.0292	0.451***
	(0.03)	(0.03)	(0.04)	(0.16)	(0.03)	(0.03)	(0.04)	(0.16)
ROA	-0.0075	0.0062	0.0807	0.0828	-0.0078	0.00772	0.0759	0.0782
	(0.04)	(0.06)	(0.08)	(0.23)	(0.04)	(0.06)	(0.08)	(0.23)
Industry distress dummy	0.0227	0.0139	0.08	0.207	0.0261	0.0204	0.078	0.19
	(0.03)	(0.04)	(0.06)	(0.17)	(0.03)	(0.04)	(0.06)	(0.17)
Log of days in bankruptcy	0.00607	-0.00478	-0.0116	0.0357	0.0098	-0.0001	-0.00549	0.0212
	(0.02)	(0.02)	(0.04)	(0.11)	(0.02)	(0.02)	(0.04)	(0.11)
Bank creditor dummy	0.0698	0.343***	0.351***	-0.684**	0.0715	0.342***	0.352***	-0.681**
	(0.04)	(0.08)	(0.08)	(0.29)	(0.04)	(0.08)	(0.08)	(0.29)
Prepackaged dummy	0.0113	-0.0238	-0.067	0.0586	0.0195	-0.0107	-0.054	0.0245
	(0.04)	(0.05)	(0.08)	(0.23)	(0.04)	(0.05)	(0.08)	(0.23)
Delaware court dummy	**0.0075**	**0.0269**	**0.0202**	**-0.0511**				
	(0.02)	**(0.03)**	**(0.05)**	**(0.15)**				
New York court dummy					**-0.0666***	**-0.0934****	**-0.0764**	**0.23**
					(0.04)	**(0.05)**	**(0.07)**	**(0.19)**
Constant	1.176***	0.927***	0.707**	-2.006*	1.134***	0.862***	0.640*	-1.846*
	(0.17)	(0.23)	(0.34)	(1.10)	(0.17)	(0.23)	(0.34)	(1.10)
N	469	340	165	340	469	340	165	340
R-squared	0.08	0.18	0.22	0.09	0.09	0.19	0.23	0.09

Panel B: Self Selection Models with Endogenous Explanatory Variable

	Delaware				New York			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	APR adherence index				APR adherence index			
Sample	Full Sample	Exclude firms that cannot violate APR	Exclude firms that do not violate APR	APR violation dummy	Full Sample	Exclude firms that cannot violate APR	Exclude firms that do not violate APR	APR violation dummy
LogATS	-0.0479	-0.0551	-0.122**	0.229	-0.054**	-0.042	-0.0607	0.2
	(0.03)	(0.04)	(0.06)	(0.15)	(0.03)	(0.04)	(0.05)	(0.18)
LogATM	-0.0489**	-0.0569*	-0.106**	0.264*	-0.056***	-0.0482	-0.0537	0.26
	(0.02)	(0.03)	(0.05)	(0.14)	(0.02)	(0.03)	(0.04)	(0.16)
LogATL	-0.055***	-0.062**	-0.104**	0.271**	-0.057***	-0.045*	-0.0516	0.236
	(0.02)	(0.03)	(0.04)	(0.11)	(0.02)	(0.03)	(0.04)	(0.15)
Log(*EMP*)	0.0353**	0.0396**	0.0751**	-0.0991	0.028**	0.0228	0.0405*	-0.0483
	(0.02)	(0.02)	(0.03)	(0.06)	(0.01)	(0.02)	(0.02)	(0.07)
Tangibility	-0.0829	-0.0485	-0.0086	-0.0667	-0.0311	-0.0283	-0.0307	-0.1270
	(0.07)	(0.09)	(0.15)	(0.31)	(0.06)	(0.08)	(0.12)	(0.33)
Profit margin	0.0106	0.0193	0.0789	-0.0191	-0.0123	-0.0183	0.0303	0.132
	(0.03)	(0.05)	(0.06)	(0.17)	(0.03)	(0.04)	(0.06)	(0.14)
Financial leverage	-0.0545*	-0.0486	-0.0212	0.410***	-0.041*	-0.0294	0.0254	0.396**
	(0.03)	(0.04)	(0.06)	(0.15)	(0.02)	(0.03)	(0.04)	(0.18)
ROA	-0.0270	-0.0052	0.0616	0.1080	-0.0078	0.0082	0.0771	0.0635
	(0.05)	(0.07)	(0.09)	(0.21)	(0.04)	(0.06)	(0.08)	(0.22)
Industry distress dummy	0.0186	0.0199	0.102	0.175	0.0262	0.0195	0.0789	0.197
	(0.03)	(0.04)	(0.06)	(0.14)	(0.03)	(0.04)	(0.06)	(0.17)
Log of days in bankruptcy	0.0060	-0.0055	-0.0093	0.0123	0.0098	0.0007	-0.0062	0.0094
	(0.02)	(0.02)	(0.03)	(0.09)	(0.02)	(0.02)	(0.03)	(0.11)
Bank creditor dummy	0.0801*	0.333***	0.359***	-0.532*	0.071*	0.341***	0.352***	-0.660**
	(0.05)	(0.09)	(0.09)	(0.30)	(0.04)	(0.08)	(0.08)	(0.29)
Prepackaged dummy	0.0576	0.0220	0.0512	-0.1120	0.0193	-0.0085	-0.0551	-0.0050
	(0.04)	(0.05)	(0.08)	(0.20)	(0.04)	(0.05)	(0.07)	(0.23)
Delaware court dummy	**-0.353*** **	**-0.352*** **	**-0.497*** **	**1.079** **				
	(0.04)	**(0.06)**	**(0.13)**	**(0.47)**				
New York court dummy					**-0.0632**	**-0.1260**	**-0.0449**	**0.6760**
					(0.05)	**(0.08)**	**(0.10)**	**(0.77)**
Constant	1.244***	1.074***	1.168***	-2.013**	1.13***	0.842***	0.664**	-1.545
	(0.19)	(0.26)	(0.38)	(0.97)	(0.17)	(0.22)	(0.33)	(1.23)
IV:								
Delaware Incorporation	0.296**	0.388***	0.213	0.490***				
	(0.12)	(0.14)	(0.18)	(0.17)				
Log dist to Delaware	-0.0366	-0.0468	0.0368	-0.122**				
	(0.04)	(0.05)	(0.06)	(0.05)				
New York Incorporation					1.251***	0.823	1.970**	0.876
					(0.46)	(0.60)	(0.85)	(0.64)
Log dist to New York					-0.233***	-0.186***	-0.236***	-0.182***
					(0.04)	(0.05)	(0.07)	(0.05)
Sign of ρ	+	+	+	-	-	+	-	-
LR test of ρ=0	11.39***	7.356***	4.813**	2.241	0.00474	0.171	0.0966	0.933
P-value	0.000738	0.00669	0.0282	0.155	0.945	0.679	0.756	0.5632
N	469	340	165	340	469	340	165	340

Table 2.11 Bankruptcy Venue Choice and Time in Bankruptcy

This table presents the effect of different bankruptcy courts on the bankruptcy duration. The first three regressions are for Delaware and the last one for New York. The dependent variable is the natural logarithm of the number of days in bankruptcy. Regression (1) includes all firms. Regression (2) has prepackaged firms only. Regression (3) includes non-prepackaged firms only. Panel A shows coefficient estimates from an ordinary least square regression. Panel B presents results from a treatment regression model with the binary endogenous bankruptcy court variable. Instrumental variables (IV) in the selection equation are the Delaware (New York) Incorporation and the distance from the company's headquarter to the Delaware (New York). We do not show the whole result from the selection regression of venue choices repeatedly since they are the same or similar to results in table 2.6 instead only reporting the coefficient estimates of two IVs. The estimated signs of the correlation coefficient ρ and Chi-square statistic and the associated p-value from a likelihood ratio test for the null H_0: $\rho = 0$ are also reported at the bottom of panel B. Variable definitions are provided in Table 2.3. Numbers in brackets are standard errors. *, **, *** correspond to statistical significance at the 10%, 5% and 1% level, respectively.

	Panel A: OLS				Panel B: Self Selection			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Sample	Full Sample	Prepackaged	Non-prepackaged	Full Sample	Full Sample	Prepackaged	Non-prepackaged	Full Sample
	Delaware			New York	Delaware			New York
LogATS	0.048	-0.073	0.104	0.030	0.033	-0.130	0.092	0.010
	(0.06)	(0.12)	(0.07)	(0.06)	(0.07)	(0.13)	(0.07)	(0.07)
LogATM	0.053	-0.045	0.0981*	0.036	0.037	-0.114	0.0894*	0.016
	(0.05)	(0.10)	(0.05)	(0.05)	(0.05)	(0.11)	(0.05)	(0.05)
LogATL	0.065	0.007	0.091**	0.050	0.057	-0.035	0.0859**	0.028
	(0.04)	(0.09)	(0.04)	(0.04)	(0.04)	(0.10)	(0.04)	(0.05)
Log(*EMP*)	0.0502*	-0.067	0.095***	0.0512*	0.043	-0.046	0.0852***	0.0552**
	(0.03)	(0.06)	(0.03)	(0.03)	(0.03)	(0.06)	(0.03)	(0.03)
Tangibility	0.148	0.229	0.219	0.187	0.225*	0.341	0.271*	0.217
	(0.13)	(0.26)	(0.16)	(0.13)	(0.13)	(0.27)	(0.16)	(0.13)
Profit margin	0.018	-0.090	-0.012	0.008	-0.013	0.049	-0.038	0.005
	(0.06)	(0.26)	(0.06)	(0.06)	(0.05)	(0.29)	(0.06)	(0.06)
Financial Leverage	-0.030	-0.140*	0.071	-0.040	-0.019	-0.074	0.056	-0.059
	(0.06)	(0.08)	(0.07)	(0.06)	(0.06)	(0.09)	(0.07)	(0.06)
ROA	0.219**	-0.110	0.340***	0.222**	0.243***	-0.084	0.337***	0.220**
	(0.09)	(0.21)	(0.11)	(0.09)	(0.09)	(0.23)	(0.10)	(0.10)
Industry distress	0.102	-0.014	0.096	0.084	0.107	-0.008	0.102	0.093
	(0.07)	(0.17)	(0.08)	(0.07)	(0.07)	(0.16)	(0.08)	(0.07)
Bank creditor	-0.220***	-0.169	-0.203**	-0.225***	-0.233**	-0.174	-0.224**	-0.227***
	(0.08)	(0.17)	(0.10)	(0.08)	(0.09)	(0.18)	(0.11)	(0.08)
Prepackaged dummy	-1.339***			-1.361***	-1.398***			-1.368***
	(0.07)			(0.07)	(0.08)			(0.07)
Delaware court dummy	**-0.125***	**-0.149**	**-0.131***		**0.335****	**0.509****	**0.233**	
	(0.06)	**(0.13)**	**(0.08)**		**(0.16)**	**(0.24)**	**(0.22)**	
New York court dummy				**0.180****				**0.459****
				(0.08)				**(0.19)**
Constant	5.943***	5.308***	5.535***	5.978***	5.858***	5.194***	5.491***	6.060***
	(0.32)	(0.58)	(0.36)	(0.32)	(0.36)	(0.66)	(0.36)	(0.35)
IV:								
Delaware Incorporation					0.535***	0.534***	0.512**	
					(0.13)	(0.16)	(0.24)	
Log distance to Delaware					-0.135***	-0.164***	-0.093	
					(0.05)	(0.06)	(0.09)	
New York Incorporation								1.152**
								(0.48)
Log distance to New York								-0.241***
								(0.04)
Sign of ρ					-	-	-	-
LR test of ρ=0					5.178**	2.64	2.25	3.071*
P-value					0.0229	0.1042	0.134	0.0797
N	469	123	346	469	469	123	346	469
R-squared	0.514	0.107	0.189	0.515				

Table 2.12 APR Adherence Based on Nominal Recovery Rates

This table presents the results for APR adherence based on the nominal recovery rates. Panel A shows the nominal and discounted recovery values of the debt instruments of two defaulted companies in our sample. We conduct a second set of regressions to assess the court effect on APR compliance in parallel to those performed in table 2.10, but now using nominal recovery rates instead to construct the APR violation dummy and APR adherence index. To conserve space, we only report essential part of the results of the treatment regressions in Panel B. Numbers in brackets are standard errors. *, **, *** correspond to statistical significance at the 10%, 5% and 1% level, respectively.

Panel A: Special Sample of Recovery Rates

Firm ID	Instrument ID	Security	Nominal Recovery Rate	Discounted Recovery Rate
1	1	Secured	1000	967.42
1	2	Secured	1000	972.27
1	3	Unsecured	500	429.54
2	1	Secured	1022.04	872.55
2	2	Secured	1096.26	896.75
2	3	Secured	1096.26	889.16
2	4	Secured	1096.26	927.95
2	5	Unsecured	147.05	102.24
2	6	Unsecured	66.14	46.62

Panel B: Self Selection Models for APR Adherence (Based on Nominal Recovery Rate)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Delaware				New York			
	APR adherence index				APR adherence index			
Sample	Full Sample	Exclude firms that cannot violate APR	Exclude firms that do not violate APR	APR violation dummy	Full Sample	Exclude firms that cannot violate APR	Exclude firms that do not violate APR	APR violation dummy
Delaware court dummy	**-0.340*** (0.04)**	**-0.367*** (0.05)**	**-0.592*** (0.13)**	**1.385*** (0.37)**				
New York court dummy					**-0.0619 (0.04)**	**-0.101* (0.05)**	**-0.0599 (0.13)**	**0.775 (0.54)**
IV:								
Sign of ρ	+	+	+	-	-	+	-	-
LR test of ρ=0	15.29***	15.54***	8.210***	2.241	0.0136	0.0707	0.0344	0.933
P-value	0.00	0.00	0.00	0.13	0.91	0.79	0.85	0.43
N	469	345	121	340	469	345	121	340

Chapter 3

Comparison of the Efficiency of Chapter 11 and Distressed Exchanges

3.1 Introduction

In deciding whether to file for bankruptcy, there is always a strong incentive for a distress firm to choose to resolve the issue privately with their creditors in order to avoid the costly formal bankruptcy process (Franks and Torous, 1994). The choice between resolving the financial distress through a court-supervised bankruptcy reorganization as opposed to a distressed exchange (i.e., private or out-of-court restructuring) can be a complicated issue for the management of the distressed firm. It is not only affected by the agency problem and information asymmetry between shareholders and creditors, but also influenced by the coordination problem and heterogenous belief among creditors. This paper investigates the efficiency of these two different approaches commonly used in resolving financial distress. Although Franks and Torous (1994) examine some outcomes of two resolutions, they say nothing about the long run viability of emerged firms. This study provides a most comprehensive investigation of the cost, performance and efficiency of the two alternatives as well as firms' long run viability after emergence.

As an alternative to bankruptcy proceedings to resolve financial distress, distress exchange has fallen out of vogue for several years until the recent financial crisis. Our data (see Table 3.1) suggest that it has become more popular in the new millennium. Altman and Karlin (2009) are the first to notice the reemergence of distressed exchanges in corporate restructuring, due to the increasing creditor friendliness of Chapter 11 bankruptcy.

INSERT TABLE 3.1 ABOUT HERE

In this study, we explore and compare aspects of the two alternative resolution mechanisms for financial distress. Despite the gaining of popularity in the recent years, we find that distressed exchange is in general not as efficient as Chapter 11. Meanwhile, we do not find that the Chapter 11 procedure results in significantly lower recovery values for the creditors, larger reduction of asset values, or more violations of the absolute priority rule (APR) among creditors. In addition, by analyzing post-emergence operating performance from the two resolution mechanisms, we conclude that both formal bankruptcy and distressed exchange can lead to some degree of operating improvement, as measured by the firms' earnings before interest, tax, depreciation and amortization (EBITDA). Nevertheless, given the lower interest expenses as a result of the reduction in their financial leverage, firms that emerge from Chapter 11 are able to attain a better operating performance in terms of their operating cash flow. The only shortcoming of Chapter 11 is that it tends to take more time to complete the resolution process. After all, this could be a necessary cost of negotiations for a better debt structure for the emerged firm.

Unlike previous studies, we make sure our comparison of the efficiency of the two mechanisms is not biased by any self-selection effect. It is typically the choice of the distressed firm (i.e., the debtor) in deciding how the financial distressed situation is to be resolved.[37] Since it is a choice process, we cannot ignore the possibility that the observed differences in the outcomes from the two resolution mechanisms are simply due to the

[37] It is worthwhile to note that there are cases of forced bankruptcy filings under the U.S. bankruptcy provisions. In some rare cases, creditors initiate the filing process.

intrinsic differences in the characteristics of the firms in the two groups, instead of the result of the direct influence of the two mechanisms. For example, the fact that creditors tend to recover more in distressed exchanges (see, e.g., Franks and Torous, 1994) might be attributed to a self-selection effect, whereby firms with intrinsically higher creditors' recovery rates choose to resolve their situations by distressed exchanges. The process of distressed exchange itself might in fact have no contribution to the higher recovery rates being observed. In order to accommodate the self-selection effect, we conduct our empirical analysis by using the treatment regression with Inverse Mills Ratio (IMR) that is adopted by Bris et al. (2006), and Mooradian and Ryan (2005). This ensures the robustness of our conclusions. Although Franks and Torous (1994) conclude that firms undertaking distressed exchange end up with higher recovery rates, lower cash repayment to creditors, and smaller reduction in asset values, we show that these effects are not significant anymore after controlling for the self-selection effect.

In addition to our findings regarding the relative efficiency between formal bankruptcy process and private distressed exchange, we make other several significant findings when we analyze the impediments of private restructuring in the process of controlling for the self-selection effect. We find that the main firm-specific determinants in choosing distress resolution mechanism are debt concentration, asset tangibility, the proportion of bank debt, and the amount of long-term debt. The role of first two factors, debt concentration and asset tangibility, is in line with the finding of Gilson et al. (1990) that firms with more intangible assets and owing to fewer creditors, are more likely to successfully and privately reorganize their debt. Firms with more creditors have a more

severe problem of coordination among creditors, while intangible assets are more vulnerable in bankruptcy court. Bank creditors are reluctant to resolve distress out of court because of their secured creditor stance with higher liquidation preference. In addition, we also find that firms with more long-term debt are prone to choose distressed exchange, supporting Jensen's (1989) hypothesis that firms with more debt have more incentive to resolve financial distress privately. Higher long term leverage is an indicator of financial distress, instead of economic distress (Lemmon et al., 2009); therefore, creditors prefer to restructure the firm rather than to liquidate it.

The rest of the paper is organized through seven sections. Following this introductory section, we review the current literature in Section 2 and highlight the contributions of the present study. In Section 3, we describe and provide an overview of our data. We also explain in detail how we construct our variables of interest. In Section 4, we examine the determinants in choosing between the two distress resolution mechanisms considered in this study. We then investigate the effect of this choice on different measures of the cost of distress and in-process efficiency of two resolutions in Section 5. In Section 6, we compare the operating performance of firms emerged from the two kinds of mechanism. Finally, we conclude with a few remarks in Section 7.

3.2 Literature Review

Given the approach we take in addressing our research questions, this study is related to various strands of research on distressed exchange. Researchers on distressed exchanges are mainly focusing on the impediments of private restructuring. For example, due to the asymmetric information, banks must pay information rent to shareholders in

order to make the exchange offers credible to bondholders (Banerji and Bose, 2004). Therefore, firms providing junior claims in exchange of private debts (bank debts), and senior claims for public debts, always have positive stock returns, because it is signaling of promising future value (Brown et al. 1993). Coordination problem (or "holdout" problem) is another concern in distressed exchanges. Distressed firms with multiple or more lenders suffer more from the coordination problems among creditors (Brunner and Krahnen, 2008; Gilson et al., 1990). Danis (2012) find that creditors insured by credit default swaps (CDS) have more severe holdout problem. Our empirical analysis in the present study also confirms that debt concentration can mitigate the cooperation problem.

The role of bank creditors in the holdout problem is controversy in the extent literature. Banks, as private debt providers, should be easy to negotiate and reach agreements of settlement because of their informational advantage compared to public bondholders (Gilson et al., 1990; Jostarndt and Sautner, 2010). On the other side, banks, usually as secured creditors, are reluctant to resolve distress out of court because of their preference of liquidation. James (1995) points out that, unless public debt is restructured, banks never participate in private restructurings. Helwege (1999) also finds that bank lenders prolong the financial distress. Given the significant role played by bank creditors as documented in the literature, the amount of bank debts is commonly used as a proxy of the complexity of the distressed case (Chatterjee et al., 1996; Asquith et al., 1994). Based on a large and updated sample of distressed firms, we confirm that the larger amount of bank debt is indeed an obstacle of distressed exchanges, thus conforming to the argument of the secured creditor stance of bank creditors.

Besides the above impediments of private restructuring, there are other factors contributing to the choice of distress resolution mechanisms. We need to address these factors in order to control for any self-selection bias in our investigation of the relative efficiency between private restructuring and Chapter 11. For example, intangible assets are easily eroded in the bankruptcy process, thus firms with more intangible assets have more incentive to workout privately (Gilson et al., 1990). High financial leverage, as an indicator of financial distress instead of economic distress, increases the probability of private restructuring (Lemmon et al., 2009; Jensen, 1989; Chatterjee et al., 1996). Firms with better operating performance are more likely to adopt distressed exchange, instead of filing for formal bankruptcy (Chatterjee et al., 1996), because Chapter 11 bankruptcy always has a higher probability of liquidation. By addressing these factors, we provide a thorough examination of the determinants of the choice of distress resolution mechanisms in the present study.

With respect to the (in)efficiency of Chapter 11 reorganizations, the conclusions differ depending on the time periods and the specific aspects of Chapter 11 researchers are examining. In the early stage of the adoption of the current bankruptcy code, especially before 2000, Chapter 11 is generally regarded as a debtor-friendly process. For example, legal scholars like Eisenberg and LoPucki (1999) argue that, not only the bankruptcy system is debtor-friendly, all bankruptcy courts are engaging in a 'race to the bottom' of catering to large distressed debtors. The direct result of debtor-friendliness is the going concern bias. Weiss and Wruck (1998) find that the going concern bias leads to significant value devastation in the bankruptcy case of Eastern Airlines. Hotchkiss (1995)

concludes that there are economically significant biases in Chapter 11 towards the continuation of unviable firms. Other researchers (Davydenko and Franks, 2008; Franks and Loranth, 2005), by examining international data of bankruptcy cases, conclude that the going concern bias can lower the recovery rates of creditor. Although some scholars are still arguing for the inefficiency of Chapter 11 after 2000, they are based on an entirely opposite perspective. For example, Ayotte and Morrison (2009) think that, in the new era, creditors, especially secured creditors, are in the control position in bankruptcy courts. They prefer to liquidate the distressed firms leading to the fire sale of the firms' assets. Adler et al. (2012) find that creditor control leads to the delay of bankruptcy filing, which prolongs the process of asset deterioration. Bharath et al. (2009) also notice the rise of creditor control through debtor-in-possession finance and key employee retention plan. Pulvino (1999) points out that Chapter 11 is not effective in asset protection in airline industry from the fire sale discount.

On the other hand, a large number of scholars are defending the efficiency of Chapter 11. Regarding the going concern bias, Lemmon et al. (2009) argue that Chapter 11 is effective in distinguish the financially distressed firms from the economically distressed ones. Denis and Rodgers (2007), and Gilson (1997) find that the size and financial leverage of distressed firms are effectively reduced in Chapter 11 and thus the chance of the recurrence of distress becomes lower. Kalay et al. (2007) and other researchers (e.g., Aivazian and Zhou, 2012; Heron et al. 2009; Alderson and Betker, 1999) demonstrate that Chapter 11 effectively improves the operating performance of emerged firms. Besides gaining operating efficiency through emergence from Chapter 11, Hotchkiss and

Mooradian (1998) show that being acquired by other firms in Chapter 11 is also an efficient way of getting out of bankruptcy.

Finally, there is a substantial literature on the performance and efficiency of the formal court supervised bankruptcy reorganization (i.e., Chapter 11) versus private debt restructurings as alternative means to resolve financial distress. Franks and Torous (1994) show that distressed exchanges lead to higher creditor recovery rates, more APR violations towards shareholders, and less cash repayments to creditors. Betker (1997) finds that private restructurings bear less direct cost than Chapter 11 does. By examining the changes in the asset values of defaulting firms, Davydenko et al. (2012) estimate that the average cost of default for bankruptcy (30.5%) is higher than that of bond renegotiations (14.7%). The findings of the above studies imply that private restructuring is superior to formal bankruptcy in terms of its lower costs. However, Gilson (1997) points out that Chapter 11 can reduce the financial leverage of the distressed firms much more than distressed exchanges do, thus ensuring a lower chance of the recurrence of financial distress. Moreover, White (1994) argues that the existence of out-of-court restructuring makes the inefficient equilibrium[38] more likely to occur, which implies that distress is likely to be more costly for firms with private workout option opened.

Building on this voluminous literature, we examine the relative efficiency of these two kinds of distress resolution mechanisms from a different perspective. In the present study, we focus on the post-emergence operating performances of firms emerged from Chapter 11 and distressed exchanges. To the best of our knowledge, we are the first to address

[38] The inefficient firms are also selecting distressed exchanges (out-of-court restructuring) to resolve the financial distress to avoid liquidation.

the issue by comparing the post-emergence operating performance, which is able to measure the long run viability of emerged firms, although operating performance has been studied extensively in assessing the efficiency of Chapter 11 reorganizations[39]. The focus of the existing literature has been on the operating performance of the bankrupted firms alone or comparing them with their non-defaulted counterparts. We argue that we should be examining the operating performance of firms emerged from Chapter 11 reorganizations against that of firms from out-of-court debt restructuring, which in the U.S. is predominately in the form of distressed exchanges. If distressed exchange could allow distressed firms to arrive at even better operating performance, the efficiency and effectiveness of Chapter 11 are undermined, even though previous studies suggest firms' performances are enhanced after emerging from Chapter 11. Our study therefore contributes to the literature by gauging the efficiency of Chapter 11 against a benchmark that, from our knowledge, has not been systematically and comprehensively explored in prior empirical studies. Our study also provides a wide scope of criteria in comparing the cost of distress and in-process efficiency of Chapter 11 versus distressed exchanges as well as the determinants of the choice of distress resolutions. By doing so, we can depict a more holistic picture of the effectiveness of Chapter 11 in resolving corporate distress.

3.3 Sample Selection and Descriptive Statistics

We construct our sample of defaulted firms by merging the recovery rate data of the Standard & Poor's (S&P's) LossStats database with the company financial statement information from Compustat.

[39] To our best knowledge, there are only two studies working on the post emergence operating performance of private restructuring in order to investigate the role and activities of venture investors and investment banks (Hotchkiss and Mooradian, 1997; Mooradian and Ryan,2005).

The LossStats database represents one of the most comprehensive set of credit loss information on defaulted loans and bonds issued by large corporations. Public and private companies, both rated and non-rated, that have bank loans and/or bonds of more than $50 million are analyzed and included in the database. To be included in the database, a firm must have fully completed its restructuring and all recovery information must be available. We use the version of the LossStats database containing recovery rates of a total of 4,386 defaulted debt instruments issued by 963 individual firms from a variety of industries that defaulted from 1987 to 2012. It consists of comprehensive recovery information on bankruptcies, distressed exchanges, and other reorganization events. We exclude other reorganization events, e.g., cured within and out of grace period, arriving at a total of 938 firms that either filed for Chapter 11 (780 firms) or underwent distressed exchanges (158 firms).[40][41] For each firm, we compute the following variables of interest from the LossStats database: the overall recovery rate for all creditors, the recovery rates for secured and unsecured creditors, respectively, an index of APR adherence among creditors, and the distress duration. All of these variables are direct or indirect measures of cost of distress in previous literature (Franks and Torous 1994; Bris et al., 2006). Detailed definitions of all our variables of interest are provided in the Appendix 3.A.

[40] With the help of UCLA-LoPucki Bankruptcy Research Dataset and by manually collecting data from SEC filings, we identify that, out of all the firms filed for bankruptcy in the dataset, there is only one firm (Amalgamated Investment Corp) that filed for Chapter 7. We also exclude this firm from our sample.

[41] Out of the 780 Chapter 11 cases, there are a total of 247 prepackaged cases. In the main analysis of this study, we consider all the 780 Chapter 11 cases. We also redo all regressions and analysis based on the subsample excluding prepackaged cases. Our results are found to be robust.

We also construct other firm-level variables that can measure the cost of distress and operating performance of the defaulted firms from the financial statement information of Compustat. According to previous literature (Gilson, 1997; Bris et al., 2006), we consider changes in the firm's financial leverage, book asset value, sales, and operating performance, respectively, from the fiscal year-end immediately preceding the distress event to the fiscal year-end immediately following emergence from distress. After merging LossStats data with the company financial data from Compustat, we have around one third of firms lost due to the lack of overlapping between two datasets. Since not all of firms are able to emerge, we have 334 firms successfully emerged from two distress resolutions with financial information available. [42]

Table 3.2 summarizes the descriptive statistics of our variables of interest. We winsorize all variables at 1% and 99%, except dummy variables and proportional variables, which are bounded from 0 to 1. The mean (median) of the overall recovery rates for the whole sample is 0.515 (0.514), which is very close to the average recovery rate of 0.511 found by Acharya et al. (2007). At least one quarter of secured creditors are fully recovered.[43] There is significant reduction in the total financial leverage. The mean and median of the change are -0.297 and -0.153, respectively. However, the mean (median) of the change in the long-term leverage is 0.004 (0.009), implying a slight increase in the long-term debt after emerged from the resolution process.

[42] Some firms are emerged as private firms or acquired by others; therefore, we are unable to trace their financial performance.

[43] The maximum recovery rate of our sample exceeds 100%. This is because our recovery rates are mostly computed based on the market values of the securities at emergence discounted back to the time of default, which may be higher than the outstanding principal amount. This approach is different from some other studies, e.g, Bris et al. (2006), in which recovery rates are obtained from bankruptcy court files and thus are on book-value basis.

INSERT TABLE 3.2 ABOUT HERE

The APR adherence index is a continuous variable that measures how close the distribution of the recovery values between secured and unsecured debts of a defaulted firm resembles a full compliance with APR. It equals to 1.0 if secured debtholders fully recover before any distribution to unsecured ones, while it takes on a value of 0.0 if the distribution is exactly proportional to the principal default amount of each debt instrument. Though uncommon, a number of the default cases in our sample have negative index values. It represents the situation where the unsecured creditors recover proportionally more than the secured ones. We have more than 50% of the cases with full APR compliance. The distress duration is measured from the default date of the first defaulted instrument to the date of final emergence from the distress event. Half of the defaulted firms in our overall sample need at least 561 (=exp(6.33)) days to resolve the distress. Not surprisingly, the changes in asset values in distress are negative for most of the defaulted firms, implying a positive indirect cost of distress. The book asset values of our sample of defaulted firms decreased by 19.4% on average, which is close to the value of 21.7% estimated by Davydenko et al. (2012) using market values. In using sales as our measure of operating performance, we scale it by the firm's asset value so as to make sure it is not affected by the change in firm size. Both the mean and median values of the changes in the scaled sales values of our overall sample are positive, suggesting that firms emerged from distress have on average at least some improvements in sales.

3.4 Pre-event firm characteristics and choice of resolution mechanism

We first examine the factors that contribute to the choice of distress resolution mechanisms. Following the existing literature (Kalay et al., 2007; Bris et al., 2006; Aivazian and Zhou, 2012; Mooradian and Ryan, 2005), we measure the pre-event (i.e., pre-default) characteristics of the defaulting firm at its fiscal year-end immediately preceding the distress event. The variables considered are listed in the Appendix 3.A together with their detailed definitions. Summary statistics are reported in Table 3.3. In Table 3.3, we also present the results of the tests on the differences in the mean and median values of the variables of our two subsamples of firms filing for Chapter 11 versus those undergoing distressed exchanges. In about 18% of the cases, firms default when their respective industries also experience a distressed situation. This proportion is essentially the same for both Chapter 11 cases and distressed exchanges. Comparing with Chapter 11 cases, distressed exchanges are more likely to occur in recessionary periods as measured by the aggregated default rate of speculative-grade bonds. In terms of asset value, bankrupted firms are, on average, of similar size as firms undergoing distressed exchanges. The former, however, has significantly more employees than the latter. The assets of firms filing for Chapter 11 are significantly more tangible. Distressed exchange firms are two (1.5) times more profitable in terms of the mean (median) of the return on assets (ROA). We construct a Herfindahl–Hirschman Index (HHI) to measure the debt concentration of the distressed firms. The greater the HHI value, the more concentrated the firm's debts. Chapter 11 cases seem to have a lower debt concentration than that of out-of-court exchanges. The difference, however, is not statistically significant. In our

overall sample, distressed firms have on average 37% of their debts being bank debts, 46% being secured debts, and 63% being public debts (i.e., bonds). Court-supervised cases have more debts owing to banks, less outstanding amount of public bonds, and are more likely to have debts that are secured. The average total financial leverage of Chapter 11 cases is higher than that of distressed exchanges. The median value of the former is, however, lower. Distressed exchange firms have higher long-term financial leverage, which is almost 1.5 times than that of Chapter 11 cases. The impression from this preliminary comparison is that firms undergoing distressed exchanges are more viable (higher ROA and long term leverage), less complicated (less employee) and tangible, and with less bank and secured debts.

INSERT TABLE 3.3 ABOUT HERE

Table 3.4 reports the results of our investigations of the determinants of the choice of distress resolution mechanism. The dependent variable is dummy, 1 indicating distressed exchanges and 0 denoting the Chapter 11 cases. The first three specifications have total leverage controlled, while the last three have long-term leverage controlled. Consistent with the above preliminary univariate results, distressed exchanges are more concentrated in recession periods based on the contemporaneous default rates of speculative-grade bonds. Given the large number of bankruptcy cases to be processed by almost every bankruptcy court, the duration in Chapter 11 is expected to be much longer during recessions. With the expectation of longer duration and thus potentially lower recovery rate, debtholders are prone to accept out-of-court negotiation during recessions even at less advantageous terms. Industry condition seems to have no impact on the choice

between Chapter 11 and distressed exchange, although Acharya et al. (2007) find negative industry distress effect on the recovery rates of distressed firms.

INSERT TABLE 3.4 ABOUT HERE

It seems that the larger the firm size (measured by total asset value), the more likely it goes for a distressed exchange rather than filing for Chapter 11. The effect is, however, marginal in terms of its statistical significance. Firm size serves as a proxy for information asymmetry. There are typically less uncertainty in the characteristics and values of the assets of bigger firms. Given the lower uncertainty, claim holders are more likely to arrive at a consensus in how the debt structure should be reorganized, thus increasing the possibility of an out-of-court resolution.[44] With the possible involvement of unions and the potential pension claims, a large number of employees make the case more complex, thus preventing the distressed firm from resolving the problems privately. Since our number of employees is scaled by the total asset value, it measures the labor intensity of the distressed firm rather than its size. A labor-intensive firm is more likely to file formal bankruptcy.

We document a significant effect for asset tangibility. The more tangible the assets, the more likely the firm files for Chapter 11. This is consistent with the argument of Gilson et al. (1990) that intangible assets are more vulnerable in bankruptcy court. Thus, the more intangible its assets, the less likely a firm chooses to resolve the case in court. We expect more profitable firms to choose distressed exchanges as opposed to filing for

[44] We also try the use of sales as a proxy for firm size in the probit regression. The statistical significance is even weaker. The results of this alternative regression analysis are not presented in Table3. 4. They are, however, available from the author upon request.

Chapter 11. If a firm is only financially distressed, instead of economically distressed, shareholders and managers are still confident about the firm's future. They are therefore more likely to choose to resolve the distress situation via private negotiations and debt exchanges, where typically they have more control than in formal court-supervised bankruptcy. However, in our probit regressions, we do not find any statistically significant effect for profitability (as measured by ROA) in explaining the choice of resolution mechanism.

Consistent with the effect of the holdout problem, our regression results suggest that higher debt concentration leads to a higher chance to choose distressed exchange. Our findings are therefore in line with the argument of Gilson et al. (1990) that owing debt to fewer lenders can increase the probability of successful private workout. Similar to our findings in the above univariate analysis, the degree of total financial leverage seems to have no influence on the choice of resolution mechanism; whereas long-term financial leverage is very significant in explaining the choice decision. We observe that highly long-term leveraged firms are more likely to workout privately, which is also the expectation of Jensen (1989) and Lemmon et al. (2009). Higher long term financial leverage is an indicator of financial distress and economic viability.

What do our regression results tell us about the effect of debt composition on the choice between the two resolution mechanisms? We find that the existence of bank claimholders is a significant impediment of private restructuring. In regression (1) and (4), the coefficients for bank debt proportion are significantly negative, which implies that bank creditors reduce the probability of their debtors to choose to restructure out of

court. This finding is contrary to the conclusions of Gilson et al. (1990), and Jostarndt and Sautner (2010), who argue that bank creditors are easier to negotiate than bondholders due to the less information asymmetry. We do not think this discrepancy could simply be attributed to the different time periods and countries covered by the sample data in these previous studies and the present one.[45] Our findings are more consistent with those of Helwege (1999) and Asquith et al. (1994), who find that the existence of bank loan makes the debt structure more complex and thereby more difficult to be renegotiated. Note that bank lenders are typically secured and senior creditors. Together with the recently observed trend of senior and secured creditor exerting more control in bankruptcy court as documented in the recent literature (e.g., Ayotte and Morrison, 2009; Adler et al., 2012; Bharath et al., 2009), it is not very surprising that bank lenders prefer to resolve distress in bankruptcy court. The results of regressions (2) and (5) confirm the above argument that the bank creditor effect in fact captures the effect exerted by secured creditors. The larger the proportion of secured debt, the lesser the chance of resolving out-of-court. Finally, we test the influence exerted by public bond holders with regressions (3) and (6). Consistent with the argument of Helwege (1999), public bond holders, instead of resulting in a strong holdout problem, facilitate private restructuring. James (1995) finds that banks never make concessions unless the public

[45] Our data is from 1987 to 2012, while Gilson et al. (1990) using data from 1978 to 1987. Jostarndt and Sautner (2010) analyze distressed firms in Germany, while we focus on U.S. firms.

bonds are also restructured. All of these evidence leads to the conclusion that bank lenders have more severe holdout problems than bondholders in the U.S. [46]

To sum up, we have conducted a comprehensive investigation of the determinants of distress resolution choice. Our findings confirm a number of conclusions previously drawn in the literature, e.g., firms with less tangibility and owing to fewer creditors are more likely to resolve distress situations out of court. We also contribute to the discussion of the role played by bank creditors in financial distress by demonstrating that bank lenders have very similar stance as secured creditors in determining the distress resolution mechanisms.[47]

3.5 Analysis of Resolution Outcomes and In-process Efficiency

In order to gauge the efficiency of the distress resolution mechanisms, we examine in this section the influence of the choice of Chapter 11 vs. distressed exchange on a number of measures of resolution outcomes and in-process efficiency. As we demonstrate in the previous section, the choice between resolving distress situation privately or in bankruptcy court is far from a random process. Both firm-specific and market-wide characteristics influence the debtors in choosing the way to resolve the distress condition.

[46] James (1995) provides an overview of the general legal regulations governing banks in holding common stocks. According to the U.S. Banking Act of 1933, commercial banks generally are not allowed to hold common stocks in nonfinancial corporations. However, there is an exception to this regulation when banks are required to exchange their loans for common stocks in the workout process. This is based on banks' authority to take debt-previously-contracted (DPC) property. The length of the time period over which banks can hold the common stocks is, however, restricted. Before 1980, it is limited to 5 years. It is subsequently extended to 10 years after 1980. Due to this restriction, banks have no strong incentive to takeover nonfinancial firms. Hence, they do not want to play actively and take control of firms like venture investors (Hotchkiss and Mooradian, 1997). Given the secured positions they typically have, banks are likely to deem that bankruptcy courts could guarantee a higher possibility of a similar strong recovery.

[47] Although bank creditors (or secured creditors) are not able to proactively choose the distress resolution mechanism, they are able to deny any private workout plan, thereby forcing debtors to file for Chapter 11 bankruptcy petition.

Thus, when we analyze the outcomes of the resolution, the choice of resolution mechanism should be treated as an endogenous effect. If we treat it as an exogenous factor (as in a number of previous studies), we will not be able to tell whether the influence on the outcomes is simply the result of the self-selection effect or not. For example, the relatively higher creditors' recovery rates in distressed exchanges found by Franks and Torous (1994) might as well be attributed to the self-selection effect, whereby firms with intrinsically higher recovery rates choose to resolve their problem via distressed exchanges as opposed to filing for bankruptcy. The process of distressed exchange itself may indeed have no contribution to the observed higher recovery rates.

In the subsequent analysis of the influence on resolution outcomes, we control for the self-selection effect by applying the two-stage treatment regression. The probit regressions conducted above (results reported in Table 3.4) serve as our first-stage regressions.

$$DE_i = X_{1,i} \cdot \hat{\beta}_1 + \varepsilon_i \qquad (3.1)$$

where DE is the dummy variable, indicating whether the case is distressed exchange (=1) or formal Chapter 11 bankruptcy (=0). X_1 is the determinants of the choice of distress resolution mechanism, while $\widehat{\beta}_1$ is the corresponding estimated coefficients; and ε is the error term. We conduct this first-stage regression based on the specification of Regression (4) as reported in Table 3.4.[48] The predicted probability of choosing

[48] We also calculate the IMR from other specifications (i.e., Regressions (1)-(3), (5), and (6)). The second-stage regression results are found to be robust to these alternative specifications of the first-stage regression.

distressed exchange as opposed to Chapter 11 is therefore $\widehat{DE}_i = X_{1,i} \cdot \hat{\beta}_1$. We then calculate the inverse Mills ratio (IMR) λ as:

$$\lambda_i = \phi(\widehat{DE}_i)/\Phi(\widehat{DE}_i) \quad \text{if } DE_i = 1$$

$$\lambda_i = -\phi(\widehat{DE}_i)/\Phi(-\widehat{DE}_i) \quad \text{if } DE_i = 0$$

where ϕ is the normal density function and Φ is the cumulative normal distribution function.

In the second-stage regression, the IMR is taken as an independent variable to accommodate the self-selection effect.

$$DV_i = X_{2,i} \cdot \alpha_1 + \lambda_i \cdot \alpha_2 + DE_i \cdot \alpha_3 + \xi_i \qquad (3.2)$$

where DV is the measure of outcomes and efficiency. X_2 is the control variables, while ξ is the error term in the second stage. Based on a simple t-test of the coefficient α_2, we can therefore examine the significance of the self-selection effect. The coefficient α_3 measures the exogenous effect of the choice of resolution mechanism on the dependent variable after controlling for any self-selection effect. This kind of treatment regression approach is commonly used in the literature to control for self-selection effect (e.g., Bris et al., 2006; and Mooradian and Ryan, 2005).

In the following, we examine the efficiency of the two resolution mechanisms by finding out how the choice between Chapter 11 and distressed exchange affects various outcomes of the case. We consider the effect on the recovery rates of the firm's creditors, the financial leverage of the distressed firm, the degree of APR compliance, the duration in distress, and the changes in asset values and sales. Recovery rates, the degree of APR

compliance and the duration in distress are very common measures of outcomes. The change in financial leverage tells whether the mechanism is effective in reducing the financial burdens for troubled firms.

3.5.1 Recovery Rate

We construct the overall recovery rate, the recovery rate of only secured debt, and the recovery rate of only unsecured debt for each defaulted firm in our sample.[49] The LossStats database records the *ultimate recovery value* of each defaulted instrument. [50] They are measured in *nominal values* at different points in time at or after emergence. In the main analysis of this empirical study, in order to account for the time value of money, we focus on the *discounted value* of ultimate recovery, which is also the common practice in the literature (e.g., Acharya et al., 2007; Liu et al., 2012; Zhang, 2009, Khieu et al., 2012). Discounted recovery rate, expressed as dollar amount recovered per $1,000 of notional principal default amount of the debt instrument, is obtained by discounting the ultimate recovery values back to the time of default by using the instrument's pre-petition interest rate. Over all recovery rates is the weighted average of recovery of all

[49] For those firms, which only have secured (unsecured) debt, the recovery rates of secured (unsecured) debt equal to their overall recovery rates.

[50] The ultimate recovery value is the eventual repayment a pre-petition creditor would have received had he/she has held onto his/her claim from the time of default through the emergence date of the restructuring event. Ultimate recovery values of the defaulted debts are calculated in the LossStats database by one of three methods: (i) *emergence pricing* - trading price of the defaulted instrument at the point of emergence from default; (ii) *settlement pricing* - trading price at emergence of those instruments received in the workout process in exchange for the defaulted instrument; and/or (iii) *liquidity event pricing* - values of those instruments received in settlement at their respective liquidity events (e.g., suppose creditors receive newly issued bonds during the settlement process; liquidation event prices are the liquidation values of these bonds at their respective maturity dates). When possible, all three methods are considered in the calculation of the recovery value of each instrument. Then, based on additional information, the method expected to be most representative of the recovery experience of the prepetition creditors was used to arrive at the recovery value.

instruments within each firm with the claim amounts as weight. Similarly, I construct secured recovery rates and unsecured recovery rates.

Table 3.5 shows the descriptive statistics of recovery rates from the two distress resolution mechanisms. Based on the overall recovery rate, creditors on average recover 48% (68%) from Chapter 11 cases (distressed exchanges). We arrive at the same conclusion that creditors recover more from distressed exchanges than from Chapter 11 by comparing the median overall recovery rates between the two subsamples. The difference is statistically significant at the 1% level. Not surprisingly, the median recovery rate for secured creditors in Chapter 11 (distressed exchanges) is 89% (100%), which is much larger than the median of 18% (53%) for unsecured creditors in Chapter 11 (distressed exchanges). Based on the median recovery rates, the difference in the recovery rates between the two kinds of creditors is smaller in distress exchanges than in Chapter 11. It therefore suggests that the relative disadvantage of unsecured creditors (as compared with secured ones) is smaller in distressed exchanges. We also notice that almost three quarters of all secured creditors fully recover all the money they lent in distressed exchanges. To the extent that equity holders also tend to extract more interest in distressed exchanges than in Chapter 11 through APR violation (see, e.g., Franks and Torous, 1994), the above preliminary analysis on creditors' recovery rate therefore implies that distressed exchange is a superior approach to resolve financial distress than Chapter 11. Filing for Chapter 11 results in *both* debtors and creditors getting less out of the reorganization process than from distressed exchanges. This may be attributed to the higher (implicit and explicit) costs of Chapter 11.

INSERT TABLE 3.5 ABOUT HERE

Is the above finding robust in a multivariate setting and to the self-selection effect mentioned above? To answer this question, we regress the overall, secured creditors', and unsecured creditors' recovery rates against a number of explanatory variables commonly considered in previous studies (Acharya et al., 2007; Zhang, 2009, Khieu et al., 2012) together with the incidence of choosing distress exchange as opposed to filing for Chapter 11. The results are reported in Table 3.6. We present the results for both the ordinary least square (OLS) regression and the second stage of the treatment regression where we appropriately control for any self-selection effect.[51] Although the OLS results (Regression (1) in Table 3.6) indicate that the overall recovery rate tends to be higher for distressed exchanges than Chapter 11 and the effect is strongly statistically significant at the 1% level, it becomes only marginally significant when we control for the self-selection effect (Regression (2) in Table 3.6). In order to distinguish the effect on different kinds of creditors, we repeat the regression analysis for secured and unsecured creditors, separately. Consistent with the overall recovery rate results, the strong disadvantage for both kinds of creditors in Chapter 11 attenuates once we control for the self-selection effect. Distressed exchanges do not result in significantly higher recovery rate for secured creditors. Nevertheless, for unsecured ones, distressed exchanges help improve their recovery values even after excluding the intrinsic difference of the characteristics of the firms choosing the two types of distress resolution mechanisms. Therefore, it is quite likely that the fact that firms in distressed exchanges tend to have

[51] We conduct the first-stage regression based on the specification of Regression (4) as reported in Table 3.4.

higher overall creditors' recovery rates is mainly due to the higher recovery values for unsecured creditors. This is consistent with the previous observation based on the description statistics (Table 3.5) that, in comparing with their secured counterparts, unsecured creditors are relatively less disadvantage in distressed exchanges than in Chapter 11. Their higher recovery value is likely to be the premium they receive in exchange for not assuming a holdout position during distressed exchanges. Given the fact that there are typically more APR violations that benefit equity holders in distressed exchanges (Franks and Torous, 1994), it is not surprising that incentives also need to be provided to junior creditors to encourage them to participate in exchanges. Although secured creditors may not find distress exchanges to be beneficial in terms of their recovery values, they indirectly benefit from the saving of time and thus the potential re-investment opportunity to the extent that distressed exchanges tend to be a faster procedure (see subsequent analysis on the duration in distress).

INSERT TABLE 3.6 ABOUT HERE

As to the other determinants of recovery rate also documented in Table 3.6, not surprisingly, when the industry is also in distress condition, firms recover significantly less. This is in line with the results of Acharya et al. (2007), and James and Kizilaslan (2012). They attribute the industry distress effect to the fire sale discount. When the whole industry is distressed, the firm's assets become more illiquid. Even if the firm is not going to liquidate or sell any of its assets, the market values of assets in distressed industry will be lower due to the depressed demand of the assets and their lower expected returns. Again, not surprisingly, recovery rate is negatively related to aggregate

speculative-grade default rate. When the whole economy is in contraction, creditors of defaulted firms usually recover less. Unsecured creditors of firms with more tangible assets recover more in general. However, we do not find the same relation for secured creditors.

3.5.2 Reduction of Financial Leverage

Reduction of financial leverage is an important criterion of resolution efficiency. Denis and Rodgers (2007), and Gilson (1997) find that the financial leverage of distressed firms is effectively reduced in Chapter 11, thereby lessening the chance of recurrence of distress. Recall in the previous preliminary analysis we notice the different behavior between changes in total financial leverage and changes in long-term financial leverage. Here, we examine the effects of the choice of distress resolution mechanism on both measures of the change in leverage from pre-event fiscal year end to the first post-emergence year end.[52]

Table 3.7 shows the summary statistics of the changes in total and long-term financial leverage for firms underwent the two resolution mechanisms. More than 75% of the firms emerged from Chapter11 have some reductions in total leverage; while only about 25% of the firms have their total leverage reduced in distressed exchanges. In terms of long-term leverage, slightly less than 50% of the firms realize a decrease for both kinds of resolution mechanisms. We run t-tests (Wilcoxon sign rank tests) for the mean (median) changes in total leverage for the two subsamples of Chapter 11 and distressed exchange

[52] In the literature, some researchers (e.g., Gilson et al., 1990; Gilson, 1997; Acharya et al., 2007) define financial leverage as the ratio of long-term debt to total asset value, whereas others (e.g., Gilson et al., 1990; Franks and Torous, 1994; Mooradian and Ryan, 2005) define it as the ratio of total liability to total asset value.

firms, separately, to see if they are significantly different from zero. Firms that went through Chapter 11 have significant reduced their total leverage based on both their mean and median values. The mean of the changes in total leverage for distressed exchange firms is, however, not significantly different from zero. Their median value is even significantly greater than zero suggesting an increase in total leverage for firms underwent distressed exchanges. This result is consistent with the notion that distressed exchanges are not powerful enough to have creditors make concession to reduce financial burdens. We also repeat the same tests for the changes in long-term financial leverage, but do not find any significant impact exerted by both types of resolution mechanisms. Finally, we run t-tests (Wilcoxon rank-sum tests) for the difference in means (medians) between the two mechanisms. Consistent with the previous observation, the test results indicate that Chapter 11 is more effective in reducing the overall financial burdens for troubled firms than do distressed exchanges. Again, we cannot find any significant difference in the reduction of long-term financial leverage.

In Table 3.8, we present the regression analysis for changes in financial leverages in controlling for other covariates. Compared to Chapter 11, distressed exchanges are not effective in reducing neither the total nor the long-term financial leverage based on the OLS regressions (i.e., Regressions (2) and (5) in Table 3.8). After controlling for the self-selection effect, the treatment regressions (i.e., Regressions (3) and (6) in Table 3.8) indicate that Chapter 11 can reduce both the total and long-term leverage even more when compared to distressed exchanges. Judging from the significance of the IMR lambda coefficient, the self-selection effect is found to be stronger in terms of the

reduction in long-term leverage than total leverage. The negative sign of the IMR lambda coefficient implies that firms, which are prone to a larger reduction in long-term leverage, are more likely to choose distressed exchanges as opposed to filing for Chapter 11. Not surprisingly, the level of pre-event leverage has strong explanatory power on the reduction in leverage during the resolution process. The higher the pre-event leverages firms have, the more leverage reductions they realize.

INSERT TABLES 3.7 and 3.8 ABOUT HERE

To sum up, our evidence suggests that Chapter 11 is more effective in lowering the financial leverage of distressed firms. This could explain the common observation that firms emerged from distressed exchanges are more likely to be in distress again (Gilson et al., 1990). The potential reason could be asymmetric information. With asymmetric information in distressed exchanges, creditors are not willing to make any concession, except to exchange for some new and 'fair' debts; while in bankruptcy court, creditors have no incentive to insist on their claims if concessions are necessary for a faster process and it is more difficult for debtors to hide any material information, due to the disclosure requirement in bankruptcy court.

3.5.3 APR Compliance

Franks and Torous (1994) point out that the high APR violation in favor of equityholders in distress exchanges is an important indicator of the high cost in the formal court-supervised bankruptcy, because APR violation is a measure of creditor's willingness to pay for in order to avoid the cost of formal bankruptcy. We construct an APR adherence index for each defaulted firm from the recovery rates of secured and

unsecured creditors to measure the degree of APR compliance among creditors. The larger the index value, the more compliance to APR. An index value of 1 indicates the case of perfect APR compliance (see Appendix 3.A for details of constructing the index). In the left-hand side of Panel A of Table 3.9, we show the summary statistics of this APR adherence index for the two subsamples of Chapter 11 and distressed exchange cases. About half of the firms in formal bankruptcy have no APR violation, while more than 75% of the defaulted firms in distressed exchanges follow the APR perfectly. We also present the results from t-tests (Wilcoxon rank-sum tests) for the difference in the means (median values) between the two resolution mechanisms in Table 3.9 as well. The Wilcoxon rank-sum test result indicates that the degree of APR compliance is significantly higher for distressed exchanges than for Chapter 11 cases. Given that Franks and Torous(1994) document a higher APR violation in favor of equity holders in distressed exchange, it is surprising to find that distressed exchanges have less APR violations among creditors. Concession cannot be only from the unsecured creditors. Secured creditors also need to make some concessions to the extent that the unsecured creditors will not holdout. One possible explanation is that a lot of secured creditors are able to recover fully in distressed exchanges, even with some concessions. The fact we find earlier (see Table 3.5) that some creditors are able to recover more than 100% makes this argument possible and reasonable.

In Table 3.10, we present the results of OLS (Regression (1)) and treatment regression (Regression (2)) for the degree of APR compliance among creditors. The OLS result indicates that distressed exchanges tend to improve the APR adherence, but the effect is

not statistically significant whether we control for any self-selection effect or not. We originally expect a negative effect from distressed exchanges on APR compliance, due to the potential reason we discussed above the coefficient is insignificant and with opposite sign.

INSERT TABLES 3.9 and 3.10 ABOUT HERE

3.5.4 Duration in Distress

We measure the duration in distress from the earliest default date of any debt instrument issued by the defaulted firm to the date of its emergence from the distress event.[53] The longer the duration, the higher the opportunity costs and the more loss creditors incur. To our best knowledge, we are the first to compare the durations of the two resolution mechanisms. The right-hand side of Panel A in Table 3.9 shows the descriptive statistics of the duration in distress. On average, firms in formal bankruptcy take 600 days (=exp(6.389)) to emerge, while about 170 days (=exp(5.137)) in distressed exchanges. The difference is statistically significant at the 1% level. We can draw the same conclusion that formal bankruptcy takes a significantly longer time to be resolved when we compare the respective median values.

We present the results of the multivariate analysis of the duration in distress in Regressions (3) and (4) in Table 3.10. The OLS results suggest that distressed exchanges can significantly reduce the duration in comparing with formal bankruptcy. This advantage of distress exchanges is even larger in the treatment regression, albeit the self-selection effect is not found to be statistically significant. Compared with formal

[53] For a small subset of the firms of which the default dates of their debt instruments are not available from the LossStats database, we use instead the date of the last cash paid as a substitute.

bankruptcy, the procedure of distressed exchanges by itself can save time for troubled firms, which has nothing to do with the intrinsic difference of the firms selecting the two kinds of resolution mechanisms. The coefficient of the treatment regression suggests that Chapter 11 on average takes 5.2 times (=exp(1.65)) more time to have the case resolved.

Two other variables are also statistically significant in explaining the length of the time spent in resolving the case. First of all, firms with higher debt concentration spend less time in distress. It is sensible that higher debt concentration facilitate the process of renegotiation. Second, the higher the proportion of bank debt, the shorter the duration, no matter the distress is resolved privately or in bankruptcy court. Since there is less information asymmetry between bank creditors and debtors, it accordingly takes less time to reach an agreement.

3.5.5 Change in Asset Value

We calculate the proportional change in asset value for each defaulted firm during the respective distress period. We measure the changes from fiscal year-end immediately preceding the distress event to the fiscal year-end immediately following emergence from distress. According to Bris et al. (2006), we consider it as a measure of the indirect cost of distress. Panel B of Table 3.9 presents the summary statistics. Firms in formal bankruptcy exhibit a larger range of changes in asset values, from -94% to 237%, which indicates that bankruptcy protection can either sharply improve the value of the firm or destroy almost all its value. On average, formal bankruptcy costs about 20% of the pre-event asset value. In contrast, distressed exchanges have a smaller range of changes in asset values, from -70% to 35%. Firms on average pay around 17% of their pre-event

asset values as a cost of distressed exchanges. The Wilcoxon test result suggests that the median of the changes in asset values of formal bankruptcy is significantly lower than that of distressed exchanges at the 5% significant level. Based on the median values, distressed exchanges can save close to 11% of the pre-event asset value in comparing with the costs of Chapter 11. Nevertheless, this benefit of distress exchanges becomes insignificant when we also consider the effects of other potential determinants of the costs of distress. Regressions (5) and (6) in Table 3.10 show the multivariate analysis of the changes in asset values. Both the OLS and treatment regressions indicate that distressed exchange is not significantly better than Chapter 11 in reducing the loss of asset values whether we control for any self-selection effect or not. Other explanatory variables are more significant in explaining the changes in asset values. For example, the industry distress dummy is significant at 1% level, indicating that firms in distressed industries are bearing a higher cost in terms of the loss in pre-event asset value. It can be attributed to the effect from fire sale. When the whole industry is distressed, the values of the assets pertaining to the industry are lower than those in the normal condition. During such industry-wide distressed situation, any potential buyers of such assets are also more likely to encounter liquidity problem. This translates into the worst case scenario for the defaulting firms of the industry. Finally, it is worthwhile to note that our regression results (Regressions (5) and (6) in Table 3.10) also suggest that the costs of distress tend to be smaller for firms with more tangible assets. Not surprisingly, intangible assets are more vulnerable to distress.

3.5.6 Change in Sales

A main source of the indirect cost of distress is the loss of suppliers and customers, thus resulting in a decrease in sales and market share. We therefore consider the change in sales as a measure of this kind of the cost of distress. Sales values of the defaulting firms are first scaled by their respectively total book asset values. We then calculate the change in this scaled sales value from the pre-event fiscal year-end immediately preceding the distress event to the fiscal year-end immediately following emergence from distress.

Summary statistics of the changes in sales is reported in Panel B of Table 3.9. T-tests (Wilcoxon tests) for the mean (median) changes in sales suggest that Chapter 11 significantly improve firms' sales after emergence. The improvement from distressed exchanges is, however, insignificant. Meanwhile, the difference between two resolution mechanisms is found to be significant at 5% (1%) level in terms of the difference in means (medians). These preliminary univariate tests indicate that distressed exchanges are not effective in improving the sales of troubled firms.

The last two regressions (Regressions (7) and (8)) in Table 3.10 show the multivariate analysis results of the changes in sales. The OLS regression results indicate that the negative influence of distress exchanges on sales is not statistically significant. However, a (weakly) significant self-selection effect is documented when we conduct the treatment regression. The positive coefficient of the IMR lambda indicates that firms choosing distressed exchanges are intrinsically more prone to have an improvement in sales. This intrinsic characteristic is however more than offset by the negative independent influence

exerted by the distress exchange process. After controlling for this self-selection effect, the results of Regression (8) confirm a statistically significant and negative impact of distress exchanges on sales. Firms undergoing distressed exchanges are less likely to realize an improvement in sales than firms filed for Chapter 11. One possible reason is that Chapter 11 can result in some forms of operating improvement along with the necessary debt renegotiation with creditors, while distressed exchange is a straightforward process of renegotiation and re-contracting of debts.

As to other explanatory variables, we find that firms in distressed industry are more likely to realize an improvement in sales; while firms with better pre-event operating performance are less likely to have any improvement. This is consistent with the notion that it is much easier to realize any sizable improvement of sales for firms that where in the most desperate situation. It is also worthwhile to note that bank creditors again demonstrate a positive impact on the case outcome in terms of sales.

3.6 Post-emergence Operating Performance

3.6.1 Operating Performance Measures

In investigating the efficiency of Chapter 11, the most popular way is to examine the post-emergence operating performance. For example, Denis and Rodgers (2007) and Alderson and Betker (1999), by examining the raw and industry-adjusted operating margins, prove that Chapter 11 is efficient. Based on industry-adjusted and normalized EBITDA, Kalay et al. (2007) find that Chapter 11 can improve the operating performance of troubled firms. Aivazian and Zhou (2012) conclude that firms emerged from Chapter 11 perform no worse than their non-defaulted counterparts based on the comparison of their operating incomes and operating cash flows. By comparing the raw and industry-

adjusted operating cash flows, Mooradian and Ryan (2005), and Hotchkiss and Mooradian (1997) investigate the role of venture investors and investment banks in financial distress reorganizations. Although these studies consider a variety of measures, all of them use EBITDA as a proxy for operating performance. Following these studies, we use operating incomes, as measured by EBITDA, to capture the operating performance of troubled firms. On the other hand, our previous analysis on financial leverage tells us that one of important comparative advantages of Chapter 11 is its ability to reduce the financial burden of distressed firms. It should therefore result in lower interest expenses while affecting the corresponding tax shield. In order to capture this effect, we also examine the influence on operating cash flow (CF), approximated by adding depreciation and amortization to the income before extraordinary items.[54] We expect that in the comparison of the performance, Chapter 11 is relatively better in terms of operating cash flow than in terms of EBITDA, due to the saving of interest expense. To the best of our knowledge, we are the first to compare the efficiency of Chapter 11 and distressed exchanges by comparing the post-emergence operating performance.

In constructing our variables of interest, we scale both the operating income and operating cash flow by the total book asset value so as to control for the size effect. Besides examining the raw values, we also consider the industry-adjusted version and the industry-adjusted and normalized version of these two variables as defined below.

[54] We do not directly employ the variable "Net cash flow from operating activities" (OANCF; Compustat item No. 308) because there are about 25% of the firms in our sample with missing values for this variable. Following Aivazian and Zhou (2012), we use the sum of income before extraordinary items, depreciation and amortization, as a substitute.

$$Indutry-adjusted\ \frac{EBITDA}{assets} = \left(\frac{EBITDA}{assets}\right)_{firm} - \left(\frac{EBITDA}{assets}\right)_{industry}$$

$$Industry-adjusted\ and\ normalized\ \frac{EBITDA}{assets} = \frac{\left[\left(\frac{EBITDA}{assets}\right)_{firm} - \left(\frac{EBITDA}{assets}\right)_{industry}\right]}{\sigma[\left(\frac{EBITDA}{assets}\right)_{industry}]}$$

$$Industry-adjusted\ \frac{CF}{assets} = \left(\frac{CF}{assets}\right)_{firm} - \left(\frac{CF}{assets}\right)_{industry}$$

$$Industry-adjusted\ and\ normalized\ \frac{CF}{assets} = \frac{\left[\left(\frac{CF}{assets}\right)_{firm} - \left(\frac{CF}{assets}\right)_{industry}\right]}{\sigma[\left(\frac{CF}{assets}\right)_{industry}]}$$

where $\left(\frac{Variable}{assets}\right)_{industry}$ is the median industry value of the variable and $\sigma\left[\left(\frac{Variable}{assets}\right)_{industry}\right]$ is the standard deviation of the variable of firms in the same industry. Following Kalay et al. (2007), we calculate the median industry value by first finding the median values of all firms in each fiscal year in Compustat with the same four-digit SIC code as our defaulted firms, provided that there are no less than five firms in the industry. If there are less than five firms in an industry, we try to define the industry as all firms with the same three-digit SIC code. If it still leaves us with less than five firms, we go for the two-digit SIC code. Following Kalay et al. (2007) and Acharya et al. (2007), we exclude the defaulted firm from the calculation of median industry value.

3.6.2 Operating Performance

We report the medians of operating incomes (Panel A) and operating cash flows (Panel B) in Table 3.11 for our two subsamples of defaulted firms. Following Kalay et al. (2007), we define Year -1 as the fiscal year end immediately preceding the distress event (i.e., filing for bankruptcy or distressed exchange); whereas Year +1 is the fiscal year end immediately following the emergence from the distressed event (i.e., emerging from Chapter 11 or distressed exchange). We present the annual operating performance from five years preceding the event to five years after the event. We run Wilcoxon sign-rank test for all medians to check whether they are different from zero and also Wilcoxon two-sample test to examine the significance of the differences between medians of firms choosing the two kinds of resolution mechanisms.

INSERT TABLE 3.11 ABOUT HERE

According to the operating incomes without any adjustment, firms in both Chapter 11 and distressed exchanges have significantly positive operating incomes in all years. Not surprisingly, post-emergence performance is relatively better than the pre-event one for both types of distressed firms. We also notice that when entering the distress event, firms undergoing distressed exchanges tend to have better performance than those in Chapter 11, albeit the difference is not statistically significant. On the other hand, firms filed for Chapter 11 deliver a better performance than those underwent distressed exchanges in the year immediately following their emergence. The difference is statistically significant at the 5% level. Nevertheless, the differences are not significant anymore in the subsequent years.

After adjusting with the industry median performance, the operating performance of distressed firms is not positive any more, particularly before the distress events. Even after the emergence, the first year performance of firms from both Chapter 11 and distress exchanges is still significantly lower than the industry median level. Before the distress event, firms choosing Chapter 11 still tend to perform worse than their counterparts in distressed exchanges. The difference is, however, not statistically significant. After two years from emergence, firms from both kinds of resolution mechanisms are able to catch up with their respective industry-level performance and deliver positive industry-adjusted EBITDAs. Normalizing the industry-adjusted operating incomes does not alter our conclusions drawn above. Based on the industry-adjusted and normalized operating income, firms emerged from distress cannot beat the industry-level performance in the short run, but they become no worse than the industry-level performance in the long run. Again, we cannot find any statistically significant difference between the performances of firms undergoing Chapter 11 vs. those undergoing distress exchanges.

The operating cash flow results (Panel B of Table 3.11) are somewhat different from those of operating incomes. First of all, based on the unadjusted values, although firms tend to generate positive operating cash flows two or three years before the distress events, the cash flows become significantly negative in the year immediately preceding the event. There is no salient difference between two resolution mechanisms before the distress event. In the first few years after emerging from distress, firms filed for Chapter 11 perform much better than those that have undergone distressed exchanges and the

difference is statistically significant. After adjusting with industry-level medians, there is no clear evidence showing that firms entering distressed exchanges have higher cash flows. In the first few years after emerging from distress, although firms emerged from both Chapter 11 and distress exchanges have below industry-level cash flows, we find that firms from distress exchanges perform much worse than those from Chapter 11 relative to their respective industry-level medians. This effect is found to be statistically significant at the 1% level. In the long run, both kinds of firms catch up with the industry-level performance and we cannot find any statistical significant difference between the two subsamples. Finally, the results from normalizing the industry-adjusted cash flows further reinforce our conclusions drawn above. Based on the industry-adjusted and normalized operating cash flows, we notice that firms entering Chapter 11 tend to have worse performance than those entering distressed exchanges, although the difference is not statistically significant. After emerging from distress, we still observe that Chapter 11 firms perform better in the short run when compared with distress exchange firms; whereas, in the long run, both kinds of firms deliver cash flows that match their respective industry-level performance.

To sum up, firms entering Chapter 11 perform worse than those entering distress exchanges, although the difference is not statistically significant. After emerging from distress events, firms from Chapter 11 tend to perform significantly better in the first two to three years. This finding is robust to normalization and adjustment with industry-level performance. After five years from emergence, both Chapter 11 and distressed exchange

firms are able to catch up their industry median levels without any significant difference between the two kinds of firms.

In order to distinguish the difference between the two groups of firms and the difference between their operating performance before and after the distress events, I run a simple difference-in-difference (DID) regression with all the performance measures from pre-event and post emergence. Table 3.12 presents the results from DID regressions. We cannot find any statistically significant effect in terms of EBITDA. In terms of operating cash flows, consistent with our observations above regarding Table 3.11, the normalized industry-adjusted operating performance of distressed exchange firms is (weakly) significantly higher than that of Chapter 11 firms prior to the distress event. Most importantly, there is a robust and strongly significant effect indicating that distress exchange firms perform much worse than Chapter 11 firms post emergence. This confirms our ex ante expectation that Chapter 11 is more effective in enhancing operating cash flow.

INSERT TABLE 3.12 ABOUT HERE

3.6.3 Improvement of Operating Performance

One of the concerns for the above analysis is that the post emergence performance is not paired with the respective pre-event performance. In Table 3.12, we are comparing the distributions of operating performance before and after the events, instead of comparing the improvements. In order to address this concern, we compute the improvement in each variable of interest for each firm from pre-event to post emergence. The post-emergence improvement is calculated by subtracting the operating performance

in Year -1 from the operating performance in each year after emergence. Panel A in Table 3.13 shows the improvements in operating income. Without any exception, the Wilcoxon sign-rank tests suggest that the improvements in operating incomes of firms emerged from Chapter 11 are significantly different from zero for each year subsequent to the event. The improvements for distressed exchange firms are, however, not very salient in certain years. If we simply compare the magnitude of improvements, we find firms from Chapter 11 tend to have larger improvements than do those from distressed exchanges. E.g., in the first year after emerging from distress, performance of firms undergone Chapter 11 has been improved by 0.021, while performance of those undergone distressed exchanges has been improved by 0.006, in terms of EBITDA/assets. Nevertheless, except for the Year -1 to 1 improvement of unadjusted EBITDA, the differences in the improvements of operating incomes between the two groups of firms are not statistically significant regardless of whether we adjust with the industry median or normalization or not.

INSERT TABLE 3.13 ABOUT HERE

Panel B of Table 3.13 shows the improvements in operating cash flow. Both groups of firms have significant improvements in operating cash flows after emergence. Similar to the improvements in operating incomes, Chapter 11 cases tend to have bigger improvements in operating cash flows than distressed exchange firms. This is particularly the case during the first two to three years after emerging from distress. Firms from Chapter 11 usually perform better and the difference is statistically significant. Although the improvements for firms from Chapter 11 are still larger than those from distressed

exchanges in the long run (i.e., fourth or fifth year post emergence), the difference between the two groups is not found to be statistically significant.

We also conduct OLS and treatment regressions to identify the effect of resolution mechanisms on the improvements of operating performance. We run pooled regression for each of the post emergence performance measure as dependent variables considering the improvements in all post-emergence years. The results are reported in Table 3.14. Panel A shows the simple OLS regressions with distressed exchange as the dummy variable. All of the coefficients for the dummy variable are negative indicating that the improvements in operating performance are larger for Chapter 11 firms than distressed exchange firms. This effect is found to be statistically significant based on the improvements in operation cash flows. In Panel B, we present the results from treatment regression by incorporating the IMR lambda. With the control of the self-selection effect, we find that the negative influence exerted by undergoing distressed exchange as opposed to Chapter 11 becomes more salient. Chapter 11 is more effective in improving firms' performance in terms of both operating income and cash flow. Firms entering distressed exchanges tend to have better performance than those filing for Chapter 11. Even both kinds of firms achieve very similar performance after emerging from distress, if there is not any superiority for firms from Chapter 11, Chapter 11 actually allows firms to realize a larger improvement in operating performance.

INSERT TABLE 3.14 ABOUT HERE

In summary, in terms of the improvement in operating incomes (EBITDA), firms from Chapter 11 firms perform no worse and, if anything, better than those in distressed

exchanges. In terms of the improvement in operating cash flow, firms from Chapter 11 definitely out-perform those going through distress exchanges. One of the important sources of this advantage of Chapter 11 is in its ability to lower the firms' financial leverage and thus reducing their interest expenses. Although we notice the difference between the two resolution mechanisms in their effects on emerging firms' operating performance, both Chapter 11 and distressed exchanges are able to save viable firms from distress by improving their operating performance.

3.6.4 Robustness Check

Another way to address the selection bias is propensity score matching (PSM). The apparent differences between firms in Chapter 11 and distressed exchanges can arouse the concern of comparability of firms in two groups. To accommodate this concern, for each distressed exchange case, I match a Chapter 11 case based on each firm's propensity score to choose distressed exchange resolution derived from Table 3.4. The consequent group of selected Chapter 11 firms is very similar to those choosing distressed exchanges in terms of their firm characteristics.

Table 3.15 shows the comparison of operating performance based on the propensity score matched sample. Similarly, Panel A presents the results measured by operating incomes, Panel B measured by operating cash flow. After adjusted by industry performance, firms in two groups have no significant difference before the start of distress event. In terms of operating income, Chapter 11 treatment does not lead to a better performance. In terms of operating cash flow, firms from distressed exchanges do

not match their counterparty's performance in the short run. As before all firms are able to catch up the industry level performance after five years from emergence.

INSERT TABLE 3.15 AND 3.16 ABOUT HERE

Table 3.16 shows the comparison of improvements in operating performance based on the propensity score matched sample. In terms of operating income improvement, the difference between two groups is not salient. Judged by operating cash flow, firms emerged from Chapter 11 always are able to realize some positive improvements immediately after emergence, whereas those from distressed exchanges do so usually two years later. The superiority of Chapter 11 treatment is more significant than the results from the sample without PSM. Therefore, the performance of firms from Chapter 11 is not worse, even better than that from distressed exchanges after their emergence.

3.7 Conclusion

Based on a very comprehensive dataset of distressed firms, we examine several aspects of distress outcomes and post-emergence efficiency from the two alternative resolution mechanisms: Chapter 11 and distressed exchanges. We observe that firms with more intangible assets, higher debt concentration and financial leverage, and less bank debt proportion are more likely to workout distress privately. We find that Chapter 11 is effective in reducing firm's financial leverage and boosting the sales after emergence. In terms of APR violations among creditors, and distress cost evaluated by proportional change of pre-event assets, the effect from different approaches are not very statistically different, with self-selection controlled. The only major drawback of Chapter 11 is that it takes more time to save firms from distress; meanwhile, Chapter 11 recovers

unsecured creditors relatively less. Thus, from the perspective of creditor's welfare, Chapter 11 is not very attractive.

By comparing the post emergence performance, we conclude that firms from Chapter 11 are performing no worse and, if anything, better than those from distressed exchanges. The most important reason is that Chapter 11 is effective in lightening the financial burdens and boosting some operating changes, like sales. Consequently, even when compared with distressed exchanges, Chapter 11 is still found to be an efficient and effective approach to resolve financial distress.

Appendix 3.A

Variable	Definition
Overall Recovery	defined as weighted average of selected discounted recovery rate of all instruments within each firm, where the weight is the claim amount of each instrument.
Secured Recovery	defined as weighted average of selected discounted recovery rate of all secured instruments within each firm, where the weight is the claim amount of each instrument.
Unsecured Recovery	defined as weighted average of selected discounted recovery rate of all unsecured instruments within each firm, where the weight is the claim amount of each instrument.
Change in Leverage	defined as (the post-emergence total leverage at fiscal year-end immediately following emergence from distress - the pre-event total leverage at the fiscal year-end immediately preceding the distress event).
Change in Long-term Leverage	defined as (the post-emergence long-term leverage at fiscal year-end immediately following emergence from distress - the pre-event long-term leverage at the fiscal year-end immediately preceding the distress event).
APR Adherence	It equals to 1.0 if secured debtholders fully recover before any distribution to unsecured ones, while it takes on a value of 0.0 if the distribution is exactly proportional to the principal default amount of each debt instrument. Lying between these two situations are cases where, although secured debtholders recover proportionally more than unsecured ones, the distribution does not fully adhere to APR. These cases are assigned values between 0.0 and 1.0 based on the extent of adherence as determined by interpolation between the case of proportional distribution and the case of full APR compliance respectively. Though uncommon, a number of the default cases in our sample have negative index values. It represents the situation where the unsecured creditors recover proportionally more than the secured ones.

Distress Duration	defined as the natural logarithm of the number of days in distress; days in distress is the time from the date of the first instrument default to the date of final emergence from the distress event.
Change in Book Assets	defined as (the post-emergence book assets at fiscal year-end immediately following emergence from distress - the pre-event book assets at the fiscal year-end immediately preceding the distress event).
Change in Sales	Sales is defined as sale/assets. change in sales is defined as (the post-emergence sales at fiscal year-end immediately following emergence from distress - the pre-event sales at the fiscal year-end immediately preceding the distress event).
Equity Proportion	We construct the proportion of equity payment for each instrument from LossStats Selected Recovery Detail table; then we take the weighted average of equity proportions within each firm to get the firm level equity payment composition,where the weight is the claim amount of each instrument.
Cash Proportion	We construct the proportion of cash payment for each instrument from LossStats Selected Recovery Detail table; then we take the weighted average of cash proportions within each firm to get the firm level cash payment composition,where the weight is the claim amount of each instrument.
Operating income	defined as EBITDA/total assets.
Operating Cash Flow	defined as (income before extraordinary items + depreciation and amortization)/total assets.
Industry Distress Dummy	defined as a dummy variable for each defaulted company, which equals to 1 (0) if the median stock return of the industry of the same three-digit SIC code is lower (higher) than -30% during the calendar year when the company under consideration defaults.
Speculative Default Rate	defined as the speculative grade default rate (%) from S&P Annual U.S. Corporate Default summary 2011
Size	defined as log(total assets)

Employee	defined as (number of employees /total assets)
Tangibility	defined as (ppent/at), which is net property, plant and equipment/total assets
ROA	defined as EBITDA/total assets.
Debt concentration	defined as the Herfindahl–Hirschman Index (HHI) of debt concentration within each firm. Debt concentration=1 if a firm only has one instrument; 0<debt concentration<1 if a firm has more than two instruments.
Bank debt proportion	defined as the(total bank debt/ total debt) for each firm.
Secured debt proportion	defined as the(total secured debt/ total debt) for each firm.
Public debt proportion	defined as the(total public bond/ total debt) for each firm.
Total leverage	defined as total liabilities/total assets
Long term leverage	defined as total long-term liabilities/total assets

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Table 3.1 Financial resolutions by Year

This table presents the number of distressed firms by distress resolutions and the year of distress event.

Year of filing or exchange	Bankruptcy	Distressed Exchange	Total
1987	4	2	6
1988	10	4	14
1989	17	7	24
1990	27	8	35
1991	49	7	56
1992	36	6	42
1993	34	4	38
1994	20	6	26
1995	27	0	27
1996	23	0	23
1997	18	0	18
1998	20	0	20
1999	52	3	55
2000	63	3	66
2001	87	8	95
2002	93	22	115
2003	55	15	70
2004	30	5	35
2005	15	2	17
2006	15	0	15
2007	5	1	6
2008	13	11	24
2009	40	35	75
2010	15	1	16
2011	10	5	15
2012	2	3	5
Total	780	158	938

Table 3.2 Summary Statistics of Variables of Interest

This table reports the descriptive statistics of all variables of interest. The definitions of variables are in appendix 3.A. Recovery rate (expressed as amount recovered per $1of principal default amount of the debt instrument) is obtained from S&P's LossStats database. It is calculated by discounting the ultimate recovery value back to the time of default. Change in leverage, change in long-term leverage, change in book assets and change in sales are all constructed from the financial variables from Compustat. The less number of observations is due to the lack of overlapping between two datasets and firms that have not emerged from Chapter 11. APR adherence index, distress duration, equity payment proportion and cash payment proportion all constructed from the information of S&P's LossStats database.

		N	Mean	SD	Min	P25	Median	P75	Max
Cost of distress & In-process Efficiency	Overall Recovery	939	0.515	0.291	0.009	0.274	0.514	0.746	1.072
	Secured Recovery	776	0.777	0.289	0.063	0.571	0.942	1	1.082
	Unsecured Recovery	775	0.328	0.309	0	0.058	0.225	0.546	1.063
	Change in Leverage	333	-0.297	0.665	-3.731	-0.484	-0.153	0.041	1.272
	Change in Long-term Leverage	332	0.004	0.435	-1.570	-0.188	0.009	0.248	1.291
	APR Adherence	939	0.910	0.217	-0.137	0.967	1	1	1
	Distress Duration	935	6.183	0.792	2.639	5.832	6.330	6.693	7.947
	Change in Book Assets	334	-0.194	0.409	-0.940	-0.442	-0.197	-0.038	2.365
	Change in Sales[3]	332	0.142	0.548	-1.573	-0.094	0.062	0.298	2.050

[3] Sales is first scaled by total assets.

Table 3.3 Pre-event firm characteristics by distress resolutions

This table reports the descriptive statistics of all independent variables. The definitions of variables are in appendix 3.A. We present overall sample statistics first, then the means and medians by difference distress resolutions. The last two columns are the p-values of t-test (Wilcoxon test) for the difference in means (medians) from two resolutions. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	Overall Sample						Bankruptcy		Distressed Exchange		P-value of t-Test (Wilcoxon Test) for Difference in Means (Medians)	
	N	Mean	SD	Min	Median	Max	Mean	Median	Mean	Median	Mean	Median
Industry distress dummy	880	0.178	0.383	0	0	1	0.180	0.000	0.170	0.000	0.774	0.772
Speculative default rate	934	6.279	3.150	1.010	6.230	11.190	6.142	6.230	6.965	7.140	**0.003*** **	**0.001*** **
Size	638	6.281	1.387	2.96	6.108	10.351	6.259	6.058	6.384	6.183	0.420	0.424
Employee	631	0.009	0.010	0	0.006	0.058	0.010	0.006	0.007	0.004	**0.008*** **	**0.011** **
Tangibility	653	0.375	0.247	0.003	0.336	0.926	0.383	0.344	0.334	0.270	**0.063***	**0.048** **
ROA	659	0.025	0.164	-0.810	0.058	0.389	0.020	0.055	0.044	0.079	0.286	**0.051***
Debt concentration	938	0.475	0.259	0.004	0.421	1.070	0.473	0.421	0.486	0.436	0.565	0.674
Bank debt proportion	938	0.371	0.324	0	0.320	1	0.381	0.329	0.323	0.259	**0.040** **	**0.080***
Secured debt proportion	938	0.462	0.356	0	0.439	1	0.473	0.454	0.406	0.371	**0.030** **	**0.036** **
Public debt proportion	938	0.626	0.324	0	0.673	1	0.616	0.665	0.676	0.741	**0.034** **	**0.066***
Total leverage	659	1.150	0.622	0.368	0.993	4.542	1.188	0.983	1.144	1.010	0.638	0.202
Long term leverage	658	0.476	0.457	0	0.431	2.555	0.467	0.386	0.675	0.635	**0.000*** **	**0.000*** **

Table 3.4 Determinants of the choice of distress resolutions

The table presents the probit regressions of the determinants of the choice of distress resolutions. The definitions of variables are in appendix 3.A. The first three specifications have total leverage controlled, while the last three have long-term leverage controlled. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Industry Distress Dummy	-0.195	-0.201	-0.197	-0.260	-0.272	-0.262
	(0.178)	(0.178)	(0.179)	(0.184)	(0.184)	(0.184)
Speculative Default Rate	0.051**	0.047**	0.051**	0.048**	0.045**	0.048**
	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)	(0.021)
Ln(Assets)	0.068	0.062	0.069	0.114**	0.108*	0.115**
	(0.059)	(0.059)	(0.059)	(0.057)	(0.057)	(0.057)
Employee	-18.210**	-20.216**	-18.192**	-15.197*	-16.173**	-15.188*
	(8.427)	(8.383)	(8.427)	(8.246)	(8.223)	(8.246)
Tangibility	-0.614**	-0.462*	-0.614**	-0.568**	-0.450*	-0.569**
	(0.270)	(0.262)	(0.270)	(0.274)	(0.267)	(0.274)
ROA	0.665	0.598	0.669	0.671	0.625	0.676
	(0.422)	(0.412)	(0.422)	(0.417)	(0.411)	(0.417)
Debt Concentration	0.562*	0.610**	0.563*	0.648**	0.686**	0.648**
	(0.292)	(0.292)	(0.292)	(0.292)	(0.292)	(0.292)
Bank Debt Proportion	-0.581***			-0.438**		
	(0.221)			(0.220)		
Secured Debt Proportion		-0.402**			-0.356*	
		(0.186)			(0.191)	
Public Debt Proportion			0.593***			0.451**
			(0.220)			(0.226)
Total Leverage	0.038	0.083	0.037			
	(0.120)	(0.118)	(0.120)			
Long Term Leverage				0.566***	0.600***	0.565***
				(0.138)	(0.136)	(0.138)
Constant	-1.447**	-1.524***	-2.037***	-2.097***	-2.110***	-2.546***
	(0.565)	(0.564)	(0.576)	(0.516)	(0.517)	(0.532)
Observations	577	577	577	577	577	577
Pseudo R2	0.0548	0.0500	0.0554	0.0866	0.0860	0.0871

Table 3.5 Summary statistics of Recovery rates by distress resolutions

This table presents descriptive statistics of recovery rates by two resolutions. We run t-test for difference of means and Wilcoxon rank-sum test for the differences of medians between two resolutions. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	Overall Recovery		Secured Recovery		Unsecured Recovery	
	Bankruptcy	DE	Bankruptcy	DE	Bankruptcy	DE
N	781	158	649	127	630	145
Mean	48%	68%***	75%	92%***	28%	54%***
SD	29%	24%	30%	19%	29%	30%
Min	0.9%	6%	6%	8%	0%	0%
p25	24%	52%	52%	98%	4%	28%
Median	46%	72%***	89%	100%***	18%	53%***
p75	70%	86%	100%	100%	45%	80%
Max	107%	107%	108%	108%	106%	106%

Table 3.6 Distress Resolutions and Recovery Rates

This table presents the effect of the choice of distress resolution mechanism on recovery rates. The definitions of variables are in appendix 3.A. Recovery rate (expressed as amount recovered per $1of principal default amount of the debt instrument) is obtained from S&P's LossStats database. It is calculated by discounting the ultimate recovery value back to the time of default. IMR lamda is calculated from the specification (4) in table 3.4. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Overall Recovery		Secured Recovery		Unsecured Recovery	
	OLS	Treatment	OLS	Treatment	OLS	Treatment
Industry Distress Dummy	-0.160***	-0.148***	-0.125***	-0.123***	-0.164***	-0.148***
	(0.028)	(0.031)	(0.034)	(0.037)	(0.034)	(0.038)
Speculative Default Rate	-0.013***	-0.016***	-0.004	-0.005	-0.014***	-0.018***
	(0.003)	(0.004)	(0.004)	(0.005)	(0.004)	(0.006)
Ln(Assets)	0.022**	0.015	0.008	0.007	0.039***	0.031**
	(0.009)	(0.012)	(0.011)	(0.014)	(0.012)	(0.015)
Employee	-0.742	-0.140	0.481	0.580	-0.821	-0.086
	(1.081)	(1.248)	(1.308)	(1.529)	(1.336)	(1.543)
Tangibility	0.085*	0.116**	-0.078	-0.074	0.095*	0.135**
	(0.043)	(0.054)	(0.051)	(0.064)	(0.054)	(0.068)
ROA	0.171***	0.141**	0.125	0.121	0.184**	0.139
	(0.064)	(0.071)	(0.079)	(0.086)	(0.079)	(0.092)
Debt Concentration	0.045	0.008	0.113*	0.108	0.041	-0.006
	(0.047)	(0.061)	(0.060)	(0.074)	(0.067)	(0.083)
Long term leverage	-0.057**	-0.090**	-0.071**	-0.076	-0.046	-0.088*
	(0.024)	(0.042)	(0.028)	(0.050)	(0.029)	(0.052)
Bank Debt Proportion	0.313***	0.333***	-0.136***	-0.133***	-0.126**	-0.095
	(0.034)	(0.040)	(0.041)	(0.048)	(0.054)	(0.063)
Distressed Exchange	**0.222*** **	**0.452***	**0.154*** **	**0.191**	**0.282*** **	**0.568***
	(0.029)	**(0.241)**	**(0.035)**	**(0.296)**	**(0.034)**	**(0.302)**
IMR_Lamda		**-0.130**		**-0.021**		**-0.160**
		(0.135)		**(0.165)**		**(0.168)**
Constant	0.320***	0.346***	0.827***	0.830***	0.174*	0.210*
	(0.081)	(0.085)	(0.098)	(0.102)	(0.105)	(0.111)
Observations	577	577	485	485	479	479
R-squared	0.291	0.292	0.112	0.112	0.234	0.235

Table 3.7 Summary Statistics of change in leverage by distress resolutions

This table presents the descriptive statistics of changes in financial leverage by two resolutions. Changes in total (long-term) leverage is defined as (the post-emergence total (long-term) leverage at fiscal year-end immediately following emergence from distress - the pre-event total (long-term) leverage at the fiscal year-end immediately preceding the distress event). We run t-test (Wilcoxon sign-rank test) for each mean (median) to check its difference from zero. We also run t-test for difference of means and Wilcoxon rank-sum test for the differences of medians between two resolutions. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	Change in total leverage			Change in long term Leverage		
	Bankruptcy	DE	P-value of t-Test (Wilcoxon Test) for Difference in Means (Medians)	Bankruptcy	DE	P-value of t-Test (Wilcoxon Test) for Difference in Means (Medians)
N	249	84		248	84	
Mean	-0.413***	0.045	0.000***	0.001	0.012	0.842
SD	0.696	0.405		0.454	0.374	
Min	-3.731	-1.844		-1.570	-1.304	
p25	-0.565	-0.071		-0.241	-0.096	
Median	-0.253***	0.041**	0.000***	0.003	0.020	0.958
p75	-0.017	0.166		0.285	0.179	
Max	1.272	1.272		1.291	1.170	

Table 3.8 Distress Resolutions and change in leverage

This table reports the effect of distress resolutions on changes in financial leverage. Changes in total (long-term) leverage is defined as (the post-emergence total (long-term) leverage at fiscal year-end immediately following emergence from distress - the pre-event total (long-term) leverage at the fiscal year-end immediately preceding the distress event). The definitions of other variables are in appendix 3.A. IMR lamda is calculated from the specification (4) in table 3.4. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Changes in total leverage			Changes in long term leverage		
	OLS	OLS	Treatment	OLS	OLS	Treatment
Industry Distress Dummy		0.031	0.055		-0.068	-0.001
		(0.056)	(0.059)		(0.053)	(0.059)
Speculative Default Rate		-0.003	-0.009		-0.005	-0.018**
		(0.007)	(0.008)		(0.006)	(0.008)
Ln(Assets)		-0.007	-0.019		-0.006	-0.040*
		(0.018)	(0.020)		(0.016)	(0.020)
Employee		1.639	2.828		2.899	5.801**
		(2.100)	(2.251)		(1.979)	(2.249)
Tangibility		-0.054	0.005		0.075	0.227**
		(0.079)	(0.089)		(0.075)	(0.094)
ROA		-0.215	-0.280*		0.022	-0.153
		(0.135)	(0.142)		(0.127)	(0.143)
Debt Concentration		-0.068	-0.128		0.001	-0.187*
		(0.093)	(0.102)		(0.088)	(0.112)
Bank Debt Proportion		0.028	0.076		-0.049	0.057
		(0.072)	(0.079)		(0.068)	(0.079)
Total leverage	-0.940***	-0.909***	-0.922***			
	(0.035)	(0.036)	(0.037)			
Long term leverage				-0.689***	-0.720***	-0.874***
				(0.044)	(0.047)	(0.075)
Distressed Exchange		**0.386*** **	**0.763*** **		**0.193*** **	**1.238*** **
		(0.046)	**(0.265)**		**(0.044)**	**(0.400)**
IMR_lamda			**-0.217**			**-0.580*** **
			(0.150)			**(0.221)**
Constant	0.787***	0.743***	0.787***	0.309***	0.303**	0.457***
	(0.045)	(0.166)	(0.168)	(0.027)	(0.138)	(0.149)
Observations	333	299	299	332	299	299
R-squared	0.689	0.749	0.751	0.424	0.470	0.483

Table 3.9 Summary statistics of costs by distress resolutions

This table presents the descriptive statistics of four different measures of in-process efficiency by two resolutions. Change in book assets and change in sales are constructed from the financial variables from Compustat. APR adherence index and distress duration constructed from the information of S&P's LossStats database. The definitions of variables are in appendix 3.A. Distress duration is the natural logarithm of the number of days in distress. Regarding the changes in assets and changes in sales, we run t-test (Wilcoxon sign-rank test) for each mean (median) to check its difference from zero. We also run t-test for difference of means and Wilcoxon rank-sum test for the differences of medians between two resolutions, for four variables. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A						
	APR adherence[3]			Distress duration		
	Bankruptcy	DE	P-value of t-Test (Wilcoxon Test) for Difference in Means (Medians)	Bankruptcy	DE	P-value of t-Test (Wilcoxon Test) for Difference in Means (Medians)
N	510	114		781	154	
Mean	0.858	0.891	0.221	6.389	5.137	0.000***
SD	0.245	0.292		0.588	0.865	
Min	-0.137	-0.137		3.332	2.639	
P25	0.802	1		6.057	4.663	
Median	0.997	1	0.000***	6.416	5.141	0.000***
P75	1	1		6.753	5.733	
Max	1	1		7.947	7.144	
Panel B						
	Changes in assets			Changes in sales		
	Bankruptcy	DE	P-value of t-Test (Wilcoxon Test) for Difference in Means (Medians)	Bankruptcy	DE	P-value of t-Test (Wilcoxon Test) for Difference in Means (Medians)
N	250	84		249	83	
Mean	-0.203***	-0.167***	0.491	0.177***	0.038	0.045**
SD	0.458	0.206		0.588	0.388	
Min	-0.940	-0.696		-1.573	-1.216	
P25	-0.492	-0.285		-0.093	-0.094	
Median	-0.240***	-0.134***	0.040**	0.115***	0.009	0.009***
P75	-0.022	-0.057		0.362	0.156	
Max	2.365	0.348		2.050	1.592	

Table 3.10 Distress resolutions and In-process Efficiency

This table presents the effect of the choice of resolution mechanism on four different measures of in-process efficiency. Change in book assets and change in sales are constructed from the financial variables from Compustat. APR adherence index and distress duration constructed from the information of S&P's LossStats database. The definitions of variables are in appendix 3.A. Sale is first scaled by total assets. With respect to the analysis of APR adherence, we exclude firms with only one instrument, from which we cannot observe APR violation. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	APR adherence[3]		Distress duration		Changes in assets		Changes in sales	
	OLS	Treatment	OLS	Treatment	OLS	Treatment	OLS	Treatment
Industry Distress Dummy	-0.005	-0.004	0.078	0.058	-0.248***	-0.202***	0.287***	0.215**
	(0.035)	(0.039)	(0.068)	(0.074)	(0.068)	(0.075)	(0.088)	(0.098)
Speculative Default Rate	0.009**	0.009	0.004	0.009	-0.004	-0.013	-0.008	0.006
	(0.004)	(0.006)	(0.008)	(0.011)	(0.008)	(0.010)	(0.010)	(0.013)
Ln(Assets)	-0.034***	-0.034**	0.010	0.021	-0.028	-0.051*	-0.011	0.025
	(0.013)	(0.016)	(0.023)	(0.028)	(0.020)	(0.026)	(0.026)	(0.034)
Employee	2.279	2.343	2.926	1.890	-1.426	0.545	-2.953	-6.057
	(1.408)	(1.678)	(2.611)	(3.016)	(2.524)	(2.893)	(3.274)	(3.751)
Tangibility	-0.158***	-0.155**	-0.056	-0.110	0.164*	0.268**	-0.111	-0.274*
	(0.055)	(0.070)	(0.105)	(0.130)	(0.096)	(0.121)	(0.124)	(0.157)
ROA	0.105	0.102	0.117	0.169	0.233	0.114	-0.780***	-0.594**
	(0.083)	(0.096)	(0.155)	(0.172)	(0.163)	(0.183)	(0.211)	(0.238)
Debt Concentration	-0.024	-0.028	-0.505***	-0.441***	-0.174	-0.302**	-0.067	0.132
	(0.081)	(0.094)	(0.114)	(0.147)	(0.112)	(0.145)	(0.145)	(0.187)
Long term leverage	-0.022	-0.025	-0.138**	-0.080	0.005	-0.099	-0.038	0.125
	(0.029)	(0.054)	(0.057)	(0.101)	(0.060)	(0.096)	(0.077)	(0.124)
Bank Debt Proportion	0.028	0.031	-0.264***	-0.298***	-0.040	0.032	0.341***	0.229*
	(0.057)	(0.066)	(0.082)	(0.096)	(0.087)	(0.101)	(0.113)	(0.131)
Distressed Exchange	**0.050**	**0.073**	**-1.252*** **	**-1.651*** **	**0.021**	**0.730**	**-0.099**	**-1.210***
	(0.035)	**(0.327)**	**(0.070)**	**(0.585)**	**(0.056)**	**(0.515)**	**(0.074)**	**(0.666)**
IMR_Lamda		**-0.013**		**0.225**		**-0.394**		**0.618***
		(0.182)		**(0.327)**		**(0.284)**		**(0.368)**
Constant	1.056***	1.058***	6.677***	6.632***	0.088	0.192	0.260	0.098
	(0.115)	(0.119)	(0.195)	(0.206)	(0.177)	(0.192)	(0.229)	(0.248)
Observations	393	393	574	574	299	299	298	298
R-squared	0.086	0.086	0.420	0.420	0.078	0.084	0.111	0.120

Table 3.11 Operating performance and distress resolutions

This table reports the median operating incomes and operating cash flow (CF) by distress resolutions. We have three measurses: EBITDA/assets (CF/assets), industry-adjusted EBITDA/assets (CF/assets), industry-adjusted and normalized EBITDA/assets (CF/assets).we calculate the median industry value by first finding the median of all firms in Compustat with the same four-digit SIC code, provided that there are no less than five firms in each industry. If there are less than five firms in a industry, we try to define the industry as all firms with the same three-digit SIC code, and finally with two-digit SIC code. We define year -1 as the fiscal year end immediately preceding the distress events; year +1 is the fiscal year end immediately following the emergence from the distress events. We run Wilcoxon sign-rank test for all medians to check whether they are different from zero and Wilcoxon two-sample test to examine the differences between medians in two resolutions as well. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A: Operating Income											
Year	N		EBITDA/assets			Industry-adjusted EBITDA/assets			Industry-adjusted and normalized EBITDA/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-5	204	63	0.108***	0.091***	0.572	0.005	-0.011	0.851	0.002	-0.001	0.637
-4	225	66	0.100***	0.099***	0.419	-0.001	-0.012	0.575	-0.004	-0.002	0.643
-3	235	74	0.101***	0.082***	0.456	-0.001	-0.012	0.531	-0.002	-0.005	0.514
-2	238	82	0.078***	0.084***	0.364	-0.013***	-0.009	0.567	-0.041***	-0.005	0.237
-1	230	79	0.063***	0.073***	0.8	-0.042***	-0.031***	0.778	-0.096***	-0.060***	0.912
1	254	87	0.090***	0.065***	0.020**	-0.017***	-0.030***	0.101	-0.032***	-0.018***	0.661
2	222	72	0.103***	0.093***	0.614	-0.006	-0.02	0.346	-0.005***	-0.008*	0.888
3	183	65	0.108***	0.111***	0.833	0.000	0.005	0.539	-0.001	0.004	0.882
4	160	42	0.104***	0.125***	0.487	0.001	0.004	0.796	0.001	0.003	0.965
5	138	33	0.104***	0.129***	0.325	-0.008	-0.004	0.897	-0.005	-0.002	0.808

Panel B: Operating cash flow											
Year	N		CF/assets			Industry-adjusted CF/assets			Industry-adjusted and normalized CF/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-5	202	63	0.050***	0.051***	0.996	-0.010**	-0.014	0.900	-0.024***	-0.003	0.738
-4	224	66	0.044***	0.048***	0.406	-0.022***	-0.021**	0.860	-0.072***	-0.034***	0.725
-3	232	74	0.035***	0.021*	0.372	-0.027***	-0.034***	0.726	-0.074***	-0.026***	0.687
-2	235	82	0.013	0.004	0.423	-0.038***	-0.048***	0.444	-0.101***	-0.062***	0.602
-1	228	78	-0.085***	-0.037***	0.229	-0.135***	-0.102***	0.260	-0.436***	-0.208***	0.089*
1	253	86	0.050***	-0.006*	0.000***	-0.015	-0.074***	0.000***	-0.014	-0.054***	0.012**
2	220	71	0.049***	0.017	0.019**	-0.016***	-0.052***	0.010***	-0.021***	-0.040***	0.272
3	182	65	0.059***	0.043**	0.232	-0.014**	-0.037***	0.089*	-0.004***	-0.021***	0.134
4	136	33	0.055***	0.058	0.504	-0.007*	-0.016*	0.246	-0.003**	-0.008	0.673
5	145	35	0.056***	0.082**	0.163	-0.010	0.005	0.487	-0.010	0.014	0.256

Table 3.12 Difference in difference analysis of operating performance

This table presents the difference in difference analysis of operating performance. We have three measurses: EBITDA/assets (CF/assets), industry-adjusted EBITDA/assets (CF/assets), industry-adjusted and normalized EBITDA/assets (CF/assets).we calculate the median industry value by first finding the median of all firms in Compustat with the same four-digit SIC code, provided that there are no less than five firms in each industry. If there are less than five firms in a industry, we try to define the industry as all firms with the same three-digit SIC code, and finally with two-digit SIC code. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	EBITDA/assets	Industry-adjusted EBITDA/assets	Industry-adjusted and normalized EBITDA/assets	CF/assets	Industry-adjusted CF/assets	Industry-adjusted and normalized CF/assets
Distressed Exchange	0.007	0.009	0.065	0.029	0.036	0.293*
	(0.010)	(0.011)	(0.059)	(0.031)	(0.031)	(0.158)
Post emergence	0.008	0.003	-0.034	0.110***	0.104***	0.338***
	(0.007)	(0.008)	(0.042)	(0.022)	(0.023)	(0.115)
(Post emergence)*(Distressed Exchange)	-0.019	-0.023	-0.116	-0.104**	-0.114**	-0.677***
	(0.015)	(0.016)	(0.087)	(0.046)	(0.046)	(0.234)
Constant	0.077***	-0.014***	-0.146***	-0.039***	-0.091***	-0.504***
	(0.005)	(0.005)	(0.029)	(0.015)	(0.015)	(0.078)
Observations	2,822	2,822	2,822	2,801	2,801	2,801
R-squared	0.001	0.001	0.002	0.009	0.008	0.004

Table 3.13 Improvements in operating performance and distress resolutions

This table reports the median post-emergence improvements in operating incomes and operating cash flow (CF) by distress resolutions. We have three measurses: changes in EBITDA/assets (CF/assets), changes in industry-adjusted EBITDA/assets (CF/assets), changes in industry-adjusted and normalized EBITDA/assets (CF/assets).we calculate the post-emergence improvements by subtracting the operating performance in year -1 from the operating performance in each year after emergence. We define year -1 as the fiscal year end immediately preceding the distress events; year +1 is the fiscal year end immediately following the emergence from the distress events. We run Wilcoxon sign-rank test for all medians to check whether they are different from zero and Wilcoxon two-sample test to examine the differences between medians in two resolutions as well. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A: Changes in operating Income

Range of year	N		Changes in EBITDA/assets			Changes in Industry-adjusted EBITDA/assets			Changes in Industry-adjusted and normalized EBITDA/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-1 to 1	243	83	0.021***	0.006	0.053*	0.009**	0.008	0.567	0.032**	0.022	0.741
-1 to 2	218	69	0.034***	0.017**	0.172	0.025***	0.015***	0.831	0.030**	0.035**	0.940
-1 to 3	181	62	0.040***	0.028**	0.227	0.036***	0.025*	0.304	0.061***	0.026*	0.444
-1 to 4	157	41	0.053***	0.047***	0.527	0.041***	0.032	0.478	0.058**	0.049	0.689
-1 to 5	137	32	0.043***	0.025***	0.709	0.041***	0.015**	0.990	0.081***	0.057	0.745

Panel B: Changes in operating cash flow

Range of year	N		Changes in CF/assets			Changes in Industry-adjusted CF/assets			Changes in Industry-adjusted and normalized CF/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-1 to 1	241	82	0.126***	0.031**	0.002***	0.114***	0.046**	0.004***	0.228***	0.045*	0.024**
-1 to 2	215	67	0.110***	0.050***	0.015**	0.097***	0.053***	0.024**	0.258***	0.091***	0.179
-1 to 3	180	61	0.125***	0.066***	0.106	0.112***	0.063***	0.066*	0.381***	0.094***	0.025**
-1 to 4	156	40	0.153***	0.087***	0.274	0.107***	0.059***	0.131	0.321***	0.058***	0.209
-1 to 5	135	31	0.137***	0.117***	0.552	0.134***	0.067***	0.554	0.415***	0.195***	0.975

Table 3.14 Improvements in operating performance and distress resolutions

This table reports the OLS and treatment regressions of operating improvements on distress resolutions. We have three measurses: changes in EBITDA/assets (CF/assets), changes in industry-adjusted EBITDA/assets (CF/assets), changes in industry-adjusted and normalized EBITDA/assets (CF/assets).we calculate the post-emergence improvements by subtracting the operating performance in year -1 from the operating performance in each year after emergence. We define year -1 as the fiscal year end immediately preceding the distress events; year +1 is the fiscal year end immediately following the emergence from the distress events. IMR lamda is calculated from the specification (4) in table 3.4. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A: OLS						
	(1)	(2)	(3)	(4)	(5)	(6)
	EBITDA/assets	Industry-adjusted EBITDA/assets	Industry-adjusted and normalized EBITDA/assets	CF/assets	Industry-adjusted CF/assets	Industry-adjusted and normalized CF/assets
Distressed Exchange	-0.010	-0.012	-0.074	-0.152***	-0.157***	-1.129***
	(0.015)	(0.016)	(0.084)	(0.054)	(0.054)	(0.288)
Constant	0.043***	0.031***	0.132***	0.261***	0.248***	1.142***
	(0.007)	(0.008)	(0.040)	(0.026)	(0.026)	(0.139)
Observations	1,223	1,223	1,223	1,208	1,208	1,207
R-squared	0.000	0.000	0.001	0.007	0.007	0.013

Panel B: Treatment regression						
	(1)	(2)	(3)	(4)	(5)	(6)
	EBITDA/assets	Industry-adjusted EBITDA/assets	Industry-adjusted and normalized EBITDA/assets	CF/assets	Industry-adjusted CF/assets	Industry-adjusted and normalized CF/assets
Distressed Exchange	-0.169***	-0.163***	-0.568*	-0.564***	-0.574***	-2.946**
	(0.059)	(0.062)	(0.349)	(0.182)	(0.182)	(1.200)
IMR Lamda	0.097***	0.090**	0.286	0.244**	0.245**	1.003
	(0.034)	(0.035)	(0.201)	(0.105)	(0.104)	(0.688)
Constant	0.071***	0.060***	0.238***	0.328***	0.318***	1.528***
	(0.012)	(0.012)	(0.069)	(0.036)	(0.036)	(0.236)
Observations	1,086	1,086	1,086	1,079	1,079	1,078
R-squared	0.008	0.006	0.003	0.015	0.017	0.019

Table 3.15 Propensity score matching and operating performance

This table reports the median operating incomes and operating cash flow (CF) by distress resolutions. The firms of Chapter 11 (bankruptcy) are selected based on the propensity score matching method with propensity scores from regression 4 of Table 3.4. We have three measurses: EBITDA/assets (CF/assets), industry-adjusted EBITDA/assets (CF/assets), industry-adjusted and normalized EBITDA/assets (CF/assets).we calculate the median industry value by first finding the median of all firms in Compustat with the same four-digit SIC code, provided that there are no less than five firms in each industry. If there are less than five firms in a industry, we try to define the industry as all firms with the same three-digit SIC code, and finally with two-digit SIC code. We define year -1 as the fiscal year end immediately preceding the distress events; year +1 is the fiscal year end immediately following the emergence from the distress events. We run Wilcoxon sign-rank test for all medians to check whether they are different from zero and Wilcoxon two-sample test to examine the differences between medians in two resolutions as well. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A: Operating Income

Year	N		EBITDA/assets			Industry-adjusted EBITDA/assets			Industry-adjusted and normalized EBITDA/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-5	61	62	0.087***	0.101***	0.194	-0.018	0.010	0.103	-0.023	0.004	0.235
-4	71	67	0.081***	0.094***	0.083*	-0.007	-0.016	0.544	-0.006	-0.008	0.634
-3	73	68	0.078***	0.096***	0.044**	-0.003	-0.001	0.506	-0.022	0.000	0.386
-2	76	72	0.068***	0.094***	0.025**	-0.017	-0.008	0.411	-0.036	-0.004	0.529
-1	74	77	0.059***	0.082***	0.101	-0.031***	-0.031***	0.817	-0.083***	-0.067***	0.937
1	79	79	0.078***	0.062***	0.591	-0.015*	-0.026***	0.3761	-0.043***	-0.015***	0.962
2	67	63	0.097***	0.100***	0.898	-0.003	-0.021	0.364	0.000	-0.008	0.616
3	52	57	0.088***	0.115***	0.451	-0.003	0.006	0.985	-0.001	0.004	0.207
4	44	37	0.102***	0.129***	0.669	0.007	0.006	0.697	0.004	0.005	0.398
5	34	30	0.114***	0.129***	0.618	0.006	-0.006	0.353	0.042	-0.024	0.065*

Panel B: Operating cash flow

Year	N		CF/assets			Industry-adjusted CF/assets			Industry-adjusted and normalized CF/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-5	61	62	0.043***	0.049***	0.355	-0.021**	-0.019	0.581	-0.034*	-0.014**	0.988
-4	71	67	0.035***	0.056***	0.033**	-0.024***	-0.023	0.507	-0.034***	-0.014*	0.242
-3	72	68	0.018	0.045***	0.013**	-0.043***	-0.021**	0.397	-0.098***	-0.013**	0.082*
-2	76	72	0.010	0.033**	0.089*	-0.025***	-0.029***	0.704	-0.052***	-0.029***	0.926
-1	74	76	-0.053***	-0.012**	0.021**	-0.084***	-0.076***	0.180	-0.260***	-0.202***	0.365
1	79	78	0.045**	-0.004	0.006***	-0.003	-0.081***	0.005***	-0.004	-0.056***	0.018**
2	66	62	0.040***	0.021	0.189	-0.009	-0.051***	0.016**	-0.005*	-0.038***	0.094*
3	52	57	0.051***	0.048**	0.589	0.000	-0.022**	0.296	0.000	-0.012**	0.092*
4	44	37	0.066***	0.064	0.519	0.008	-0.008	0.163	0.001	-0.001	0.314
5	34	30	0.072***	0.080**	0.893	0.020	-0.002	0.411	0.021	0.012	0.757

Table 3.16 Propensity score matching and improvements in operating performance

This table reports the median post-emergence improvements in operating incomes and operating cash flow (CF) by distress resolutions. The firms of Chapter 11 (bankruptcy) are selected based on the propensity score matching method with propensity scores from regression 4 of Table 3.4. We have three measurses: changes in EBITDA/assets (CF/assets), changes in industry-adjusted EBITDA/assets (CF/assets), changes in industry-adjusted and normalized EBITDA/assets (CF/assets).we calculate the post-emergence improvements by subtracting the operating performance in year -1 from the operating performance in each year after emergence. We define year -1 as the fiscal year end immediately preceding the distress events; year +1 is the fiscal year end immediately following the emergence from the distress events. We run Wilcoxon sign-rank test for all medians to check whether they are different from zero and Wilcoxon two-sample test to examine the differences between medians in two resolutions as well. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A: Operating Income

Range of year	N		Changes in EBITDA/assets			Changes in Industry-adjusted EBITDA/assets			Changes in Industry-adjusted and normalized EBITDA/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-1 to 1	79	79	0.016	-0.004	0.174	0.011	0.003	0.498	0.013	0.011	0.655
-1 to 2	67	63	0.032***	0.017*	0.264	0.022*	0.017	0.597	0.068**	0.032	0.410
-1 to 3	52	57	0.035***	0.031***	0.752	0.034**	0.028**	0.808	0.178***	0.058*	0.097*
-1 to 4	44	37	0.074***	0.054***	0.160	0.044***	0.032*	0.453	0.246***	0.142	0.310
-1 to 5	34	30	0.081***	0.043***	0.103	0.051***	0.029**	0.174	0.418***	0.104*	0.085*

Panel B: Operating cash flow

Range of year	N		Changes in CF/assets			Changes in Industry-adjusted CF/assets			Changes in Industry-adjusted and normalized CF/assets		
	Bankruptcy	DE	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians	Bankruptcy	DE	P-value of Wilcoxon Test for Difference in Medians
-1 to 1	79	78	0.144***	0.020	0.001***	0.159***	0.018	0.001***	0.152***	0.037	0.046**
-1 to 2	66	61	0.102***	0.033**	0.004***	0.093***	0.021	0.001***	0.216***	0.025	0.003***
-1 to 3	52	56	0.095***	0.054***	0.029**	0.092***	0.053***	0.015**	0.441***	0.050**	0.002***
-1 to 4	44	36	0.150***	0.075***	0.046**	0.084***	0.052**	0.012**	0.369***	0.142**	0.050**
-1 to 5	34	29	0.165***	0.088***	0.103	0.166***	0.070**	0.073*	0.412***	0.143***	0.190

Chapter 4

Bankruptcy contagion and competitive effects on peer firms' investments

4.1 Introduction

Previous studies (Lang and Stulz, 1992; Zhang 2010; Jorion and Zhang, 2007) identify bankruptcy contagion and competitive effects by investigating the abnormal returns of equity and the spread change of credit default swap (CDS) of industry peers. The bankruptcy of a firm could have a positive (i.e., competitive) or negative (i.e., contagion) effect on its peers in the same industry. These effects could be the results of a change in investors' perception and their responses to the event. They may as well be the results of any fundamental changes in the business and operational environment of the industry.

Although various aspects of these bankruptcy ripple effects are well documented, from our knowledge, the corporate response to competitor's bankruptcy has not yet been investigated in the literature. We still do not know if and how bankruptcy contagion and competitive effects may alter peer firms' corporate policy in the long run. In the present study, we attempt to answer this question by examining the change (if any) of the investment policy of peer firms during the bankruptcy of their competitors.

Recent studies suggest that firms will adjust their corporate policy, particularly investment policy, proactively and accordingly, based on industry competitors' performance. For example, Beatty, Liao, and Yu (2013) find that if industry leaders exaggerate their performance, peers are prone to invest more aggressively. Given that

bankruptcy is a signal of deteriorating investment opportunity within the industry, it is not surprising that it will affect peers' investment decisions.

Any fundamental changes in the peers' investment decision are likely to be amplified by the changes in investors' response and reaction to the bankruptcy event. For example, equity investors are likely to raise similar concern for firms in the same industry as the bankrupted firm, thereby demanding a higher return for the increased uncertainty. Hertzel and Officer (2012) document a higher loan spreads for industry peers when the industry is undergoing a bankruptcy wave. Benmelech and Bergman (2011) find that the cost of debt has increased for industry peers because of contagion through the collateral channel. Hence, credit market investors require a premium as well. Jorion and Zhang (2007) demonstrate that peers experience higher CDS spreads during competitor's bankruptcy announcement, indicating that derivative market investors are not insulated from bankruptcy contagion, neither. Given the higher cost of capital as a result of the bankruptcy ripple effect as documented in the above research, we conjecture that peers are forced to scale down their investment policy. We refer these as the bankruptcy contagion effects on peers' investment decision.

On the other hand, the bankruptcy of a firm may have a positive influence on its peers. For instance, the bankruptcy of a major competitor may suggest a good investment opportunity for peers to grab more market share and power, so as to advance their leadership in the industry. Bankrupted firms usually have to scale down their operations and productions, sell off unproductive plants, branches and stores to ensure a successful emergence from the bankruptcy process. It leaves more room for its peers to grow. Hence,

the motivation to grow will induce peers to adopt a more aggressive investment policy than originally planned. We refer this positive influence as the bankruptcy competitive effect on investment decision. In the literature, empirical evidence suggests that the contagion effect tends to dominate the competitive effect. For example, Lang and Stulz (1992) find that contagion effect from bankruptcy announcements on peer firms' equity return dominates the competitive effect. However, none of the previous research has examined the relative importance of the impact of these two opposing effects on corporate investment activities.

To test the significance of the contagion versus the competitive argument, we study the effect of 60 bankrupted firms on the investments conducted by 1,881 industry peers around the bankruptcy periods. We focus on large firms' bankruptcy effect because these cases are more visible and widely known by all kinds of investors, and usually used as a benchmark to evaluate the industry market conditions and investment opportunities. We define peers as firms sharing the same three-digit standard industrial classification (SIC) code as the bankrupted firms in the bankruptcy filing year. Bankruptcy period is defined as the period between the date of filing and the date of the confirmation of the reorganization plan of the defaulted competitor. We define the pre-bankruptcy period as the five-year period before the bankruptcy filing date of the defaulted competitor.

In general, we find that bankruptcy contagion effect dominates in affecting peers' investment activities. Particularly, peer firms have significantly less capital expenditure during the bankruptcy period than during the pre-bankruptcy period of their defaulted competitors. Moreover, we find that those firms, which historically have higher

comovements with the defaulted competitors, suffer more from the contagion effect in terms of a larger reduction in investments during the bankruptcy period.[55] Our finding is consistent with the evidence presented by Beatty, Liao, and Yu (2013) that peer firms with higher comovements have more investments during industry competitors' account exaggeration periods than those with lower comovements. Besides, we find that the reduction in investments by the financially constrained firms during competitor's bankruptcy period is larger than those that are not financially constrained. This is consistent with the notion that financially constrained firms are less able to mitigate the adverse influence of the bankruptcy of their competitors. Because external financing is more expensive during competitors' bankruptcy period, peer firms that are more dependent on external funding for their investment programs will reduce their investments by a larger amount. Consistently, we also find that firms of higher external financing dependence also lessen their financing activities, in terms of the issuance of new debt and equity, during competitor's bankruptcy period.

How important is the bankruptcy competitive effect in affecting peers' investment activities? Lang and Stulz (1992) argue that industry concentration and financial leverage are two important factors in dictating the significance of competitive effect. Particularly, firms in a concentrated industry are more likely to take advantage of the competitive effect, while firms with lower financial leverage are more capable to expand their investment programs at a short notice so as to capture the market share that is

[55] Comovement between two firms measures how historically the peer firm's market-to-book (MTB) ratio varies with the MTB of the defaulted competitor. Please refer to the Appendix 4.A for the detailed definition.

vacated as a result of the bankruptcy of a market leader. According to our examination of peers' investments, we indeed find that industry concentration is an important factor determining the competitive effect. Firms in concentrated industry are more prone to invest more than those in non-concentrated industries during the bankruptcy period of their competitors. In other words, higher industry concentration could alleviate the dominating contagion effect. Consistent with the same argument, we also find that internal cash reserve can lessen the influence of bankruptcy contagion effect and thus facilitating the competitive effect. Nevertheless, we do not find any evidence suggesting that a firm's financial leverage can influence the impact of these two opposing effects on its investment activities.

We also examine the peer effect on investment activities post-emergence of the defaulted firm. Zhang (2010) finds that, after a firm emerges from bankruptcy, its peers tend to experience lower equity returns and a decrease in operating performance. This adverse effect on peers is also based on the competitive argument. That is, as the firm emerged from Chapter 11 becomes more efficient and thus a stronger competitor, it worsens the prospect of its peers. Using another sample of successfully emerged firms, we find that peers are investing relatively less during the first two years after the defaulted firm emerged from the bankruptcy process. Therefore, we conclude that it is the competitive effect that dominates the influence on peers' investment activities in the short run post-emergence.

We also conduct a number of robustness analyses. First, we address the concern that the reduction of investment is in fact the result of a general industry distress as opposed

to the contagion effect of competitors' bankruptcy events. Although we have already alleviated this issue in the main analysis by only including firms bankrupted in an industry where the industry median equity return is positive for at least two consecutive years, we further address the concern by conducting subsample analysis based on different industry conditions.[56] We find that peers still suffer from the contagion effect even when the industry median equity return is higher in the bankruptcy year. Our study argues that the contagion effect is different from the general industry distress effect, which, however, is also industry-wide. In our context, the contagion effect is an idiosyncratic factor, however, affecting all peer firms within an industry. The major reason why idiosyncratic effect can be industry-wide is that (private and/or public) investors perceive that the bankruptcy of one firm is derived from a systematic risk for all firms within the same industry, although it is idiosyncratic. Therefore, the contagion effect is implicitly built on the fundament of information asymmetry.

Meanwhile, we also conduct analysis to mitigate any reverse causality problem between the bankruptcy of a firm and the investment activities of its peers. It is possible that a firm bankrupts as a result of losing a competition (e.g., in market share) among its peers. We will therefore expect to observe aggressive investment activities of its peers prior to the bankruptcy. In other words, it is peer competition that leads to the bankruptcy of the firm. Furthermore, we expect such competitive effect being more salient in concentrated industries. As suggested by Brander and Lewis (1986) and

[56] Acharya, Bharath and Srinivasan (2007) define industry distress as the time when the industry median annual equity return is lower than -30%. We adopt a more restrictive criterion to ensure that the industry is not in distress during the bankruptcy year.

Maksimovic (1988), it is the strategic interaction among a small number of rivals that plays an important role in deciding whether market competition affects each other. If competition indeed leads to a firm's bankruptcy, it is more likely to happen in concentrated industries, where firms' activities have more impact on each other. In order to gauge the significance of this competitive effect and to mitigate any reverse causality problem, we examine the investment activities of peer firms in the two years prior to the bankruptcy period in our regression analysis. Contrary to the implications of the above competitive effect, our results indicate that peer firms do not increase investments in these years. More importantly, this result is still valid even if we focus on only firms in concentrated industries. Third, the finding of bankruptcy contagion effect on peers' investment is found to be robust to alternative measures of corporate spending. It seems that all measures of corporate spending are similarly affected by the bankruptcy contagion effect.

Our paper makes several contributions to the literature. First, it is the first time that we examine if and how peers respond to the bankruptcy of their competitors by altering their investment activities. We conclude that peer firms proactively react to industry competitors' failure. Second, we identify a channel by which bankruptcy affects peers' investment policy. Specifically, it is the increasing cost of external financing that leads to the reduction of investment activities of its peers. Third, unlike the existing studies, which focus on the short-run bankruptcy effects (e.g., on peers' stock price), we show that there could be a longer-run effect on peers' corporate spending police. Furthermore, we demonstrate that, contingent upon their cash reserve level, firms in concentrated

industries can enjoy the competitive effect as a result of the failure of their competitors. Finally, because the bankruptcy is so widely influential on industrial communities and the economy, regardless of its filing or emergence, it is reasonable to take these externalities into account for bankruptcy court.

The rest of the paper is organized in four sections. Following this introductory section, we review the current literature and demonstrate how we develop our hypothesis in Section 2. In Section 3, we describe how our sample is selected and provide an overview of our data. In Section 4, we examine how bankruptcy contagion and competitive effect alter peer firms' investment activities. We also conduct a number of robustness checks. Finally, we conclude with a few remarks in Section 5.

4.2 Literature Review and Hypothesis Development

Lang and Stulz (1992) first identify two possible effects that the bankruptcy of a firm can impose on its peer firms: contagion effect and competitive effect. In general, contagion effect describes the situation that, when an adverse event happens to a firm, its peer firms also suffer from such an event. On the other hand, competitive effect describes the situation that, when an adverse event happens to a firm, it is good news for its industry peers.[57] Lang and Stulz find that generally bankruptcy contagion effect dominates, while there is a competitive effect for peers with lower leverage and in concentrated industries. Ferris, Jayaraman, and Makhija (1997) replicate Lang and

[57] Contagion and competitive effects are not specific to bankruptcy events. Researchers have also documented contagion and competitive effects from other corporate events. For example, Hadlock and Sonti (2012) find that peer firms' stock prices decrease due to competitor's asbestos litigation; Gleason, Jenkins, and Johnson (2008) show that the financial restatement of a firm could arouse investors' similar concern for its industry peers; Slovin, Sushka and Polonchek (1999) examine the contagion and competitive effect from various adverse events among commercial banks.

Stulz's work and also find contagion effect is more salient than competitive effect. Based on the case study of WorldCom, Akhigbe, Martin, and Whyte (2005) point out that creditors and investors with well diversified portfolios are not severely affected by the failure of WorldCom, however, industry peers suffer from its bankruptcy. Hadlock and Sonti (2012) show that, when a firm goes bankrupt due to asbestos litigation, the equity prices of its competitors fall.

The contagion effect of bankruptcy, not only can affect industry peers, but can also influence the operation and financial health of other stakeholders. For example, contagion spreads in financial industry through inter-bank lending, which increases the probability of systemic default events (Mistrulli, 2011; Ladley, 2013). Hertzel et al. (2008) find that suppliers of bankrupted firms suffer from stock price decreases around the time when bankruptcies are filed. Furthermore, bankruptcy could propagate itself through the supply chain, credit tie among firms, and business partner network (Battiston et al., 2007; Giesecke and Weber, 2004). Based on the study of Lehman Brothers' bankruptcy case, Chakrabarty and Zhang (2012) show that counterparty risk is an important channel to spread the credit contagion, although it could be mitigated by diversification (Helwege and Zhang, 2012).

The above studies suggest that the bankruptcy contagion effect is influential and wide spread, and it dominates the competitive effect. However, none of these studies examines the effects on peers' investment activities, which could have a long-run impact on their operations. In an attempt to address this issue, we formulate our main hypothesis as follows:

H1: Firms tend to invest less during the bankruptcy periods of their competitors than in the pre-bankruptcy periods.

Any empirical evidence in support of H1 will therefore confirm the dominating contagion effect that peers rationally reduce their investments in light of the worsening business and/or financial environment. On the other hand, if H1 is rejected, we cannot rule out the significance of the competitive effect where we expect peers will try to exploit the opportunity by increasing their investment activities with a view to capturing the market share vacated by their bankrupted competitors.

If there is indeed a contagion effect, through what channel does the bankruptcy of a firm affect its peers' investment activities? We argue that it is the reduction in the supply of external funding and the increase of its costs that lead to a reduction in a firm's investment activities during the bankruptcy period of its competitors. The bankruptcy contagion effect on the cost of equity and debt is well documented in the literature. Benmelech and Bergman (2011) find that bankruptcy could increase the cost of debt for non-bankrupt competitors through the collateral channel. Hertzel and Officer (2012) document a higher loan spreads for industry peers when the industry is undergoing a bankruptcy wave.[58] We argue that the higher cost of debt together with the negative shock to the supply of credit will result in the reduction in peers' investment activities.[59] The effect can also be transmitted through the cost of equity and stock price. Stock

[58] Moreover, Kraft and Steffensen (2009) demonstrate that contagion effect could influence investors' fund allocation and significantly reduce the demand of corporate bonds. Jorion and Zhang (2007) extend Lang and Stulz's (1992) work to derivative market. Consistent with the contagion effect, the spreads of credit default swaps of their peers widen when a firms file for Chapter 11. Nevertheless, it is competitive effect rather than contagion effect that dominates in Chapter 7 filings.

[59] Lemmon and Roberts (2010) demonstrate how the exogenous shock to the supply of credit decreases corporate investments.

market investors demand a higher compensation (i.e., higher cost of equity and thus lower stock price) given the increased concern and uncertainty regarding the non-bankrupt industry peers (Lang and Stulz, 1992; Ferris, Jayaraman, and Makhija, 1997). How does stock price affect investment activities? Campello and Graham (2013) find that firms increase investment in response to their higher stock price. Gilchrist, Himmelberg and Huberman (2005) demonstrate that stock market bubble could boost real corporate investment. Baker, Stein and Wargler (2003) argue that investments in equity-dependent firms are more sensitive to stock price. Given the positive relation between stock price and investments as documented in the above studies, we therefore hypothesize that the lower stock price as a result of the bankruptcy contagion effect of a competitor will lead a peer firm to decrease its investment.

If it is indeed the reduction in the supply of external funding and the increase of its costs that lead to a reduction in a firm's investment activities during the bankruptcy period of its competitors, we expect those firms that are more dependent on external funds and/or more financially constrained will be more adversely affected by the bankruptcy contagion effect.[60] This leads us to our second group of hypotheses:

H2a: Firms that are more dependent on external funds tend to have larger reductions in investments during the bankruptcy periods of their competitors.

H2b: Firms that are more financial constrained tend to have larger reductions in investments during the bankruptcy periods of their competitors.

[60] Duchin, Ozbas, and Sensoy (2010) find that financially constrained firms and those with more dependence on external funds for their investments are more severely affected by the financial crisis.

Although we expect the contagion effect to dominate during competitor's bankruptcy period, it is interesting to see if we can still document any competitive effect over that time period. Lang and Stulz (1992) find that firms in concentrated industries and with lower financial leverage are more able to take advantage of the competitive effect when their competitors bankrupt. On the other hand, we expect the amount of cash reserves to be another determinant of the importance of competitive effect. The precautionary cash saving argument tells us that firms hold cash to hedge against bad states in the future. Duchin, Ozbas, and Sensoy (2010) demonstrate that corporate internal cash reserve could help firms to mitigate the destructive effect of the recent financial crisis on corporate investment. Faulkender and Wang (2006) find that cash reserve is more valuable for financially constrained firms. Acharya, Almeida, and Campello (2007) show that firms hold cash to hedge against situations where cash flow is low while there are lots of investment opportunities. The bankruptcy period of a competitor does indeed represent such a situation as financing cash flow dries up given the negative shock to the supply of external funding; whereas new investment opportunities emerge for peers who want to take advantage of competitive effect. Thus, consistent with the hedging theory of cash holding, we expect that peer firms with higher cash reserve are more able to enjoy the bankruptcy competitive effect. Although the competitive effect might not be strong enough to dominate the contagion effect even for the three kinds of peer firms mentioned above, we expect the adverse effect from contagion will at least be alleviated. We therefore have:

H3a: Firms in concentrated industries tend to have smaller reductions in investments during the bankruptcy periods of their competitors compared to those in non-concentrated industries.

H3b: Firms with lower financial leverage tend to have smaller reductions in investments during the bankruptcy periods of their competitors compared to those with higher leverage.

H3c: Firms with more cash reserves tend to have smaller reductions in investments during the bankruptcy periods of their competitors compared to those with lower reserves.

With respect to the competitive effect, Zhang (2010) find that market regards the emergence of a more efficient firm from bankruptcy as bad news for its peers. Caton, Donaldson, and Goh (2008) arrive at similar conclusion and point out that peers' forecasted earnings from analysts also get negative revisions. Therefore, we hypothesize that when a firm emerges from bankruptcy, it exposes more competitive pressure on peers, causing them to reduce their investments as their rivals emerge as more efficient competitors. On the other hand, the emergence of a competitor from bankruptcy may indicate that the industry condition and investment opportunities within the industry have been improved. It will therefore present a "good contagion" effect on peer firms, causing them to increase their investment activities. To gauge the relative importance of the contagion and competitive effect post-emergence of a competitor, we posit:

H4: Firms tend to invest less during the post-emergence periods of their defaulted competitors than during the bankruptcy periods.

Any empirical evidence supporting H4 will indicate that the competitive effect is dominating the (good) contagion effect in the post-emergence period.

4.3 Data and statistics

We start by selecting bankrupted firms from UCLA-LoPucki Bankruptcy Research Database (BRD), which includes all large bankruptcy cases filed between 1980 and 2012 under Chapter 7 and Chapter 11 of the US Bankruptcy code.[61] We then match the defaulted firms in BRD database with those in Standard and Poor's Compustat database by GVKEY. In doing so, we also exclude financial institutions (SIC code of 6000-6999) and firms in regulated industries (SIC code of 4900-4949). To ensure we are not confounding bankruptcy contagion effect and general industry distress effect, we only include bankrupted firms in an industry where the industry median annual equity return is positive in at least two consecutive years immediately before the incidence of bankruptcy.[62,63] The above selection criteria leave us with a total of 60 bankrupted firms in 60 distinct bankruptcy cases.[64] Table 4.1 Panel A shows the distribution of our sample of bankrupted firms in different industry sector. Almost one third of the firms are manufacturing companies, while firms in the construction sector have the largest median firm size by total assets. The earliest bankruptcy case in our sample was filed in 1980;

[61] "Large" case is defined as a case in which the bankrupted firm has assets exceeding $100 millions (measured in 1980 dollars).
[62] We define an industry as a group of firms sharing the same three-digit SIC code. Our results are robust to the alternative definition based on two-digit SIC code.
[63] In the following sections, we will perform further analysis to ensure that we are not wrongfully capturing the general industry distress effect.
[64] Refiling bankruptcy cases are excluded from our sample.

whereas the most recent one was filed in 2011. There are 12 cases in 2004, which is the busiest single year in our sample.[65]

For each bankrupted firm in our sample, we search for all of its peers with the same three-digit SIC code during the fiscal year in which the firm filed for bankruptcy. After excluding those peer firms with missing values of total tangible assets and capital expenditures, we arrive at a total of 1,881 non-bankrupt peer firms for our sample of 60 defaulted firms. Table 4.1 Panel A also presents the distribution of peers among industry sectors and the median firm sizes of different sectors. We construct financial variables for our sample of 1,881 peer firms for each year from five years before bankruptcy filing to the date of confirmation of the reorganization plan. Fiscal years ending before the filing date are defined as pre-bankruptcy period. Fiscal years ending between filing date and the date of confirmation are defined as bankruptcy period. Financial variables, like investment, cash flow, Tobin Q and so on, constructed for each year, are time varying. Other variables, such as industry concentration measures and financial constrain measures, constructed only once for each firm, are therefore time invariant. The detailed definitions of the variables are provided in Appendix 4.A. Panel B of Table 4.1 shows the descriptive statistics of the time variant variables pooled over time and firms. The descriptive statistics of the firm-specific time invariant variables (observed before the filing date) are reported in Panel C of Table 4.1. All variables (except for dummy variables) are winsorized at 1% and 99% level.

INSERT TABLE 4.1 ABOUT HERE

[65] In our robustness check, we re-run our analysis by excluding all cases from manufacturing and those cases filed in 2004, respectively. Our results and conclusions are still found to be valid.

The mean and median amount of investment of the peer firms are 34.5% and 21.6% of their total tangible assets, respectively. It is very close to the size of investment as documented in Beatty, Liao, and Yu (2013), which is from 30% to 40%. The similar range of investments as well confirms that our sample firms are not in industry distress. The average duration in bankruptcy of our defaulted sample is 722 days (i.e., about 2 years).[66] The median value of cash flow is 13.9% of total assets, with some negative outliers. The Tobin Q of all firms ranges from 0.59 to 6.15, with a mean of 1.59. Compared to the documented statistics of Cash flow and Tobin's Q in Duchin, Ozbas, and Sensoy (2010), our sample firms' financial conditions are reasonable. The average amount of combined equity and debt issuance is 18.6% of total assets with a maximum value of 263.1%. The median (mean) value of the industry equity return is 1.7% (2.4%), which is much higher than the industry distress criterion (-30%) adopted by Acharya, Bharath and Srinivasan (2007). Therefore, we are not confounded by the industry distress effect. In terms of industry concentration, the most concentrated industry only has a single peer firm, while the least concentrated industry has 285 peer firms (excluding any bankrupted ones). The combined amount of sales of the top five firms in each industry makes up 57.3% of the sales of the whole industry on average. Peer firms, on average, have a financial leverage of 23.5% and a cash reserve that amounts to 13.6% of their total assets right before the bankruptcy events of their competitors.

[66] Since we include five years before bankruptcy, on average almost 30% of the observations fall within the bankruptcy period.

4.4 Empirical Results

4.4.1 Bankruptcy contagion and peers' investment: Base regression

In this section we examine if and how the bankruptcy of a firm may affect its peers' investment. Table 4.2 represents estimates from our base regression models. We regress the amount of capital expenditure as a fraction of the total tangible assets ("Investment") of each peer in each fiscal year against the dummy variable ("Bankruptcy time") denoting whether the observation falls within the bankruptcy period of the defaulted competitor or not. In all the regressions, we control for the firm fixed effect to address the concern of unobservable firm characteristics. Besides, we also account for the time clustering effect to accommodate the lack of independence of firm years. Column 1 shows that peers' annual investment as a fraction of tangible assets declined by 0.119 during the bankruptcy of their industry competitors. This decline is strongly statistically significant. In Column 2 to 4, we control for a number of firm-level, industry–level, and macroeconomic variables that are expected to also influence a firm's investment intensity. Not surprisingly, we find that investment is positively associated with the firm's Tobin Q, while firms tend to invest more when the economy is going well with high GDP growth rate and interest rate. Nevertheless, adding these control variables does not weaken the statistical significance of the contagion effect. It is worthwhile noticing that our results are robust to control the contemporaneous industry variables, which may alleviate the concern of confounding industry distress effect. Based on the estimated results in Column 4, the decline in peers' investment is 0.077, which corresponds to a drop of 22% (=.077/0.345) relative to the unconditional mean investment of 0.345 across all fiscal

years. Hence, the bankruptcy contagion effect on peers' investment is both economically and statistically significant.

INSERT TABLE 4.2 ABOUT HERE

To rule out the possibility that our findings are simply the results of the effect of any unobservable contemporaneous changes in macroeconomic and/or industry conditions on firms' investments, we explicitly control for the time fixed effect in the regressions of Columns 5 and 6 of Table 4.2. We adopt a matched sample difference-in-difference methodology, following Graham, Li, and Qiu (2008). We consider a matched sample of control group with the same two-digit SIC codes, but not the same three-digit SIC as the peer firms. We then run the following regression:

$$Ivestment_{i,t} = \alpha_t + \beta_i + \gamma X_{i,t} + \delta * Peer_i * Bankruptytime_{i,t} + \varepsilon_{i,t}$$

where $Investment_{i,t}$ is capital expenditure as a fraction of tangible assets of firm *i* in year *t*, α_t and β_i are, respectively, the time and firm fixed intercepts. Vector $X_{i,t}$ is the vector of control variables. The dummy variable $Peer_i$ equals to one when the firm is a peer firm (i.e., with the same three-digit SIC code), while equals to zero otherwise. Finally, the dummy variable $Bnkruptytime_{i,t}$ is the dummy variable equals to one when the dependent variable is observed at a time during the bankruptcy period of the defaulted competitor. The estimated coefficient δ therefore captures the pure change in peer firms' investments during the bankruptcy of their competitors that is free of any time-varying confounding effects. The estimated results as reported in Columns 5 and 6 suggest that the bankruptcy contagion effect on peers' investment is still significant even after removing any unobservable time effect. Based on the estimated coefficient, the average

decline in investment is around 0.040 of total tangible assets, which corresponds to a drop of 11.6% relative to the unconditional mean investment of 0.345 of tangible assets. This drop is less than those documented in Columns 1 to 4. The smaller decline as compared with the previous results is consistent with the notion that firms within the same two-digit SIC industry also suffer from the bankruptcy contagion; albeit the effect is weaker than that felt by peers within the same three-digit SIC industry.

To further examine the peer effects, we conduct two subsample regressions according to the degree of comovement between peer and bankrupted firms. We expect peer effect to be stronger for those peers that have higher comovement with the bankrupted firms. We follow Beatty et al. (2013) and define comovement as the comovement in the changes in market-to-book (MTB) ratio over time. For each peer firm, we calculate the "comovement beta" by regressing the annual changes in the MTB ratio of the peer firm against those of the defaulted competitor over the five-year pre-bankruptcy periods. Columns 7 and 8 of Table 4.2 show the regression results for the subsamples of peer firms with comovement betas in the highest and lowest 30%, respectively. Based on the point estimates of the coefficient, peer firms in the top 30% by the degree of comovement reduce capital expenditure by 0.090, which is more than twice that of those in the bottom 30%. The test of equality of the estimated coefficients of the two subsamples indeed indicates that there is a significant difference between the two groups of peer firms in terms of the magnitude of the contagion effect.

Another general conjecture is that the bankruptcy of larger firm has more impact on their peers than does that of small firm, although our sample of defaulted firms are large

ones in general. We conduct another subsample regression according to the size of bankrupted firms. We expect that the contagion effect from the bankruptcy of larger firms is more substantial than that from smaller bankrupted firms. Columns 9 and 10 of Table 4.2 show the regression results for the subsamples of peer firms, according to the size of their bankrupted competitors. Based on the point estimates of the coefficient, peer firms affected by the contagion of larger bankruptcies reduce capital expenditure by 0.091, which is close to twice that of those affected by the contagion of smaller bankruptcies. As before, the test of equality of the estimated coefficients of the two subsamples indeed indicates that there is a significant difference between the two groups of peer firms in terms of the magnitude of the contagion effect.

Based on the above observations, we cannot reject our first hypothesis. It therefore leads us to conclude that bankruptcy contagion effect dominates bankruptcy competitive effect. During the bankruptcy of industry competitors, peers are reducing investments in responding to the dominating contagion effect. This dominating contagion effect is robust to potentially confounding firm, industry, and economic factors, as well as any unobservable time- and firm-fixed effects. Meanwhile, consistent with our expectation, we find that firms with higher comovement with their bankrupted competitors indeed suffer more from the contagion effect.

4.4.2 Bankruptcy contagion effect and external finance dependence

According to previous studies, when one industry competitor files for bankruptcy, other health firms within the same industry suffer from a general reduction in the supply of external funding and the increase of its costs. As a result of the higher costs of

external funding, we expect peers will reduce their investments when their competitors defaulted. We therefore conjecture that it is through the impact on external funding that we witness the dominating bankruptcy contagion effect. If this conjecture is correct, we expect those firms that are more dependent on external funding will be more adversely affected by the bankruptcy contagion effect, which is our hypothesis H2a.

Following Rajan and Zingales (1998), we calculate for each peer firm the degree of external finance dependence and the degree of external equity dependence (see Appendix 4.A for detailed descriptions of the two measures).[67] To smooth out any temporal variations, we take the averages of these two measures over the five-year pre-bankruptcy period of the competitor. Then, we divide the sample into high vs. low external fund dependence groups based on whether the measures are above or below the respective median values over the full sample. We repeat the previous regression analysis on these two subsamples individually. The results are reported in Panel A of Table 4.3.

Consistent with our expectation, the bankruptcy contagion effect is more salient for peers with higher dependence on external fund (see Columns 1 and 2 of Panel A). Peers that depend more on external fund reduce capital expenditure, on average, by about 0.126 of total tangible assets in response to the contagion effect (potentially as a result of the increased cost of external funding). This corresponds to a drop of more than 35% relative to the unconditional mean investment of 0.345 of tangible assets. Consistent with the expectation that they are less sensitive to any changes in the costs of external funding,

[67] Although the Kaplan-Zingales (1997) Index is sometime used to measure external equity dependence (e.g., in Baker, Stein, and Wargler, 2003), we follow the usual practice of using it to measure financial constraint instead (see Section 4.3).

peers that depend less on external fund reduce capital expenditure, on average, by only 0.035 of tangible assets, which is less than one third of that for high dependence peers. The difference in contagion effect between the two groups of peers is statistically significant at the 1% level. The results are very similar when we classify based on external equity dependence as opposed to external fund dependence (see Columns 3 and 4 of Panel A).

INSERT TABLE 4.3 ABOUT HERE

If peers reduce their investments because of the increased costs of external financing, we expect they will also reduce the issuance of debt and equity during the bankruptcy period of their competitors. In order to verify this, we conduct further regression analysis to examine if the issuance of debt and equity and the financial activities of peers are indeed different during such period. For each peer and in each fiscal year, we calculate the scaled amount of issuance (Issuance Level) by adding up the annual issuance of debt and equity as fractions of the total assets. We also calculate the net financing cash flow as a fraction of the total assets (Financing CF) for each firm and in each fiscal year. We then regress these two financing activity variables against the same set of explanatory variables that we use in Panel A separately for the high and low external fund dependence groups of peers. The results are reported in Panel B of Table 4.4. Consistent with our expectation, peers in the high external fund dependence group significantly curtail their external financing activities during the bankruptcy period of their industry competitors. On average, they reduce the issuance of debt and equity (their financing cash flow) by 7.0% (8.6%) of total assets. In contrast, there is no significant decline in

the issuance activities or financing cash flows for peers of low external fund dependence. Based on the one-tailed test of equality of coefficients, the difference between the two groups in terms of the effect of the bankruptcy of their competitors is found to be strongly statistically significant.[68]

Overall, the results presented in Table 4.3 suggest that the bankruptcy contagion effect on peer firms' investment activities is more salient for firms with higher dependence on external funding. The effects on the change of issuance of new capital and net financing cash flow supports the argument that the increased cost of external fund is an important channel through which the contagion effect is influencing peers' investment activities. Therefore, we cannot reject hypothesis H2a.

4.4.3 Bankruptcy contagion effect and financial constraints

Duchin, Ozbas, and Sensoy (2010) show that financially constrained firms have higher investment sensitive to outside shock, e.g., they reduce investments by a larger amount during the financial crisis. Theoretical model of investment suggests that financially constrained firms are more vulnerable to the change of supply of external fund. Hence, if the bankruptcy contagion effect on peers' investments is mainly through a diminished

[68] One may question the exogeneity assumption of our classification of high vs. low external fund dependence groups. One may argue that a firm's degree of external fund dependence is endogeneous to its investment decisions and/or future investment opportunities. We mitigate this concern by measuring the external fund dependence in the pre-bankruptcy period. It is therefore less likely to be correlated with future investment opportunities. Nevertheless, we conduct further analysis to address this concern (results not presented here). We follow Duchin, Ozbas, and Sensoy (2010) by re-classifying peers based on industry-level external fund dependence measure as opposed to firm-level fund dependence measure. To smooth out the noise, we take the five-year average of the industry-level measures before the bankruptcy event. We then classify peers into high vs. low external fund dependence groups by finding out if the industry-level measure of the three-digit SIC industry they belong to is above or below the median of such measure among all three-digit SIC industries. Such a re-classification does not alter the conclusion made above. Based on the one-tailed test of equality of coefficients, the difference between two groups in terms of the effect of the bankruptcy of their competitors are still statistically significant at the 10% level. These additional results are available upon request.

supply of external funding, we will expect the effect to be stronger for peers that are more financially constrained. To distinguish firms that are financially constrained or not, we follow the investment literature (e.g., Duchin, Ozbas, and Sensoy, 2010; Almeida, Camppello, and Weisbach, 2004) and consider a number of measures, namely firm size, payout ratio, whether the firm has a bond and/or commercial paper rating, the Kaplan-Zingales (1997) index, and the Whited-Wu (2006) index. A firm is considered to be financially constrained (unconstrained) if it is smaller (larger), has lower (higher) payout ratio, does not have (does have) a bond and/or commercial paper rating. The Kaplain-Zingales index and Whited-Wu index are comprehensive measures of financial constraint constructed by using a number of financial variables. The details of how to calculate these measures are provided in Appendix 4.A. We divide our sample of peer firms into two subsamples (financially constrained vs. unconstrained) according to each of the six different measures. Firm size (i.e., total assets), payout ratio, Kaplan-Zingales index and Whited-Wu index are continuous variables. We therefore separate our sample into two groups based on whether the specific financial constraint measure of the firm is smaller or larger than the respective median value. For the bond rating measure, we consider those peer firms that either have their long-term bonds rated by Standard and Poor's (S&P's) or do not have any liabilities one year prior to the bankruptcy event of their competitors to be financial unconstrained; otherwise they are considered to be financially constrained. Similarly, firms with (without) commercial paper rating from S&P's are considered to be financially unconstrained (constrained). All these measured are

calculated during the fiscal year immediately before the incidence of bankruptcy of the competitor.

We run the same regression for the peer effect on investment for each subsample based on the six different financial constraint measures. The results are reported in Table 4.4. Based on the point estimate of the coefficient (of "Bankruptcy Time"), peers' investment activities on average decline during the bankruptcy period of their competitors regardless of whether they are financially constrained or not. Without any exception, the drops in investment are statistically significant for all subsamples of firms that are financially constrained. However, the contagion effect is not found to be as salient for firms that are financially unconstrained. Namely, we cannot detect any statistically significant drop in investment for firms with S&P's commercial paper rating. Again, consistent with our expectation, the average drop in investment is always of a larger magnitude for firms that are financially constrained than those that are not. The same pattern is observed regardless of which of the six different financial constraint measures we use in the classification. Based on the one-tailed test of equality of coefficients of Bankruptcy Time, we find that the contagion effect on financially constrained peers to be significantly stronger than that on financially unconstrained ones for four out of the six financial constraint measures we consider (the classification based on firm size and bond rating are the exceptions). Based on the average value of the coefficients of Bankruptcy Time of the six measures, the average decline in investments for financially constrained peers is 9.12% of their total tangible assets, which is almost two times of the average decline of 4.80% for financially unconstrained ones.

INSERT TABLE 4.4 ABOUT HERE

Overall, the result presented in Table 4.4 indicate that, the more financially constrained the peers, the larger is the reduction in their capital expenditures during the bankruptcy of their industry competitors. This result is therefore consistent with the argument that the reduction in the supply of external funding is an important channel through which the contagion effect is influencing peers' investment activities. Based on the above empirical evidence, we cannot reject hypothesis H2b.

4.4.4 Bankruptcy competitive effect

The above analysis indicates a significant bankruptcy contagion effect on peers' investments. It, however, does not necessarily rule out the existence of bankruptcy competitive effect. Any competitive effect simply may not be strong enough to offset the dominating contagion effect and manifest itself in affecting peers' investments. But we expect the bankruptcy competitive effect can at least alleviate some of bankruptcy contagion effect in lessening the curtailment of investment activities. It will be especially true for those peers that are in the best position to benefit from the competitive effect. Lang and Stulz (1992) find that firms in concentrated industries and with lower financial leverage are able to take advantage of competitive effect from competitor’s bankruptcy. To ensure the robustness of our results, we construct three different industry concentration measures: The industry's Herfindahl-Hirschman Index (HHI), the ratio of the aggregates sales of the top five firms of the industry to the total sales of the industry

(Beatty, Liao, and Yu, 2013), and the number of peers in each industry.[69] We use the financial leverage of the peer ("Leverage Before") in the fiscal year immediately before the bankruptcy of its competitor to measure the peer's financial flexibility to increase investments.[70] The details of constructing the above four measures can be found in Appendix 4.A. We then repeat the previous regression analysis on peers' investments for our full sample while including different interaction terms of the above four measures with bankruptcy time to gauge how these variables may affect the bankruptcy peer effect. The results are presented in Table 4.5.[71]

Let us first examine the industry concentration effect. Based on the estimated coefficient of "Bankruptcy time" in Table 4.5 Columns 1 to 3, when the industry concentration measures are equal to their unconditional means (reported in Table 4.1), the reduction in peers' investments during competitors' bankruptcy periods is about 0.075 of total tangible assets. It is very close to the base case regression results of 0.077 (see Column 4 of Table 4.2). All three interaction terms of industry concentration measures with bankruptcy time are statistically significant. Consistent with our expectation, the more concentrated the industry in which the peer belongs to, the less is the reduction in its investments. Base on the estimated coefficients of the interaction terms in Columns 1 to 3, a one standard deviation increase of industry concentration could alleviate the

[69] To make sure they are comparable with each other, we standardize these three measures of industry concentration before using them in the subsequent regression analysis. After standardization, we assign another negative sign to the number of peers to intuitively reflect the concentration.
[70] The three industry concentration measures and the financial leverage measure are only measured once before the bankruptcy of competitors. They are therefore constant for each peer firm over time.
[71] We also conduct subsample regressions as before by dividing peer firms into two groups based on the median value of each concentration measure. The results are qualitatively the same as what we present here.

reduction in investments by about 0.04 of total tangible assets. This represents a 11.6% change from the (unconditional) mean investment level of 0.345 as reported in Table 4.1. Hence, we cannot reject hypothesis H3a that peers in concentrated industries tend to have smaller reductions in investments during the bankruptcy periods of their competitors. Then, what about the financial leverage effect? The regression result with the interaction term of financial leverage and bankruptcy time is presented in Column 4 of Table 4.5. As expected, peers with higher financial leverage tend to reduce their investments by a larger amount. In other words, it is consistent with the notion that peers with lower financial leverage are in a better position to exploit the competitive effect and thus tend to reduce their investments by a smaller amount. This effect, however, is not statistically significant. We therefore reject hypothesis H3b.

INSERT TABLE 4.5 ABOUT HERE

To sum up, we find evidence suggesting that firms in highly concentrated industries are more likely to take advantage of competitive effect from competitor's bankruptcy. They tend to reduce their investments by a smaller amount compared with firms in less concentrated industries during the bankruptcy periods of their competitors. However, we cannot find any statistically significant evidence support the argument that peers with a lower financial leverage are in a better position to benefit from competitive effect. The insignificant financial leverage effect may be attributable to the fact that there are other impediments that forbid a firm with even very low financial leverage to increase its investments in a short period of time even if it wants to do that. For example, it may be heavily financially constrained and thus it is not easy to finance any new project by

increasing financial leverage. On the other hand, firms with high financial leverage may actually be in a position to raise equity (instead of debt) to finance new project and thus capturing the opportunity vacated by their defaulted competitors.

Next, we test the implication of the hedging theory of cash holding on the bankruptcy competitive effect. As a source of internal funding, cash reserve allows peer firms to more readily engage in any new investment opportunities made available as a result of the bankruptcy of their competitors. In other words, we expect peer firms with higher cash reserves are more able to enjoy the bankruptcy competitive effect and thus they will tend to invest more than those with lower cash reserves when their competitors file for bankruptcy. Moreover, we expect this cash reserve effect to be stronger in concentrated industries where the marginal benefit from capturing market shares is higher. To test the above argument, we repeat the previous regression analysis on peers' investments using two subsamples of peers with low vs. high cash reserves.[72] We measure the level of cash reserve of a peer firm as the amount of cash holding as a fraction of its total assets in the fiscal year immediately before the bankruptcy event of its competitor. We then divide the peers into the two subsamples based on the median value of cash reserve.

Table 4.6 Columns 1 to 4 present the regression results on the two subsamples. The results in Columns 1 and 2 suggest that, consistent with our expectation, peers with higher cash reserves indeed reduce their investments by a smaller amount that those with lower cash reserves during the bankruptcy period of their competitors. In other words, some of the contagion effect can be offset by the competitive effect for peers with higher

[72] We also conduct regressions with interactions of cash reserves and the bankruptcy time as before. The results are qualitatively the same as what we present here.

cash holding. However, this between-group difference of the effect on investments is not statistically significant. This insignificant difference between the two subsamples could be the result of the fact that not all the peers with high cash reserve can benefit from the competitive effect. For example, we might not witness any competitive effect for peers in non-concentrated industries. Peers in such industries might not perceive the bankruptcy of a single competitor to present any opportunity that is worthwhile for increasing their investment program even if they have lots of cash at their disposal. We examine this argument by running the same subsample regressions but now also including the interaction term of bankruptcy time and the industry concentration measure of the peers.[73] The results (reported in Columns 3 and 4) are consistent with the above conjecture. The results in Column 3 indicates that firms with low cash reserves are not able to enjoy any competitive effect regardless of whether they are in concentrated industries or not. On the contrary, we find a statistically significant industry concentration interaction effect for peers with high cash reserves (see Column 4). Peers with high cash reserves tend to invest more if they are in concentrated industries as opposed to non-concentrated ones. The between-group difference in the concentration interaction effect is found to be significant at the 1% level. Compared with the full sample results presented in Column 2 of Table 4.5, the concentration interaction effect for peers with high cash reserves is about 65% (=0.066/0.040) larger than that of the full

[73] Here, we measure industry concentration based on the ratio of the aggregates sales of the top five firms of the industry to the total sales of the industry (i.e., variable "Concentration"). The results are robust to alternative concentration measures as considered in the regressions presented in Table 4.5.

sample. Hence, whether peers in concentrated industries can invest more than those in non-concentrated ones is contingent upon their cash reserve level.

To further illustrate the above argument, we rerun the regression on our full sample while including a three-variable interaction term of bankruptcy time, industry concentration, and cash reserve level (see Column 5). After control for this additional interaction term, the effect of the original interaction term of bankruptcy time and industry concentration disappears. Therefore, we conclude that only peer firms in concentrated industries and also have high cash reserve can enjoy the competitive effect from the bankruptcy of their competitors. In summary, we cannot reject hypothesis H3c but only for those peers in concentrated industries.

INSERT TABLE 4.6 ABOUT HERE

4.4.5 Bankruptcy peer effect on other corporate spending

So far we already demonstrate that the bankruptcy contagion effect dominates the bankruptcy competitive effect, whereas industry concentration could alleviate the impact of the dominating contagion effect. All of the above analysis is conducted based on the impact of these effects on corporate capital expenditure. Besides affecting investment activities of peer firms, does the bankruptcy of a competitor also affect other kinds of corporate spending of its peers? Duchin, Ozbas, and Sensoy (2010) show that the financial crisis exerts similar impact on other kinds of corporate spending as on investments. We consider the same kinds of corporate spending as examined by them to explore whether the bankruptcy peer effects are equally applicable to other corporate spending. Following Duchin, Ozbas, and Sensoy (2010), we construct four corporate

expenditure measures for each peer firm in each fiscal year: Sales, general, and administrative expense ("Sale cost"); research and development expense ("RD"); net working capital excluding cash ("NWC"); and inventories ("Inventory"). The first two measures are scaled by the total amount of sales; whereas the third and fourth measures are scaled by the amount of total assets. The details of the calculations of these variables are provided in Appendix 4.A. We then repeat our regression analysis but now separately using these four measures as dependent variables. The results are reported in Table 4.7.

From Columns 1 to 4, we notice that the bankruptcy contagion effect is still dominating the bankruptcy competitive effect for these four kinds of other corporate spending. Without any exception, the impact of the bankruptcy of a competitor on the peers' other corporate spending activities are negative and strongly statistically significant. Meanwhile, based on the results in Columns 5 to 8, the interaction effect of industry concentration is also found to be significant suggesting that the contagion effect is alleviated in concentrated industry. Peers in concentrated industries tend to reduce their corporate spending by a smaller amount than those in non-concentrated ones during the bankruptcy of their competitors. Overall, Table 4.7 provides evidence supporting the argument that the bankruptcy contagion and competitive effect we find above for capital expenditure are similarly applicable to other kinds of corporate spending.

INSERT TABLE 4.7 ABOUT HERE

4.4.6 Robustness Check

We conduct a number of robustness analyses. First, we address the concern that the reduction in investment is the result of a general industry distress as opposed to the

contagion effect due to the bankruptcy of one's competitor. In fact, we have already mitigated this concern in our main empirical analysis by selecting only those defaulted firms of which their industry median equity returns are positive for at least two years prior to the bankruptcy filing dates. Meanwhile, we have also been controlling for contemporaneous industry returns and industry Tobin's Q in our regression analysis. We have also been able to confirm the robustness of our results by including the year-fixed effect. To further address this concern of the general industry distress effect, we run subgroup regressions by classifying our peers into two groups based on whether the industry equity returns are higher or lower than the median value across all industries in the default years of their competitors. If indeed we have been picking up the industry distress effect rather than the bankruptcy contagion effect, we will expect the reduction in investment to be larger and also more significant for the low industry equity return group. The regression results for the low and high industry return groups are presented in Table 4.8 Columns 1 and 2, respectively. We observe that peers in the high industry return group actually reduce their investments by a larger amount than those in the low industry return group. It therefore invalidates the argument that we have been misinterpreting the general industry distress effect as the bankruptcy peer effect.

Another possible concern is the reverse causality. It is possible that it is in fact industry competition that leads to the bankruptcy of a competitor. The competitor bankrupts because its peer firms have been investing aggressively before its bankruptcy. And, thus, what we observe in our previous regressions is in fact the aftermath of such competitive environment when peers revert back to their normal level of investment after

the bankruptcy event. In order to address this concern, we check if the investment intensity of the peers is in fact higher during the two years leading up to the default event of their competitors. We create a dummy variable ("Before1") to denote the case where the dependent variable (i.e., peer's capital expenditure) is observed during the year right before the bankruptcy event of its competitor. We also construct another dummy variable ("Before2") to denote the case where the observation is made two years before the default event. If there is indeed reverse causality effect, we will expect positive and significant relation between investments and these two dummies when we regress peers' investment activities on these two dummy variables and other control variables. The results presented in Table 4.8 Columns 3 and 4 however depict the opposite picture. We actually detect a lower level of peers' investment activities in each of the two years leading up to the bankruptcy filing date of their competitors; albeit the reductions are not statistically significant. This negative influence on peers' investments prior to the default date is consistent with the notion that the bankruptcy event is not entirely surprising for peers. Any asset deterioration of the bankrupting competitor should have started well before the bankruptcy filing date; thereby resulting in the corresponding bankruptcy contagion effect showing up in a couple of years before the default event. But perhaps the reason why we cannot detect any reverse causality effect is because we are not focusing on those peers that are most subjected to such effect. Brander and Lewis (1986) and Maksimovic (1988) suggest that it is the strategic interaction among a small number of rivals that plays an important role in deciding whether market competition affects each other. Following this logic, if it is peer competition through aggressive investments that

leads to a firm's bankruptcy, it is more likely to happen in concentrated industries, where a firm's activities have a greater impact on its peers. We therefore expect, if there is indeed any reverse causality effect, it is most likely to show up among peers in concentrated industries. To test this argument, we rerun our regressions but now only on the subsample of peers in concentrated industries.[74] We expect to find higher peers' investment activities during the first or the second year before the bankruptcy event if in fact the reverse causality effect is more salient in concentrated industries. But different from what the reverse causality effect will imply, the regression results (Columns 5 and 6) suggest that peers' investments were not higher than average in the two years leading up to the bankruptcy event even in concentrated industries. Therefore, we can conclude that the reverse causality does not affect our study significantly.

INSERT TABLE 4.8 ABOUT HERE

4.4.7 Post-emergence peer effect

The previous analysis focuses on peer firms' investment change before and during the bankruptcy period of their competitors. But bankruptcy peer effect may also exist in the post-emergence period of the competitor. According to Zhang (2010), and Caton, Donaldson, and Goh (2008), when firms emerge from the Chapter 11 bankruptcy, their industry peers tend to deliver negative equity returns while their forecasted earnings will also be downwardly revised. Therefore, market regards the emergence of a more efficient firm from bankruptcy as bad news for its peers. Previous studies (Kalay, Singhal, and

[74] Here, we define industry concentration based on the ratio of the aggregates sales of the top five firms of the industry to the total sales of the industry (i.e., using variable "Concentration" constructed previously). The results presented here are robust to alternative measures of industry concentration as constructed in Table 4.5.

Tashjian, 2007; Gilson,1997) also find that Chapter 11 can improve the operating performance of defaulted firms as well as a much stronger and healthier financial structure. On the other hand, the emergence of a competitor from bankruptcy may indicate that the industry condition and investment opportunities within the industry have been improved. It will therefore result in a "good contagion" effect on peers, causing them to increase their investments. In formulating H4, we conjecture that the competitive effect dominates the (good) contagion effect in the post-emergence period. In other words, we expect peer firms will reduce their capital expenditure after the emergence of their competitors. We test H4 on another sample of bankrupted firms that have successfully emerged from bankruptcy. We investigate how the bankruptcy emergence alters peers' investment policy. As before, we consider corporate capital expenditure as the main variable of interest, and other corporate spending measures as complements. For each peer firm in our new sample, we calculate its capital expenditure (and other corporate spending measures) during the default periods of their competitors and also during the first two years after the emergence of their competitors.[75] We then regress their capital expenditures (and other corporate spending measures) against the bankruptcy time dummy variable and other control variables considered previously.

The regression results presented in Table 4.9 show that peer firms' investment change between the bankruptcy period and the first two years after the emergence of their competitors (see Column 1). Based on capital expenditure, peer firms have higher investment level during the bankruptcy period. In other words, peers reduce their

[75] Unlike in the previous regressions, we ignore the observables in the pre-bankruptcy period, while only focusing on the bankruptcy and post-emergence period.

investments after the emergence of their once bankrupted competitors. Regarding the other corporate spending measures (Columns 2 to 5), all results indicate the same directional change that peers reduce spending after the emergence of their rivals; albeit the effect is not statistically significant for R&D expenses and inventory. If the emergence of a competitor has any effect on its peer firms' corporate spending policy, it is the competitive effect rather than the contagion effect that dominates. We therefore cannot reject H4. Nevertheless, it is worthwhile to note that when we extend the post-emergence period to five years after the default event (results not reported here), the competitive effect disappears. Therefore, the competitive effect around the competitor's bankruptcy emergence only works in the short run.

INSERT TABLE 4.9 ABOUT HERE

4.5 Conclusion

In this study, we investigate the bankruptcy contagion effect and competitive effect on peer firms' corporate investment policy. We find that, in general, bankruptcy contagion effect dominates any competitive effect. Contagion effect is very robust to the inclusion of different macroeconomic variables, firm fixed effect, and time fixed effect. We observe that peers of higher comovement with their bankrupted competitors reduce their investment by a larger amount. Previous studies suggest that when a firm bankrupts, investors are raising similar concerns for non-bankrupted peers and increase the price of external fund, including debt and equity, for those peers. Consistent with this argument of increasing cost of financing for peers, we find that peer firms with higher dependence on external fund or external equity for their investment have a significantly larger capital

expenditure decline than others with lower dependence during the bankruptcy period of their competitors. Meanwhile, we also observe that these peers have indeed reduced the issuance of equity and debt as well as experiencing a lower net financing cash flow during such time periods.

Following the argument raised by Lang and Stulz (1992) that firms in concentrated industries and with lower financial leverage are able to enjoy the competitive effect from competitor's bankruptcy, we examine the impact of these two factors on competitive effect. We find that industry concentration is an important factor determining whether peers are willing to take advantage of competitor's bankruptcy. There is, however, no influence from peer firms' financial leverage. In addition, we argue and demonstrate with our empirical analysis that the corporate internal cash reserve can dramatically alter the competitive effect. Particularly, only firms in concentrated industries and having higher level of cash reserve are able to increase investments during competitor's bankruptcy; firms in concentrated industries, but with lower cash reserve have no difference from those in non-concentrated industries. Therefore, we conclude that the ability of a firm in a concentrated industry to enjoy the competitive effect is contingent upon its cash reserve level. Finally, we demonstrate that our analysis is robust to alternative measures of corporate spending. Our results are robust to the potentially confounding industry distress effect and reverse causality effect.

Appendix 4.A

Time variant variable	
Investment	Beatty et al. (2013):The ratio of capital expenditure (capx) to lagged properties, plants and equipment (ppent).
Bankruptcy time	1 if fiscal years ending between filing date and the date of confirmation.
Cash flow	Operating income before depreciation (oibdp)/lagged total assets (at).
Tobin Q	Market value of assets (at+csho*prcc_f-ceq)/book assets (at).
Financing CF	level of financing activities (fincf)/total assets (at).
Issuance Level	(Stock issuance (sstk) +long term debt issuance (dltis))/ total assets (at).
Sale cost	Selling, general, and administrative expenses (xsga)/sales(sale).
RD	R&D expense(xrd)/ sales(sale).
NWC	Net working capital excluding cash(act-lct-che) / total assets (at).
Inventory	total inventories (invt)/ total assets(at).
Industry Q	The median of each industry Tobin Q.
Industry Equity Return	The median of each industry annual equity return.
Time invariant variables	
HHI	In each 3-digit SIC industry, we construct Herfindahl index using firm sales, which measured at the default year. The greater the Herfindahl index, the higher concentration the sales of industry.
Concentration	In each 3-digit SIC industry, concentration is defined as the ratio of top 5 firms' sales to the total sales of each industry. Sales is measured at the default year.
No. of Peers	Number of peers in each industry measured at the year immediately before the bankruptcy.
Leverage Before	The financial leverage of each firm (dltt/at) at the year immediately before the bankruptcy.
Cash Before	The cash reserve of each firm (che/at) at the year immediately before the bankruptcy.
Comovement	The comovement beta is measured in the regression $\Delta MTB\_peer=\alpha+Beta*\Delta MTB\_bankrupted+\varepsilon$, where ΔMTB_peer is defined as change in peers' MTB and $\Delta MTB\_bankrupted$ represents bankrupted firms' change in MTB. MTB is the market-to-book ratio.

External finance dependence	Rajan and Zingales (1998): (Capital expenditures (capx)-funds from operation (fopt))/capital expenditures (capx). If fopt is missing, then fopt=ibc+dpc+txdc+esubc+sppin+fopo. For each peer firm, we take average of external finance dependence over the pre-bankruptcy period.
External equity dependence	Rajan and Zingales (1998): ratio of the net amount of equity issued (sstk-prstkc) to captal expenditures (capx).For each peer firm, we take average of external equity dependence over the pre-bankruptcy period.
Kaplan-Zingales Index	Kaplan-Zingales (1997) index=-1.002*Cash flow(oibdp/at)+0.283*Q+3.139*debt(dltt/at)-39.368*Dividends((dvp+dvc+prstkc)/at)-1.315*Cash(che/at). Values are measured at the default year.
Whited-Wu Index	Whited-Wu index=-0.091*Cash flow+0.062*Dividend Dummy+0.021*debt-0.044*size+0.102*Industry sales growth-0.035*sales growth.
Payout Ratio	(cash dividend+repurchases)/income before extraordinary items. ((dvp+dvc)/ib).
Firm Size	The natural logarithm of assets (log(at)) in the fiscal year immediately before the bankruptcy event of its competitor.
Bond Rating	Dummy equals one if the firm is rated by S&P and assigned a domestic long-term issuer credit rating (this dummy is also assigned a value of one if the firm has no liability at all); it equals to zero otherwise.
Commercial Paper Rating	Dummy equals one if the firm is rated by S&P and assigned a domestic short-term issuer credit rating; it equals to zero otherwise.
Before1	Dummy equals one if it is the year immediately before the bankruptcy event; it equals zero otherwise.
Before2	Dummy equals one if it is the second year immediately before the bankruptcy event; it equals zero otherwise.
Macro Variables	
Interest rate	3-month treasury bill rate
GDP Growth Rate	US real GDP growth rate
S&P 500 Return	Annual return on the Standard and Poor's 500 Composite Index

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Table 4.1 Summary and descriptive statistics

This table reports the summary statistics of bankrupted firms and their peers by industry sectors as well as the descriptive statistics of all dependent and independent variables. Details of variable definition and construction are included in Appendix 4.A.

Panel A: Summary statistics of bankrupted firms and their peers

Sector	No. of defaulted firms	Median size of defaulted firms (Millions)	No. of peers	Median size of peers (Millions)
Mining	2	$596	68	$36
Construction	2	$2,083	15	$2,025
Manufacturing	22	$416	520	$85
Transportation, Communications, Electric, Gas	13	$983	547	$779
Wholesale Trade	4	$429	64	$52
Retail Trade	13	$490	442	$352
Services	4	$478	225	$33

Panel B: Descriptive statistics of time variant variables

Variable	N	Mean	Median	STD	MIN	P25	P75	MAX
Investment	13008	0.345	0.216	0.449	0	0.119	0.386	3.104
Bankruptcy time	13008	0.368	0	0.482	0	0	1	1
Cash Flow	13008	0.098	0.139	0.257	-1.499	0.057	0.208	0.570
Tobin Q	13008	1.592	1.303	0.923	0.594	1.042	1.800	6.151
Finaning CF	10054	0.082	-0.004	0.355	-0.269	-0.050	0.066	2.350
Issuance level	13008	0.186	0.045	0.394	0	0.004	0.178	2.631
Sale cost	10663	0.418	0.251	0.705	0.032	0.151	0.428	5.758
RD	6549	0.084	0.019	0.200	0	0	0.092	1.559
NWC	12778	0.014	0.004	0.315	-1.724	-0.095	0.164	0.676
Inventory	12905	0.132	0.053	0.161	0	0.009	0.223	0.709
Industry Q	13006	1.426	1.355	0.343	0.911	1.191	1.564	2.560
Industry Equity Return	13006	0.024	0.017	0.298	-0.598	-0.175	0.170	0.866

Panel C: Descriptive statistics of time invariant variables

Variable	N	Mean	Median	STD	MIN	P25	P75	MAX
Industry HHI	1881	0.118	0.082	0.105	0.030	0.051	0.157	1
Concentration	1881	0.573	0.576	0.195	0.296	0.399	0.705	1
No. of Peers	1881	114.461	65	97.876	1	33	184	285
Cash Before	1880	0.136	0.075	0.164	0	0.024	0.177	0.979
Leverage Before	1881	0.235	0.201	0.230	0	0.076	0.328	3.154

Table 4.2 Base regression

This table presents the base regressions of the effect from competitor's bankruptcy on peer firms' investments. Details of variable definition and construction are included in the Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All Firms	All Firms	All Firms	All Firms	Matched Sample Difference in Difference	Matched Sample Difference in Difference	High Comovement	Low Comovement	Defaulted Firm Size Large	Defaulted Firm Size Small
Bankruptcy time	-0.119***	-0.097***	-0.100***	-0.077***	-0.040***	-0.039***	-0.090***	-0.038**	-0.091***	-0.048***
	(0.015)	(0.013)	(0.014)	(0.012)	(0.013)	(0.013)	(0.024)	(0.017)	(0.017)	(0.012)
Cash Flow		0.116	0.119	0.104	0.034***	0.034***	0.090	0.189*	0.075	0.275*
		(0.073)	(0.072)	(0.072)	(0.012)	(0.012)	(0.119)	(0.102)	(0.083)	(0.137)
Tobin Q		0.192***	0.187***	0.177***	0.144***	0.143***	0.145***	0.174***	0.178***	0.150***
		(0.013)	(0.013)	(0.013)	(0.004)	(0.004)	(0.030)	(0.044)	(0.015)	(0.022)
Industry Q			0.050*	0.013		0.033***	0.257***	0.051	0.027	0.033
			(0.026)	(0.024)		(0.011)	(0.068)	(0.051)	(0.028)	(0.037)
Industry Equity Return			-0.030	-0.016		0.005	-0.108**	0.008	-0.018	-0.016
			(0.028)	(0.019)		(0.005)	(0.048)	(0.035)	(0.023)	(0.035)
GDP				0.755**			0.851	0.502	0.615	0.358
				(0.305)			(0.792)	(0.509)	(0.469)	(0.277)
SP Annual Return				-0.006			-0.009	-0.136*	-0.023	0.001
				(0.037)			(0.085)	(0.074)	(0.054)	(0.047)
Interest				0.018***			0.023***	0.024***	0.018***	0.011***
				(0.002)			(0.006)	(0.005)	(0.003)	(0.003)
Constant	0.379***	0.056**	-0.008	-0.049	0.291	0.199	-0.366***	-0.141*	-0.025	-0.054
	(0.015)	(0.022)	(0.039)	(0.037)	(0.541)	(1.006)	(0.098)	(0.076)	(0.048)	(0.049)
							Test of equality of coefficient Ho: H=L	P-value=0.028	Test of equality of coefficient Ho: H=L	P-value=0.038
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	No	No	No	No	Yes	Yes	No	No	No	No
Year Clustering	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,008	13,008	13,006	13,006	40,481	40,290	2,355	2,361	8,065	4,874
R-squared	0.375	0.421	0.423	0.429	0.356	0.356	0.356	0.354	0.432	0.459

Table 4.3 External finance dependence and bankruptcy contagion effect

This table presents regression estimates on explaining the relation between bankruptcy peer firms' capital expenditure change and external fund dependence. Details of variable definition and construction are included in Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

Panel A: External Fund Dependence and Bankruptcy contagion effect

	(1)	(2)	(3)	(4)
	External Fund Dependence		External Equity Dependence	
	High	Low	High	Low
Dependent	Investment	Investment	Investment	Investment
Bankruptcy time	-0.126***	-0.035**	-0.114***	-0.032***
	(0.020)	(0.014)	(0.019)	(0.011)
Cash Flow	0.025	0.484***	0.079	0.283**
	(0.081)	(0.081)	(0.075)	(0.138)
Tobin Q	0.187***	0.132***	0.185***	0.139***
	(0.016)	(0.017)	(0.015)	(0.017)
Constant	-0.181**	0.005	-0.041	-0.076**
	(0.069)	(0.036)	(0.057)	(0.034)
Bankruptytime: Ho: H=L; Ha:H<L		0.000		0.001
Macro Variables	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes
Observations	5,921	6,237	6,363	6,245
R-squared	0.429	0.455	0.436	0.398

Panel B: Corporate financial activities and Bankruptcy contagion effect

	(1)	(2)	(3)	(4)
	External Fund Dependence		External Fund Dependence	
	High	Low	High	Low
Dependent	Issuance Level	Issuance Level	Financing CF	Financing CF
Bankruptcy time	-0.070***	-0.004	-0.086***	-0.014
	(0.016)	(0.010)	(0.024)	(0.010)
Cash Flow	-0.439***	0.253***	-0.621***	-0.070
	(0.086)	(0.085)	(0.064)	(0.087)
Tobin Q	0.196***	0.080***	0.178***	0.089***
	(0.015)	(0.017)	(0.018)	(0.014)
Constant	-0.246***	-0.049	-0.328***	-0.146***
	(0.059)	(0.033)	(0.056)	(0.027)
Bankruptytime: Ho: H=L; Ha:H<L		0.000		0.000
Macro Variables	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes
Observations	5,921	6,237	4,418	4,830
R-squared	0.520	0.390	0.634	0.356

Table 4.4 Financial constraints and bankruptcy contagion effect

This table presents regression estimates on explaining the relation between bankruptcy peer firms' capital expenditure change and financial constraints. Details of variable definition and construction are included in Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Payout Ratio		Firm Size		Bond Rating		Commercial Paper Rating		Kaplan-Zingales Index		Whited-Wu Index	
	Low	High	Small	Big	Without rating	With rating	Without rating	With rating	Constrained	Unconstrained	Constrained	Unconstrained
Bankruptcy time	-0.083***	-0.036***	-0.081***	-0.069***	-0.080***	-0.065***	-0.092***	-0.016	-0.121***	-0.037***	-0.090***	-0.065***
	-0.016	-0.009	-0.017	-0.009	-0.012	-0.016	-0.01	-0.024	-0.015	-0.011	-0.016	-0.01
Cash Flow	0.181*	0.508***	0.054	0.509***	0.140*	0.095	0.128	0.091	0.116	0.103	0.083	0.507***
	-0.104	-0.098	-0.066	-0.099	-0.073	-0.087	-0.077	-0.082	-0.08	-0.093	-0.064	-0.088
Tobin Q	0.158***	0.135***	0.183***	0.128***	0.219***	0.120***	0.207***	0.104***	0.186***	0.167***	0.177***	0.147***
	-0.023	-0.021	-0.018	-0.023	-0.016	-0.017	-0.014	-0.025	-0.017	-0.015	-0.02	-0.022
Constant	-0.001	-0.038	-0.132*	-0.025	-0.056	-0.049	-0.082**	0.005	-0.132**	0.004	-0.073	-0.061
	-0.049	-0.033	-0.074	-0.04	-0.041	-0.047	-0.037	-0.068	-0.054	-0.032	-0.065	-0.04
Bankruptytime: Ho: C=U; Ha:C<U		0.005		0.27		0.22		0.002		0.00		0.08
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	5,219	6,136	5,849	6,925	7,482	5,524	10,197	2,809	5,469	5,958	5,997	6,374
R-squared	0.419	0.417	0.389	0.509	0.443	0.428	0.441	0.425	0.416	0.429	0.395	0.496

Table 4.5 Bankruptcy competitive effect

This table presents regression estimates on determinants of bankruptcy competitive effect. Three measures of industry concentration are standardized in all regressions. After standardization, we assign another negative sign to the number of peers to intuitively reflect the concentration. Details of variable definition and construction are included in Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)
	Industry Concentration			Leverage
Dependent	Investment	Investment	Investment	Investment
Bankruptcy time	-0.076***	-0.074***	-0.074***	-0.046**
	(0.012)	(0.011)	(0.011)	(0.022)
Bankruptcy time*HHI	0.038***			
	(0.012)			
Bankruptcy time*Concentration		0.040***		
		(0.011)		
Bankruptcy time*(- No. of Peers)			0.037**	
			(0.014)	
Bankruptcy time*Leverage Before				-0.127
				(0.082)
Cash Flow	0.114	0.115	0.114	0.121
	(0.074)	(0.074)	(0.074)	(0.073)
Tobin Q	0.172***	0.173***	0.172***	0.175***
	(0.013)	(0.013)	(0.013)	(0.013)
Constant	-0.030	-0.025	-0.029	-0.050
	(0.031)	(0.032)	(0.032)	(0.034)
Macro Variables	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes
Observations	13,006	13,006	13,006	12,764
R-squared	0.444	0.445	0.445	0.442

Table 4.6 Corporate cash reserve and bankruptcy effect

This table presents regression estimates on explaining the relation between corporate internal cash reserve and bankruptcy ripple effects. The measure of industry concentration is standardized in all regressions. Details of variable definition and construction are included in Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)
Sample	Cash Low	Cash High	cash Low	Cash High	All
Dependent	Investment	Investment	Investment	Investment	Investment
Bankruptcy time	-0.089***	-0.067***	-0.088***	-0.059***	-0.071***
	(0.013)	(0.017)	(0.012)	(0.016)	(0.010)
Bankruptcy time*Concentration			0.015	0.066***	0.011
			(0.009)	(0.018)	(0.013)
Bankruptcytime*Concentration*Cash before					0.241**
					(0.106)
Cash Flow	0.080	0.148	0.080	0.151	0.116
	(0.079)	(0.104)	(0.079)	(0.105)	(0.075)
Tobin Q	0.163***	0.179***	0.163***	0.176***	0.170***
	(0.021)	(0.014)	(0.021)	(0.014)	(0.013)
Constant	-0.028	-0.073	-0.028	-0.046	-0.036
	(0.043)	(0.054)	(0.043)	(0.046)	(0.032)
Bankruptytime: Ho: H=L; Ha:H>L		0.125		0.062	
Bankruptytime*Concen: Ho: H=L; Ha:H>L				0.000	
Macro Variables	Yes	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes	Yes
Observations	6,217	6,477	6,217	6,477	12,694
R-squared	0.403	0.451	0.403	0.454	0.442

Table 4.7 Other corporate spending measures

This table presents regression results on other corporate spending measures. The measure of industry concentration is standardized in all regressions. Details of variable definition and construction are included in Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent	Sale cost	RD	NWC	Inventory	Sale cost	RD	NWC	Inventory
Bankruptcy time	-0.078***	-0.013***	-0.029***	-0.010***	-0.078***	-0.013***	-0.028***	-0.010***
	(0.017)	(0.005)	(0.005)	(0.002)	(0.018)	(0.005)	(0.004)	(0.002)
Bankruptcy time*Concentration					0.050***	0.007*	0.014***	0.003**
					(0.015)	(0.004)	(0.004)	(0.002)
Cash Flow	-0.876***	-0.159***	0.301***	0.062***	-0.872***	-0.158***	0.302***	0.062***
	(0.151)	(0.033)	(0.027)	(0.015)	(0.150)	(0.033)	(0.027)	(0.015)
Tobin Q	0.100***	0.015**	-0.029***	0.017***	0.098***	0.015**	-0.030***	0.017***
	(0.020)	(0.006)	(0.009)	(0.003)	(0.020)	(0.006)	(0.009)	(0.003)
Constant	0.195***	0.055***	-0.015	0.097***	0.213***	0.056***	-0.009	0.099***
	(0.054)	(0.016)	(0.022)	(0.009)	(0.054)	(0.017)	(0.023)	(0.009)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,600	6,523	12,709	12,836	10,600	6,523	12,709	12,836
R-squared	0.747	0.765	0.775	0.876	0.748	0.765	0.775	0.876

Table 4.8 Robustness Check

This table presents regression results on robustness check concerning the general distress effect and the reverse causality. Specification 1 and 2 are subsample regressions for low and high industry return groups, respectively. Specification 3 and 4 are regression results on pre-bankruptcy year investments based on the whole sample. Specification 5 and 6 are regression results on pre-bankruptcy year investments based on the sample of firms in concentrated industries. Details of variable definition and construction are included in Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Industry Return		All Firms		High Concentration Firms	
	Low	High				
Bankruptcy time	-0.065***	-0.080***				
	(0.017)	(0.015)				
before1			-0.018		-0.007	
			(0.012)		(0.015)	
before2				-0.020		-0.018
				(0.014)		(0.013)
Cash Flow	0.392***	-0.084	0.113	0.113	0.300**	0.299**
	(0.068)	(0.093)	(0.087)	(0.087)	(0.122)	(0.122)
Tobin Q	0.157***	0.179***	0.160***	0.160***	0.154***	0.154***
	(0.021)	(0.015)	(0.017)	(0.018)	(0.023)	(0.024)
Constant	0.110*	-0.095**	-0.065*	-0.065	-0.113*	-0.101
	(0.060)	(0.045)	(0.038)	(0.044)	(0.062)	(0.063)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,276	8,663	8,216	8,216	3,891	3,891
R-squared	0.467	0.434	0.514	0.514	0.526	0.526

Table 4.9 Competitive effect from bankruptcy emergence

This table presents regression results on bankruptcy emergence effect on different measures of corporate spending. Details of variable definition and construction are included in Appendix 4.A. Significance level at 10%, 5% and 1% is indicated by *, ** and ***, respectively.

	(1)	(2)	(3)	(4)	(5)
Dependent	Investment	Sale cost	RD	NWC	Inventory
Bankruptcy time	0.037**	0.047*	0.027	0.024***	0.000
	(0.015)	(0.027)	(0.025)	(0.006)	(0.003)
Cash Flow	0.072	-0.847***	-0.351**	0.365***	0.024**
	(0.062)	(0.186)	(0.154)	(0.034)	(0.010)
Tobin Q	0.165***	0.165***	0.060	-0.040**	0.016***
	(0.016)	(0.057)	(0.037)	(0.015)	(0.003)
Constant	-0.068	0.489***	0.349***	0.084**	0.107***
	(0.056)	(0.143)	(0.070)	(0.032)	(0.010)
Macro Variables	Yes	Yes	Yes	Yes	Yes
Industry Variables	Yes	Yes	Yes	Yes	Yes
Firm fixed effect	Yes	Yes	Yes	Yes	Yes
Year Clustering	Yes	Yes	Yes	Yes	Yes
Observations	12,400	10,872	7,247	12,087	12,293
R-squared	0.536	0.834	0.804	0.837	0.881

Chapter 5

Conclusions

This thesis investigates three important issues in financial distress and corporate bankruptcy: the relation between bankruptcy venue choice and creditor recovery, the efficiency of Chapter 11 corporate bankruptcy as compared to distressed exchanges, and the bankruptcy contagion and competitive effect on peer firms' investment policies.

In Chapter 2, we investigate the effect of bankruptcy venue choice on recovery rates, APR adherence, and bankruptcy duration. We find that settlements in Delaware lead to higher APR violation while those in New York result in lower recovery values for all creditors. Further to this, these two courts need more time to process cases once self-selection effect is taken into consideration. These empirical findings suggest that the agency problem is severe when firms file for bankruptcy in Delaware and New York. Unlike in some other jurisdictions, APR violation is allowed in the U.S. bankruptcy code. The philosophy of bankruptcy protection is to allow for the inception of a new and economically viable corporation, which could benefit all stakeholders instead of protecting the interests of secured and senior creditors alone. Junior and unsecured claimholders as the collectors of residual values have a substantial part of interest from the time value which cannot be captured in present value in bankruptcy court. In other words, junior claimants are betting on a state of better performance. They can be regarded as taking a long position in an out-of-money call option with zero intrinsic value. Junior claimholders, therefore, should still have some time value for their call options even

though they may not be entitled to any distribution based on APR. Furthermore, the fiduciary duty of managers and directors, who are case placers and are typically in control of the distressed company before it emerges from reorganization, remains ambiguous during the bankruptcy process.

This kind of ambiguity and uncertainty can exaggerate the agency problem around default, thereby leading to a higher ex ante cost of debt. Our results demonstrate strong evidence to disprove the unification of the corporate bankruptcy system. The question of how to divide the par is up to the judge's discretion and claim holders' bargaining instead of being disciplined by any code or theory. Under such a circumstance, from the perspective of creditors, a significantly shrunken recovery rate could lead to an accusation of 'corruption'.

Chapter 3 examines several aspects of distress outcomes and post-emergence efficiency from two alternative resolution mechanisms: Chapter 11 and distressed exchanges. We observe that firms with more intangible assets, higher debt concentration and financial leverage, and less bank debt are more likely to resolve distress privately. We find that Chapter 11 is effective in reducing a firm's financial leverage and boosting sales after emergence. In terms of APR violations among creditors and distress cost evaluated by the proportional change in pre-event asset value, we cannot detect any statistically significant difference between the two resolution mechanisms once self-selection is controlled for. The only major drawback of Chapter 11 is that it takes more time to save firms from distress and it results in lower recovery values for unsecured

creditors. Thus, from the perspective of creditors' welfare, Chapter 11 is not very attractive.

By comparing post-emergence performance, we conclude that firms emerged from Chapter 11 are performing no worse and, if anything, better than those from distressed exchanges. The most important reason is that Chapter 11 is effective in easing their financial burdens and boosting some operations (e.g., sales) of the emerged firms. Consequently, even when compared with distressed exchanges, Chapter 11 is still found to be an efficient and effective approach to resolve financial distress.

In Chapter 4, we investigate the bankruptcy contagion effect and competitive effect on peer firms' investment policies. In general, we find that the bankruptcy contagion effect dominates any competitive effect. The contagion effect is very robust to the inclusion of different macroeconomic variables, firm fixed effect, and time fixed effect. We observe that peers with a higher level of comovement with their bankrupted competitors, reduce their investment by a larger amount. Previous studies suggest that when a firm bankrupts, investors raise similar concerns for their non-bankrupted peers and increase the price of external funds, including debt and equity, for those peers. Consistent with this argument of increasing cost of financing for peers, we find that peer firms with a higher dependence on external funds or external equity for their investment have a significantly larger capital expenditure decline than those with a lower dependence during the bankruptcy period of their competitors. Moreover, we also observe that these peers have indeed reduced the issuance of equity and debt, as well as experiencing a lower net financing cash flow during such time periods.

Following the argument raised by Lang and Stulz (1992) that firms in concentrated industries and with lower financial leverage are able to enjoy the competitive effect from a competitor's bankruptcy, we examine the impact of these two factors on the competitive effect. We find that industry concentration is an important factor in determining whether peers are willing to take advantage of a competitor's bankruptcy. There is, however, no influence from peer firms' financial leverage. In addition, we argue and demonstrate with our empirical analysis that corporate internal cash reserves can dramatically alter the competitive effect. Particularly, only firms in concentrated industries and who have a higher level of cash reserves are able to increase investments during a competitor's bankruptcy; firms in concentrated industries, but with lower cash reserves have no difference from those in non-concentrated industries. Therefore, we conclude that the ability of a firm in a concentrated industry to enjoy the competitive effect is contingent upon its cash reserve level. Finally, we demonstrate that our analysis is robust to alternative measures of corporate spending. Our results are also robust to the potentially confounding industry distress effect and reverse causality effect.

In summary, this thesis studies three important aspects of financial distress and corporate bankruptcy. We find that creditors' welfare, as well as the current U.S. corporate bankruptcy system, is affected by the agency problem, particularly by bankruptcy venue choice. We further investigate the efficiency of Chapter 11 bankruptcy as compared to that of distressed exchanges and conclude that it is still an efficient and effective way to resolve financial distress. Finally, we extend our investigation to beyond the equity- and debt-holders of the defaulting firm. We shift our focus to other

stakeholders involved in a firm's bankruptcy, namely its industry peers. We demonstrate that the bankruptcy of a firm has a dominating contagion effect on peer firms' investment policies. We can therefore conclude that bankruptcy is widely influential on industrial communities and in turn the economy as a whole.