Private Equity and the Resolution of Financial Distress*

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Abstract

We examine the role private equity (PE) firms play in the resolution of financial distress using a sample of 2,151 firms that borrow in the leveraged loan market between 1997 and 2010. Controlling for leverage, PE-backed firms are no more likely to default than other leveraged loan borrowers. When firms do default, PE-backed firms restructure more often out of court, restructure faster, and are more likely to remain an independent going concern following the restructuring. PE owners are also more likely to retain control of the firm following the restructuring. The propensity for PE owners to infuse capital as firms approach distress is positively related to measures of the success of the restructuring. Overall, our results show that PE sponsors resolve distress in portfolio firms relatively efficiently.

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I. Introduction

Leveraged buyouts (LBOs) by private equity (PE) funds have played a dominant role in corporate finance for over three decades. Dating back to Jensen (1989), proponents have identified the benefits of LBOs to include the discipline of high leverage, concentrated ownership, and monitoring by PE investors. A number of subsequent empirical studies have documented positive effects of PE ownership on firm operating performance.[1]

One important exception to these positive results is the use of leverage in PE buyout transactions. Kaplan and Stein (1993) argue that PE transactions involved excessive amounts of leverage during the "hot" LBO market of the late 1980s, leading to a large number of defaults. More recently, Axelson et al. (2013) show that PE deal leverage increases in times of easy credit, and that higher leverage is associated with higher transaction prices and lower fund returns. This raises the concern that PE investors contribute to excessive defaults and high deadweight costs of financial distress to the economy. Whether this is true is still an open empirical question.

The main goal of our paper is to discern how private equity owners influence both the risk of default and the resolution of financial distress. The impact of PE ownership on the risk and severity of distress is unclear. On the one hand, actions that boost PE owners' short-term returns, such as increasing leverage to pay large dividends or to pursue acquisition programs, could drain liquidity and put PE-owned firms at higher risk of default. On the other hand, PE investors could help avoid defaults or more efficiently resolve financial distress when defaults do occur. PE funds often have reserves that can be used to recapitalize a distressed portfolio company. Further, reputational concerns with lenders and other stakeholders might provide incentives for the PE sponsor to ensure that distress is resolved efficiently.

To conduct our analysis, we follow a set of 2,151 firms that borrow in the leveraged loan market between 1997 through 2010, tracking when PE funds enter and exit as owners of these firms, and recording when firms default. Borrowers in this market are highly leveraged, below-investment-grade credit firms that pay relatively high spreads on their loans. LBO financing in the U.S. predominantly occurs through the leveraged loan market, and about half of the borrowers in our sample are PE-backed at some point. The remaining borrowers in this market are similar to the PE-backed firms in that they

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deliberately choose to take on relatively large debt loads. The non PE-backed leveraged loan borrowers provide a control group to compare how PE ownership differentially impacts firm behavior at high levels of debt.

The first part of our analysis studies the frequency with which PE-backed firms become financially distressed, using a Cox proportional hazard model with time-varying explanatory covariates to predict defaults. We find that PE-backed firms default more frequently than non PE-backed firms, but PE-backed firms also carry more debt than non PE-backed leveraged borrowers in our sample. Once we control for the level of firm leverage, differences in default probabilities between the two groups disappear. Moreover, we find that for particularly high levels of debt, PE-backed firms are less likely to default than their non PE-backed peers, suggesting that PE firms are especially effective at managing distress risk at high leverage levels.

We document several other important features of the relation between PE ownership and the likelihood of default. First, previously PE-owned firms, in which a PE fund has exited within the last five years, have nearly a 50% lower default probability than other firms, including those with no history of PE ownership. This result suggests that PE owners leave their portfolio companies in relatively strong financial condition when they exit. Second, while PE-backed firms are more likely than their non PE-backed peers to engage in leverage-increasing recapitalizations, these recaps are not associated with a greater likelihood of default. Third, the likelihood of default is lower when the LBO acquisition is relatively recent -- at a time when the acquiring fund likely has undrawn commitments (so called "dry powder") to provide capital support to the distressed firm - or when the PE owner has been more successful, as measured by the PE sponsor's ability to raise new buyout funds.

The second part of our paper focuses on the firms that do default, and assesses how these firms resolve their financial distress. We show that distressed PE-backed firms restructure more often through consensual agreements accomplished outside of bankruptcy court or through pre-packaged bankruptcy agreements ("pre-packs") that are negotiated prior to filing. The differences from non PE-backed firms are economically meaningful; over half (52%) of all PE-backed restructurings are accomplished entirely

out of court or through a pre-pack, whereas most (64%) non PE-backed firms restructure via a traditional "free-fall" Chapter 11 bankruptcy filing.

Distressed PE-backed firms also restructure more quickly than non PE-backed firms. The median PE-backed firm restructures 4.2 months (35%) faster than a distressed non PE-backed firm. This is not simply driven by PE-backed firms restructuring more often out of court; among free-fall Chapter 11 reorganizations, PE-backed firms restructure roughly three months (25%) faster. Since both direct and indirect costs increase with the time spent in distress, this suggests that financial distress is less costly for PE-backed firms. The distribution of restructuring outcomes also differs for PE-backed versus non PE-backed firms. PE-backed firms are more likely to exit their restructuring as a viable independent entity and less likely to liquidate. PE owners are also significantly more likely to remain as the controlling equity owners at emergence from a Chapter 11 restructuring.

Our results also show how proxies for PE reputation, experience with distressed investing, and capital resources are related to restructuring outcomes. Firms owned by PE sponsors that also manage funds specializing in distressed debt are more likely to restructure out of court and restructure more quickly than other PE-backed firms. PE sponsors that have raised a new fund in the recent past, our proxy for successful PE sponsors and therefore PE reputational capital, emerge from distress more frequently as independent companies. We also find that PE-backed firms that are owned by funds that are likely to have uncommitted fund capital ("dry powder") to invest in the distressed firm are more likely to restructure out of court.

We further study the propensity for pre-default equity owners to invest capital into a distressed company by tracking capital infusions into our distressed sample firms. In the two years prior to a default, 29% of PE-backed firms receive some form of capital injection, compared with only 18% of firms without a PE owner. Firms that receive fresh capital are more likely to resolve their distress out of court (or through a pre-pack) and restructure more quickly, even while holding the presence of a PE owner constant. These findings suggest that the ability to inject capital into a distressed portfolio company explains, in part, the advantage PE-backed firms have in moving efficiently through a restructuring.

One issue that arises when interpreting our results is that PE funds may choose to acquire firms with lower expected costs of financial distress; that is, the behavior we observe is endogenous to the types of firms acquired by PE owners. We provide further analysis that suggests the differences we document reflect a causal effect of PE backing rather than selection. Repeating our analysis of restructuring outcomes for defaulted firms on a restricted sample constructed with propensity score matching methods, we obtain virtually identical results. We also compare the default outcomes of PE-backed firms with firms that were formerly owned by PE funds; most of our results are driven by the PE fund being present at the time of default, suggesting that PE ownership (rather than firm characteristics driving the costs of distress) has a causal impact on the resolution of financial distress. Also, our cross sectional findings that efficient outcomes are related to PE fund characteristics, and our observation that specific actions by PEs -- infusions of capital -- are related to more efficient outcomes, are difficult to explain by pure selection.

Finally, even if some differences are still due to selection on unobservable characteristics, our results still suggest that the high leverage in PE transactions does not lead to excessive costs of financial distress. Hence, while PE funds may have incentives to use higher leverage in their transactions, our findings show that there is no reason to believe that this behavior leads to excessive deadweight costs compared to the leverage choices of other firms.

The rest of the paper is organized as follows. Section II discusses the positive ("bright side") and negative ("dark side") aspects of PE ownership that are hypothesized to impact the resolution of distress. Section III provides an overview of the data collection and sample construction. Sections IV through VII present our results. Section VIII discusses robustness and interpretation issues. Section IX summarizes the findings and implications of our paper.

II. Related Literature and Hypotheses

A. Private Equity and Financial Distress: the "Dark Side" View

Previous research has suggested that PE firms tend to use "excessive" leverage in their transactions, particularly during times when credit markets are booming and PE transaction volumes are high. Kaplan and Stein (1993) argue that excessive leverage led to a high incidence of financial distress among PE transactions undertaken in the LBO boom of the late 1980s. More recently, Axelson et al.

(2013) show that leverage levels in PE transactions are largely unrelated to firm and industry characteristics, and instead are driven primarily by economy-wide credit conditions. PE deal leverage is found to be associated with higher transaction prices and lower buyout fund returns, suggesting that PE funds overpay when access to credit is relatively easy.[2]

One reason why PE fund managers may be compelled to employ excessive leverage has to do with the structure of their compensation contracts. In particular, the call option-like payoff of the PE fund manager's profit share (or "carried interest") might give an incentive to invest in more risky investments, since the PE fund manager benefits from the upside while the investors in the fund bear most of the downside risk.[3] By using more leverage in their acquisitions, the PE fund manager increases the expected profits and volatility of the fund, leading to a higher value of carried interest.

The incentive for PE fund managers to lever up their investments raises the concern that PE investors put too much debt on the firms they acquire, beyond what would be optimal for maximizing firm value (given a trade-off between tax and incentive benefits of debt against the costs of financial distress). This, in turn, potentially leads to excessive defaults and high financial distress costs among the PE fund's portfolio companies, compared to other firms.

A second argument – also found in media and policy discussions -- for why PE transactions may be associated with excessive leverage and high costs of financial distress relates to the presumed short-termism of PE fund managers.[4] PE funds have a limited life, usually 10-12 years, during which the fund needs to make investments, exit the investments, and pay proceeds back to their investors. This by necessity leads to a limited investment horizon for the PE fund, and raises the concern that the PE fund may emphasize short-term profits at the expense of long-run value.

A behavior cited by critics as an example of such short-termism is "dividend recapitalizations", in which a PE fund raises new debt financing sometime after the LBO to pay the equity owners a dividend, thus recovering part or all of the fund's initial investment. In the extreme case, the dividend provides such a high short-term investment return to the PE fund that it has little incentive to expend effort to support the portfolio company in the longer run, despite still being the controlling owner. Similarly, PE funds could reap short-term profits in other ways, such as selling off assets or neglecting long-term investments.

This type of behavior is argued to lead to costly defaults, as the PE portfolio companies struggle under their high debt loads without support from their PE owners, who have already recovered their investment. Empirical research, however, has so far not shown evidence of excessive short-termism of PE owners.[5]

These "dark-side" views of PE behavior have a number of testable predictions with respect to the probability and resolution of financial distress of PE-backed firms relative to other firms. First, PE-backed firms should be more likely to have sub-optimally high leverage, given the underlying risk of the firm's operations. Hence, conditional on the level of leverage maintained by a firm, the dark-side views predict that the probability of financial distress will be higher if the company is PE-backed. Second, once a firm enters financial distress, the dark-side views would predict that PE owners have less incentive to support a portfolio company compared to other owners, for example in providing additional liquidity through a capital infusion, or working to negotiate with creditors. Hence, the dark-side views imply that PE-backed firms will experience higher costs of financial distress than other firms.

B. Private Equity and Financial Distress: the "Bright Side" View

The counterargument to the "dark side" view is that PE-funds optimally use more leverage for their portfolio companies because PE owners are better at managing financial distress. Jensen (1989) and a number of subsequent researchers have argued that the PE ownership model – with concentrated ownership, strong incentives to managers and employees, and high leverage – is a superior form of corporate governance. High leverage, and the threat of financial distress, forces management to deal with operational problems earlier and more forcefully than they would have done in the absence of the debt repayment obligations. Although such benefits of leverage would in principle also accrue to non PE-backed firms, shareholders in these firms may not be able to persuade managers to voluntarily take on enough debt in firms with weaker corporate governance (see Berger et al, 1997).

There are also factors that imply that PE ownership in itself may decrease the likelihood and cost of financial distress for firms. First, to the extent that a PE owner has undrawn commitments ("dry powder") left in the fund when a portfolio company becomes distressed, this locked-in capital can be used to support the distressed firm, by infusing new money and making it easier to strike a deal with creditors. A non PE-backed firm in a similar situation would have to raise external capital from arms-length

investors, and incur the adverse selection costs associated with raising financing from asymmetrically informed investors (Myers and Majluf, 1984). Moreover, a PE fund can provide the "insurance" of locked-in capital to many portfolio companies with a relatively small amount of capital left, since not all portfolio companies will experience financial distress at the same time. Hence, these capital reserves enable the PE fund to increase the debt capacity for its portfolio companies. This effect is similar to the borrowing advantage of a diversified conglomerate, where the diversification across divisions decreases the risk of financial distress and increases debt capacity (see e.g. Lewellen, 1971).

Second, because PE sponsors are repeat players in the buyout market, financial distress of portfolio companies may harm their reputation with lenders and possibly other stakeholders.[6] If a bank or other lender experiences large losses in connection with a PE-backed firm's default, these lenders may not lend on favorable terms for future buyouts.[7] As a result, the PE fund has a larger incentive than other owners to avoid defaults, and to make a default less costly to lenders when they do occur. For example, a PE fund may have an incentive to provide more capital to a distressed company, despite the fact that most of the value of this infusion would benefit creditors rather than equityholders (i.e. Myers, 1977).

Third, PE sponsors may have developed unique skills, which enable them to manage firms in financial distress more efficiently. Established PE sponsors likely will have experienced financial distress in their portfolio companies before, and thus well understand the restructuring process. In addition, many PE sponsors also manage investment funds that specialize in distressed investing in addition to their traditional buyout funds. The knowledge acquired from their distressed investment practice may help these PE funds manage the distressed investments in their buyout fund.

This "bright side" view of PEs and financial distress has very different predictions from the "dark side" view. First, the effect of PE-backing on the probability of distress is somewhat ambiguous. On the one hand, the ability of PE funds to manage firms in financial distress should decrease the likelihood of default. On the other hand, the lower likelihood of financial distress or lower expected distress costs will enable the PE fund to take on additional leverage in their portfolio companies compared to similar non PE-backed firms, increasing the probability of default. Regardless, conditional on leverage, PE-backed firms should be no more likely to default, and possibly less likely. Second, conditional on default, PE-

backed firms should experience lower costs of financial distress. Third, the beneficial effects of PE-backing on the likelihood and cost of financial distress should be stronger for PE funds with more capital left to support the distressed company, more reputable PE sponsors, and for PE sponsors with experience in resolving distressed situations.

C. Related Empirical Evidence

Our evidence relates to a number of papers investigating financial distress following highly-leveraged transactions. Kaplan (1994) shows that Federated Department Store, which went bankrupt following a 1988 leveraged buyout, had a higher value post-bankruptcy than pre-buyout. Asquith, Gertner, and Scharfstein (1994) examine a sample of junk bond issuers from the 1970's and 1980's and document the ways in which financially distressed firms avoid bankruptcy. Andrade and Kaplan (1998) show that value gains outweighed subsequent costs of financial distress for a sample of 31 highly-levered transactions in the 1980s. Apart from having a large sample which is more representative of modern PE transactions, our sample construction permits us to compare highly leveraged borrowers which are PE vs. non PE-backed, to focus on how the presence of PE investors impacts the risk and resolution of financial distress.

One related recent paper is Tykvova and Borell (2012), who compare accounting measures of performance and bankruptcy rates for PE-backed and non PE-backed firms in Europe. They find PE-backed bankruptcy rates are similar to the bankruptcy rates for non PE-backed firms. The authors restrict their analysis to predicting bankruptcy but not other distressed restructurings, and do not consider how financial distress and bankruptcy is resolved, which is a major focus of our analysis.

Our paper is also connected to recent papers that extend our understanding of the impact of private equity investors on firm performance. Recent papers in this literature include Guo, et al (2009) and Cohn, et al (2014), who examine the operating performance of PE-backed firms during the late 1990s and early 2000s, Harford and Kolasinski (forthcoming), who study wealth creation by PE-backed firms following the exit of the PE owner, Lerner, et al (2011), who investigate the relation between PE ownership and innovation, Acharya, et al. (2013) who relate PE fund returns to value-creation activities, and Davis et al. (2011), who study the impact of private equity investment on employment and

productivity. Among these papers, only Harford and Kolasinski (forthcoming) include any analysis of PE-backed firms in financial distress. They find that a PE sponsor's reliance on dividend recapitalizations has no impact on the default probability of a PE-backed firm. Overall our paper contributes to this new group of PE performance papers, but differs in its focus on the impact of PE ownership on firms' ability to resolve financial distress.

III. Data

III.a. Full Sample of Leveraged Loan Borrowers

Our sample is constructed to meet two objectives: (1) Collect information on a comprehensive sample of PE-backed firms whose financial health can be observed through time, and (2) include a set of control firms that are not owned by a PE fund but share characteristics similar to PE-backed firms. PE-backed firms are, by definition, held primarily as private companies and therefore lack consistent public information on their existence, much less their financial health. To overcome this challenge, we draw on a number of datasets to build an extensive panel of PE-backed and control firms.

We start with listings of all firms borrowing in the leveraged loan market, as tracked by Reuters LPC Dealscan and Dealogic between January 1997 and April 2010. Borrowers in this market are financed through private credit agreements using significant amounts of debt. The definition of a leveraged loan varies across sources, but applies generally to loans with spreads higher than 200 to 250 basis points above LIBOR (see Yago and McCarthy (2004)). A major benefit of starting from a set of leveraged loan borrowers is that both the PE and control samples consist of firms that voluntarily take on significant leverage ex ante. This mitigates the potential selection bias that PE-funds choose firms based on their ability to take on leverage; our non-PE firms also choose to lever up significantly.

We also restrict our sample to firms that are rated below investment grade (Ba1 or below) by Moody's at some point during the sample period.[8] Linking the leveraged loan data to Moody's ratings produces a sample of 2,151 firms, which we refer to hereafter as our "full sample". Firms enter our full sample panel when they first borrow in the leveraged loan market. Firms exit the panel when they default, are acquired, or when their credit rating rises above investment-grade.[9] The average firm is in our sample for seven years, yielding an unbalanced panel of 12,737 firm-year observations from 1997 to April 2010.

We restrict our analysis to Moody's rated issuers for two reasons. First, Moody's provides firm-level information for rated borrowers, including both private and public companies. Second, Moody's tracks these firms over time and produces a consistent measure of what constitutes an event of default. A default occurs when Moody's observes: (a) a missed interest or principal payment on a debt obligation, (b) a filing of a court-led bankruptcy, or (c) the execution of an out-of-court "distressed exchange."[10] Moody's continues to follow firms after a default, producing information about the restructuring and estimates of creditor recovery rates. We also search other sources including The Deal and the Debtwire private debt intelligence service, and find only seven additional defaults (for a total of 552 defaulting firms) not already flagged by Moody's, indicating that Moody's has identified virtually all defaults within our sample of leveraged loan borrowers.

It is possible that our methodology overlooks firms that become financially distressed but do not default. For instance, PE investors might successfully employ fund resources to inject capital into the company, thereby avoiding a default. Based on our examination of three additional sources, we do not appear to under-observe cases of financial distress. We search Moody's DRS database for evidence of ratings downgrades to CCC or below followed by an upgrade or recovery without default, The Deal's "Distressed Warnings" archive, which provides "warnings" for firms at high risk of default, and Debtwire's monthly published listings of leveraged loan borrowers classified as "Pre-Restructuring". We find that virtually all firms classified as distressed (or pre-distressed) appear in our sample of defaulting firms. This suggests that when performance declines significantly, highly leveraged firms are unlikely to avoid a default. Therefore, our analysis of default probabilities may be more broadly interpreted as predicting the likelihood of significant financial distress.

III.b. Identifying PE-backed Firms

For our panel leveraged loan borrowers, we identify dates that firms are under PE ownership. We define a firm to be "*PE-backed*" when it is acquired through a leveraged or secondary buyout and held in a managed PE fund for purposes of active control. For the purposes of our paper, a PE fund is a limited liability partnership managed by a general partner that raises outside funding from a set of limited partners. We label leveraged borrowers in our sample that do not fit the above criteria as *non PE-backed*.

Non PE-backed firms include public corporations with no controlling shareholder, as well as public and private companies that may be controlled by non PE investors, including investment management companies, financial institutions, and other corporations. Controlling interests held by individuals and families are also considered non PE-backed when they do not hold their ownership stake within a private equity fund structure.[11]

We consider a firm to be PE-backed from the time the PE fund acquires the firm through the time the fund exits by: (a) the firm going public, (b) selling the company to a strategic or non-PE financial buyer, or (c) relinquishing ownership following a bankruptcy or other restructuring.[12] We identify the time series of ownership information using a variety of sources, including Capital IQ, Dealogic, The Deal Pipeline, SEC filings, and the websites of the PE funds and their portfolio companies. We record the dates at which a PE sponsor enters as a controlling owner of a sample firm, the exit date, type of exit, and other information about actions taken by a PE fund during the period in which they own the firm.[13]

We collect data on all loan financings, including the date, amount, and loan purpose, as well as firm size (total sales) at the time of the financing from Dealscan and Dealogic. Additional financial characteristics, including measures of asset size, leverage, and profitability are obtained from Capital IQ, Compustat or Moody's Financial Metrics database. For SEC-registered firms that are not on Compustat, we also hand collect financial data from 10-Ks. We collect information on firm-level capital infusions using Moody's reports and Capital IQ. Finally, because some firms have no reported financial information while private, some specifications of our regression models use industry medians sales growth and profitability calculated from Compustat, using Fama-French industry classifications. It is important to note that once a firm defaults, a significant amount of financial information and details of the restructuring become publicly available from news sources and bankruptcy court documents, even for firms that were previously private.

III.c. Full Sample Summary Statistics

Table 1 provides summary statistics for our full sample. Panel A shows that 965 of the firms, or 44.9% of the 2,151 firm in sample, are PE-backed at some point during the sample period. A total of 552 firms (25.7% of the sample) experience a default at some point between 1997 and 2010; 241 of these are

PE-backed at the time of default or within the five-year period prior to default. From these summary statistics, PE-backed firms do not appear have a higher default frequency relative to the full sample of firms that borrow in the leveraged loan market.

Panel B of Table 1 provides a comparison of PE-backed and firms with no PE owner across a variety of firm, industry, and market characteristics. For our default probability analysis, we divide non PE-backed firms into those where the PE sponsor has exited within the last five years (*PE-exited*) and those with no recent history of PE ownership (*Non PE-backed*). Firms sold from one PE owner to another through a secondary buyout remain classified as PE-backed.

All variables reported in Table 1 are defined in Appendix Table A1. In the analysis to follow, we use these variables as controls in our regressions, along with industry and time fixed effects. We also provide the industry distribution of our sample firms in Appendix Table A2.

Although all of our sample firms are, by definition, highly leveraged borrowers, Table 1 Panel B shows that PE-backed firms and companies with no recent PE ownership history (non PE-backed) differ on a number of dimensions. The median PE-backed firm carries a slightly lower credit rating (B2 compared to B1) and more debt (*total debt/assets* of 66.4% compared to 41.3%), and is smaller (*total assets* of $598 million in assets compared to $1,349 million) than the median non PE-backed firm. We use the dummy variable, *On Compustat*, to indicate firms with dispersed equity ownership.[14] Only 36.9% of PE-backed firms have information on Compustat, compared to 75.6% of non PE-backed firms (financial information as available from 10-Ks is filled in for non-Compustat firms from the sources noted above).

PE-exited firms fall in between PE-backed and other non PE-backed companies based on their credit rating (median Moody's rating = B2), leverage (median *total debt/assets* = 51.1% of assets), and size (median *total assets* = $748 million). PE-exited firms appear to have higher profit margins (median *EBITDA/sales* = 14.6%) than the other firms, suggesting that PE funds typically do not leave firms in weak financial condition when they exit.

Panel B also shows that PE-backed firms and PE-exited firms differ substantially from non PE-backed firms in their financing behavior. PE-backed firms are far more likely than non PE-backed firms

to engage in leverage-increasing recapitalizations within the last five years (*recap* 16.8% vs. 7.8%), including recaps used primarily to pay large dividends to shareholders (*dividend recap* 8.5% vs. 0.6%), and debt financings that fund acquisitions (*acquisition financing* 48.1% vs. 41.2%). PE-exited firms are more active in the recapitalization market than currently PE-backed firms, engaging in some form of recap in 23% of the cases and debt-financed acquisitions in 55.7% of the cases. The relative frequency of these recapitalizations is consistent with the popular perception that PE owners maintain high leverage for portfolio companies following an LBO. Our analysis below addresses whether this behavior is related to default rates and the resolution of financial distress.

The last panel in Table 1 (Panel C) reports characteristics of the PE investors that own firms in our sample. We use these characteristics to study whether PE investors with deeper capital resources, stronger reputations, and skills specific to managing financially distressed companies are associated with lower default probabilities or more efficient restructurings. Because the amount of undrawn capital available in the PE fund at a given point in time is not observable, we use *months since PE entry* as a proxy, since levels of undrawn capital should decline with the age of the fund.. From Panel C, the median PE-backed firm has been owned by its sponsor for three years (36 months). We consider several measures of the PE fund's reputational capital. *Last fund raised < 5 yrs ago* proxies for PE reputation based on the idea that PE investors that have successfully raised a recent fund are likely to have a more reputable track record. Among our PE-backed sample, 85% of the firms are owned by funds investors that have raised a new fund within the last five years.[15] We also consider *PE sponsor age* (median = 13 years) and a dummy variable, *PE sponsor older than 10 yrs*, equal to one when the sponsor, rather than the fund itself, is older than 10 years (57.1% of the PE-backed firms), as additional measures of PE reputation. Finally, the indicator variable *PE sponsor is top distressed investor* (11.6% of PE-backed firms) equals one when a sponsor is listed as a top investor in distressed companies, "turnarounds", or "special situations" by Preqin or in the appendix of Jiang et al (2012).

IV. Likelihood of Financial Distress

The previous section shows that leveraged loan borrower defaults are fairly common. In this section, we examine the impact of PE ownership on default probabilities using a hazard model that controls for firm, industry, owner, and market characteristics.

IV.a. Defaults of PE- and Non PE-backed Firms Through Time.

Table 2 provides an overview of annual default frequencies for our sample firms over the period 1998 to 2010. The table shows that PE-backed firms default at a rate of 4.9% per year on average during the sample period, compared to a rate of 3.6% for non PE-backed firms. Counter to the argument that PE owners with short-term motives leave a company in weak financial shape upon exit, PE-exited firms have the lowest default frequency; the 3% overall default frequency of firms where PEs have recently exited is 39% lower than that of PE-backed firms and 17% lower than that of other non PE-backed firms.

IV.b. Default Probability Models

To control for observable differences that might explain variation in default rates across the full sample, we employ a default prediction framework similar to the models of Shumway (2001), Chava and Jarrow (2004), Campbell, Hilscher, and Szilagyi (2008), and Bharath and Shumway (2008). Specifically, we estimate a Cox proportional hazard model that describes the conditional likelihood of default as a function of a set of time-varying explanatory covariates.

As described in Section II, the "dark side" hypothesis predicts that PE-backed firms will have higher default probabilities conditional on a given level of leverage. Predictions from the "bright side" hypothesis with respect to the probability of default are less clear. On the one hand, the ability of PE funds to manage financial distress may decrease the likelihood of default. On the other hand, if the presence of a PE fund leads to higher leverage compared to a similar non PE-backed firm, PE-backed firms may have a greater probability of default.

Table 3 reports our model estimates. Because proportional hazard models assume that that the logarithm of the hazard rate (in our model, the conditional likelihood of default) is linear in the control variables, coefficients in each of the columns of Table 3 describe the log-linear relation between the control variables and the conditional likelihood of default.[16] Panel A reports seven specifications that differ by the set of variables included as controls. The first two variables in all seven columns are the

indicator variables that identify PE-backed and PE-exited firms; the excluded category is the group of firms with no recent history of PE ownership (*non PE-backed firms*). Columns (1) and (2) report specifications that exclude firm-level characteristics and include industry controls, which allows us to include the private firms in our sample that do not report firm-level financial data. Column (1) also excludes industry and year fixed effects, while Column (2) includes these effects. Columns (3) through (5) include firm financial characteristics (which reduces the number of firms in the sample), without and with industry and year fixed effects respectively. We consider two different measures of leverage, measured at the date of the last financing: *total debt/assets*, and *rating* (with a higher number representing a lower credit rating). The credit rating variable is appealing because it is available for a wider set of sample firms than *total debt/assets* and likely includes information on credit risk that is not impounded in accounting measures of leverage.

The control variables enter the regressions with signs and significance that are consistent with the existing literature. The likelihood of default is lower when industry profitability (*industry change in EBITDA/sales*) and growth potential (*industry market-to-book ratio*) are higher, although the market-to-book effect is not significant once we include industry fixed effects. As expected, default likelihoods are increasing in a firm's leverage at the time they took on the loan, regardless of whether we measure leverage as *total debt/assets* or through *rating*. For specifications without year fixed effects, we also include the annual *S&P 500 return*, which indicates that default probabilities are counter-cyclical to market performance, as would be expected.

Our first of three key takeaways from Panel A of Table 3 is that the measured relation between PE ownership and default depends on whether we also control for the use of leverage. The positive and statistically significant estimate on *PE-backed* in specifications (1) and (2) disappears when we add either leverage measure to the equation. In other words, PE-backed firms are no more likely to default than non PE-backed firms with similar leverage.

To better understand how PE ownership and leverage factor into default probabilities, column (5) interacts the PE-backed indicator with *total debt/assets*. The interaction term is negative and statistically significant, and both *PE-backed* and *total debt/assets* enter with positive and significant coefficients.

Jointly, these estimates imply that there is level of *total debt/assets*, 64.2%, below which increasing amounts of debt imply that PE-backed firms are more likely to default than non PE-backed firms, and above which PE-backed firms become *less* likely to default for further increases in leverage.[17] For instance, the estimates imply that for a firm with leverage that is 70% of assets, PE-backed firms are 0.8 percentage points less likely to default than their non PE-backed peers; for leverage of 75%, PE-backed firms have a default probability that is 1.7 percentage points lower than non PE-backed firms.[18] Column (7) performs a similar exercise using *rating* as the measure of leverage. In this case, only the ratings variable itself is significant. This result would be expected if the credit rating already incorporates information about the interaction between PE ownership and leverage, thereby absorbing information on the interaction. Regardless, the results indicate that once we control for leverage, PE-backed firms are no more likely to default than non PE-backed firms.

The second takeaway from these models is that PE-exited firms are significantly less likely to default than non PE-backed firms with no recent history of PE ownership. The coefficients for *PE-exited* are tightly estimated across all specifications in the range of -0.51 to -0.64, implying that PE-exited firms are 50-60% *less* likely to default than other non PE-backed firms, holding other variables constant. This result weighs strongly against the idea that PE sponsors leave behind financially weak firms upon exit.

The third takeaway from the Table 3 regressions is that leverage-increasing recaps, which includes dividend recaps and acquisition-related debt financings, have no impact on the likelihood of default. Indeed, specifications (3)-(5), which incorporate firm-level measures of performance and leverage, suggest that firms that engage in leverage increasing recapitalizations are about 30% *less* likely to default, holding other control variables constant.[19] Our findings on this dimension suggest that PEs tend to recap the better performing firms in a fund.

We also examine whether characteristics of the PE fund and sponsor affect the likelihood of default. Panel B of Table 3 reports the Cox proportional hazard model using only the subsample of PE-backed firms. We include four variables from Panel C of Table 1 that proxy for PE reputation, capital resources, and skill. Although not significant across all specifications, the estimates suggest that the conditional likelihood of a default is increasing in the length of time a PE sponsor has owned a firm (our

proxy for less remaining fund capital), and is lower when the PE owner has raised a new fund within the last five years (our proxy for PE reputation). This suggest that firms owned by PE funds that have uncommitted capital and that are managed by more successful sponsors tend to default less frequently.

To summarize, PE-backed firms default at a rate that is 1.3 percentage points (36%) more frequent than non PE-backed firms. However, these differences are not significant once we control leverage. Moreover, our default model provides some evidence that PE-backed firms default less frequently at higher levels of leverage than non PE-peers. Recapitalizations that increase leverage, such as dividend recaps, are not associated with a higher probability of default, and in some specifications are associated with lower default probabilities. Meanwhile, firms from which PE funds have recently exited have low subsequent default rates. Finally, firms backed by more successful PE sponsors and more well-capitalized PE funds appear to default less frequently. Overall, our results on default likelihood are inconsistent with the "dark side" hypothesis.

V. Resolving Financial Distress

While it is important to understand how PE ownership relates to the probability of financial distress, it is equally relevant to understand how PE-backed firms that default resolve their distress. From an efficiency stand-point, being in a state of financial distress only matters to the extent that the state: (a) creates deadweight costs that reduce the ex post value of a firm, and (b) influences ex ante incentives in a manner that raises the cost of financing (see, e.g., Smith and Strömberg, 2005). According to the "bright side" hypothesis, PE-backed firms have a comparative advantage in resolving financial distress, leading to lower ex post costs of financial distress. Indeed, moving through a restructuring following a default could, for some firms, be the most efficient way to turn around a firm with operational problems. According to the "dark side" hypothesis, on the other hand, a PE-owner has a little incentive to support portfolio companies in financial distress. For example, a common characterization of the "dark side" hypothesis is that PE owners abandon troubled portfolio companies when the owners have earned their required investment return by paying themselves large debt-financed dividends. In this case, we might expect the defaulted PE-backed firm to have a more difficult time resolving financial distress, leading to higher ex post costs.

Because there is no single unambiguous measure of financial distress costs, we investigate several indicators suggested by previous literature. First, resolving financial distress outside of court is typically less costly than restructuring in a formal bankruptcy proceeding (Gilson et al, 1990; Asquith et al, 1994). Therefore, we look at the frequency of out-of-court restructurings and pre-packaged bankruptcies relative to regular Chapter 11 filings among our defaulted firms. Second, both the direct and indirect costs of distress should be related to the time the firm spends in resolving distress (Bris, et al, 2006; Denis and Rodgers, 2007). We therefore also examine the time spent from the default date until the completion of a restructuring. Third, a number of papers suggest that deadweight costs of financial distress are high when a firm assets are sold through fire-sale liquidations (see e.g. Gertner and Scharfstein, 1990; Pulvino, 1999; and Strömberg, 2000).[20] Hence, we also measure the extent to which firms survive a restructuring as an independent going concern. Fourth, since higher costs of financial distress reduce the value left for creditors (see e.g. Bris et al, 2006; and Bharath et al, 2010), we also examine creditor recovery rates.

V.a. Data on Restructuring Following Default

To conduct the analysis in this section, we collect detailed information related to 621 default events for the 552 defaulting firms in our sample using information from Moody's Default and Recovery database, Deal Pipeline, Chapter 11 bankruptcy court documents including disclosure statements, SEC filings, Capital IQ, and web-based news searches.

For each defaulted firm, we code the *type* of restructuring as an (1) out-of-court "distressed exchange" of debt for equity, (2) a non-exchange out of court restructuring, (3) a pre-packaged Chapter 11 filing, or (4) a traditional ("free-fall") Chapter 11 filing. A pre-packaged bankruptcy ("pre-pack") filing occurs when a company negotiates its bankruptcy plan of reorganization and receives support from a majority of creditors outside of court, and then uses the court approval process to complete the restructuring. In this sense, a pre-pack is a hybrid of an out-of-court and traditional bankruptcy filing (see Tashjian et al, 1996).

We classify restructuring *outcomes* as follows. A firm is either: (1) reorganized as an independent company, (2) sold as a going concern to a financial buyer, (3) sold as a going concern to a strategic buyer, or (4) liquidated piecemeal.[21] We consider outcomes (1) and (2) as cases in which the *company survives*,

and also record the identity of the post-restructuring controlling owners of the company. We consider outcomes (3) and (4) as cases in which the company ceases to exist as an independent concern.

V.b. Restructuring Types and Outcomes: Summary Statistics

Table 4 summarizes the restructuring data for PE and non PE-backed firms. Panel A shows that PE-backed firms restructure more frequently out of court or through a pre-packaged Ch. 11 filing, while non PE-backed firms file more often for a traditional Chapter 11. Specifically, 52% of PE-backed firms restructure out of court or through a pre-pack (28% out of court, 24% prepacks), compared to only 36% of non PE-backed firms (20% out of court, 16% prepacks).

Panel B shows that PE-backed firms restructure roughly 40% faster than do non PE-backed firms. The panel reports the mean and median number of months that a firm takes to complete its restructuring, which measures the time from default to the completion of an out of court restructuring or exit from Chapter 11. On average, PE-backed firms restructure in 10.1 months (median 7.7 months), compared with 16.2 months (median 11.9 months) for firms that are not backed by a PE sponsor. This relationship holds across various time periods, including during the 2007-09 financial crisis. Given that PE-backed firms restructure more frequently out of court or through prepacks, it is not necessarily surprising that PE-backed restructurings are resolved more quickly. However, as we show in the regressions below, PE-backed firms also move more quickly through free-fall Chapter 11 filings than non PE-backed firms.

To the extent that distress costs are lower for firms that restructure out-of-court and resolve distress more quickly, Panels A and B suggest that PE-backed firms resolve distress more efficiently than non PE-backed firms, consistent with the "bright side" hypothesis.

Panel C of Table 4 reports that PE-backed firms survive more often as an independent entity – either by reorganizing the firm directly, or through a sale to a financial buyer – in 80% of the cases, compared with 71% of the cases for non PE-backed firms. The most notable difference between the groups is the relative frequency of reorganizations versus liquidations. PE-backed firms reorganize at a higher rate (74% vs. 66%) and liquidate piecemeal at a lower rate (9% vs. 15%) than non PE-backed firms. This result is not consistent with the "dark side" hypothesis that PE owners leave their defaulted firms in worse shape than other owners.

Panel D of Table 4 examines the identities of the controlling equity owners for the restructured firms that survive Chapter 11 as an independent entity. New owners obtain control of a Chapter 11 firm through an outright acquisition of the company via "Section 363" of the Bankruptcy Code, by converting debt claims that they hold into equity of the reorganized firm, or by providing new equity capital to the firm. Debt claims converted to controlling equity stakes are typically the "fulcrum" claims, often acquired as a control play by sophisticated investors via secondary markets for distressed debt.[22] So while control often passes to new owners in distressed restructurings, the original PE equity owners can retain control, even when they are "out of the money" at the time of default.

Panel D shows that the original PE investors retain a controlling equity stake in 18% of the PE-backed firms that file for Chapter 11. By comparison only 4% of non PE-backed owners retain control of their firms in bankruptcy.[23] This fact suggests that PE owners often have a long-term interest in managing the firm. Below, we explore one mechanism by which PE owners retain control, namely through capital infusions into the troubled companies.

Also noteworthy from Panel D of Table 4 is the broader role that PE investors, in general, play in the restructuring of distressed firms. New PE investors – i.e. PE sponsors that are not already owners of a defaulted firm – enter and take control of 19% of all defaulted firms in our sample, including a roughly equal proportion of firms that were not previously PE-backed. Because restructurings often involve transfers of control to new owners, the restructurings are a ripe source for PE investors, particularly those that specialize in turning around distressed companies, to acquire portfolio firms.

Finally, Panel E of Table 4 reports discounted creditor recovery rates, as tracked by Moody's.[24] These firm-wide recovery rates are calculated using all debt claims of the defaulted firm, and so are estimates of the market value of the restructured company, expressed as a percentage of the face value of liabilities of the defaulted firm. Overall recovery rates are slightly lower in PE-backed defaults, with the greatest differences appearing in firms acquired by a financial buyer (median recovery 19% for PE-backed versus 34% for non PE-backed). Below, we show that these differences disappear once we control for the larger amount of leverage carried by PE-backed firms at the time of default.

In sum, Table 4 suggests that PE-backed firms move through a distressed restructuring more efficiently than non PE-backed firms, and that PE-backed firms are more likely to emerge from a restructuring as a going concern, often with the original PE owners remaining in control. At the same time, creditor recoveries are lower for PE-backed firms. In the next section, we examine the persistence of these patterns in multivariate regressions that control for firm, industry, market and PE characteristics.

VI. Multivariate Analysis of Distress Resolution

In this section, we examine the relation between PE ownership and the resolution of financial distress within a regression setting, following the same sequence as the univariate comparisons in Table 4. The control variables are similar to those used in the default probability models in Table 3, measured at the time of default or the last financial disclosure prior to default. Financial ratios are winsorized to reduce the effect of outliers.[25]

We also include additional control variables relevant to the resolution of default. Following Acharya, et al. (2007), we calculate an indicator for firms in a *distressed industry*, industry-level *specific assets*, and an interaction term (*distressed industry*specific assets*), which captures potential fire-sale costs along the lines of Shleifer and Vishny (1992) and Strömberg (2000). As a measure capital structure complexity, we add to the regressions an indicator variable for whether a company has *public debt outstanding*. Creditor coordination problems could be higher when dispersed public bondholders are part of restructuring negotiations (see e.g. Gilson et al, 1990). To control for the overall macro environment, we include the contemporaneous average default rate on all Moody's-rated firms and return on the S&P 500 index. Finally, for some specifications, we include indicator variables for whether a firm filed for bankruptcy protection in Delaware or the Southern District of New York, which are the predominant venues for large debtor bankruptcy filings. Both courts are recognized for their ability to move expediently through a bankruptcy case; Delaware in particular is known for its ability to process prepackaged bankruptcies (see, e.g., Ayotte and Skeel, 2004).[26]

In Table 5, we report additional summary statistics for selected characteristics of the default events used in the regressions discussed below. The leverage *(total debt/assets)* of defaulting PE-backed firms is high; the median leverage of defaulting PE-backed firms is 86.2%, compared to 64.8% for non

PE-backed firms. This finding reinforces the idea in Table 3 that PE-backed firms are less likely than their non PE-backed peers to default at higher levels of leverage. Table 5 shows that defaulting PE-backed firms are also more profitable at default (median *EBITDA/sales* = 8.2%) than non PE-backed firms (median *EBITDA/sales* = 5.6%), suggesting that PE-backed firms are less economically distressed as they enter a restructuring. Table 5 also reports that 55.3% of all defaulting PE-backed companies file for Chapter 11 in Delaware, compared with only 38.1% of non PE-backed firms, consistent with the high incidence of pre-packs among PE-backed firms.

Table 6 reports logit regressions in which the dependent variable equals one when a firm files for Chapter 11 (either through a pre-pack or free-fall) and zero when a firm restructures out of court. The table shows marginal effects and t-statistics calculated using standard errors clustered at the default year. We incorporate firm-level data, which are not available for every observation, without excluding observations with missing data by including an indicator variable that flags the firms for which financial information is missing.[27] Regressions (1) and (2) evaluate a PE-backed dummy relative to other firm characteristics, while regression (3) includes additional information specific to the PE sponsor or fund.

The PE-backed variable is negative and statistically across all three specifications, indicating that PE-backed firms are less likely to file for Ch. 11 bankruptcy – and more likely to restructure out of court – than their non PE-backed peers. The estimates in regressions (1) and (2) imply that PE-backed firms are between 5.5 and 7.3 percentage points more likely to restructure out of court, holding other characteristics constant. Column (3) shows that PE-backed firms are less likely to restructure out of court the longer the time since the original buyout occurred, our indicator that the PE fund is less likely to have unused capital left in the fund at the time of default. This is consistent with the ability of PE-funds to infuse capital to help distressed firms avoid bankruptcy, a point to which return in the next section. Column (3) also shows that PE sponsors that specialize in distressed investments are more apt to restructure out of court than other PEs. Firms with prior dividend recaps are also more likely to restructure out of court. Most control variables are insignificant in regressions (1) through (3), except that larger firms and firms with lower market-to-book ratios are more likely to file for bankruptcy rather than restructure out of court.

Regressions (4) and (5) in Table 6 exclude out-of-court restructurings and focus on the decision to file a pre-pack versus a traditional bankruptcy filing. Holding other characteristics constant, including whether or not the filing occurs in Delaware, PE-backed firms are 7.8 to 8.6 percentage points more likely to file a pre-pack than non PE-backed firms, conditional on not restructuring out of court. More profitable firms (*EBITDA/sales*) are more likely to file a pre-pack, which typically involve less operational restructuring than a free fall bankruptcy.

Table 7 reports regressions for the time spent in restructuring. Regressions (1) through (3) include both out-of-court and bankruptcy restructurings. For a number of out-of-court restructurings, the recorded default and emergence date are the same (that is, time in default equals zero). Because of this left censoring at zero, we use Tobit regressions for these specifications. Regressions (4) through (6) include only bankruptcy restructurings, and thus use OLS.

Consistent with the univariate results, *PE-backed* is negative and statistically significant in all specifications. Regressions (1) and (2) show that, measured across all restructurings, PE-backed firms resolve their financial distress 3.5 to 4.2 months faster than non PE-backed firms. The faster speed with which PE-backed firms complete their restructurings is consistent with PE-backed firms relying more on out-of-court and pre-pack restructurings, which move much faster than free-fall Chapter 11 cases. But regression (6) shows that PE-backed firms also move nearly three months faster through a free-fall Chapter 11 than non PE-backed companies, indicating that PE-backed firms resolve distress more swiftly even in traditional bankruptcy settings. Regression (3) also shows that firms backed by PE sponsors with experience as distressed-debt investors move through restructurings more quickly than other PE-backed firms. In terms of the control variables, the results indicate that larger firms (*log sales*) take longer to resolve financial distress, while more leveraged firms (*total debt/assets*) restructure more quickly.

Table 8 uses logit regressions to study the association between PE ownership and the likelihood that a firm survives the restructuring as an independent entity. As described above, we define *company survives* as cases in which the firm emerges from a reorganization or is sold to a financial buyer. A firm is deemed not to survive when it is liquidated or acquired by (and thus becoming a part of) another non-financial firm. Columns (1), (2), and (4) of Table 8 show that, holding other characteristics constant, PE-

backed firms are roughly nine percentage points more likely to survive a restructuring than non PE-backed firms, and conditional on bankruptcy, 12 percentage points more likely to exit Chapter 11 as a surviving entity. Column (3) suggests that much of the effect documented in the other specifications arises among firms that are backed by a PE sponsor that has recently raised a new fund, implying that more successful PE sponsors are associated with a higher likelihood of survival. In contrast with the results on out-of-court restructurings and time in default, neither the time since the PE transaction was undertaken (our proxy for the level of uncommitted capital) nor PE experience as a distressed investor significantly affect the likelihood of survival. The results also indicate that more profitable firms (*EBITDA/sales*) and firms in industries with higher current valuations (*industry market-to-book ratio*, controlling for industry fixed effects) are more likely to survive, consistent with a positive screening role of financial distress and bankruptcy.

Table 8 also examines regressions in which the dependent variable equals one when the pre-default shareholders retain control following the restructuring. Columns (5) and (6) show that the original PE owners are more likely to retain control following a restructuring than non PE owners, consistent with the univariate results. Interestingly, original shareholders are less likely to retain control when filing in Delaware or Southern District of NY, going against the notion that these jurisdictions are more "shareholder-friendly."

We next consider the relation between PE ownership and recovery rates in Table 9. Once we control for firm characteristics, creditor recovery rates from PE-backed and non PE-backed firms are statistically indistinguishable. The regressions include leverage (*total debt/assets*) at the last financial statement before filing as a control, which enters with a negative and significant coefficient. Since total debt is closely related to the denominator – total liabilities at filing -- of the recovery rate ratios, higher leverage implies lower recovery rates. Apart from leverage, we obtain a similar result to Acharya et al (2007) that recovery rates are lower for firms in distressed industries with more specific assets (*industry distress*specific assets*), consistent with the fire-sale hypothesis of Shleifer and Vishny (1992).

One question that arises from the creditor recovery results is: Why do we not observe *higher* recovery rates for PE-backed firms, given that these firms are restructured more quickly and efficiently

than their non PE-backed peers? The answer probably lies in the fact that creditor recovery rates are an incomplete measure of value-related gains in efficiency.

Overall, the multivariate analysis demonstrates that, holding relevant firm, industry, and market characteristics constant, defaulted PE-backed firms are more likely to restructure through cost-effective out-of-court restructurings than non PE-backed firms, and resolve their financial distress more quickly – both in court and out of court – than their non PE-backed peers. At the same time, PE-backed firms are less likely to be liquidated and more likely to survive as a going-concern, often with the original PE owners still in place. With the exception of recovery rates, where we find no difference, this suggests that PE-backed firms experience lower costs of financial distress compared to other distressed firms, consistent with the "bright side" hypothesis.

VII. Capital Infusions and Resolving Financial Distress

In this section, we explore more directly the possibility that capital infusions are a mechanism behind the observed differences in PE-backed and non PE-backed restructurings. Capital infusions by owners into a distressed firm can provide the liquidity required to fund operations during an ongoing restructuring. Injections of financing also signal a willingness by owners to have "skin in the game" during the restructuring negotiation, which in turn may induce other parties to commit to a successful and quick resolution of distress.[28]

Our analysis proceeds by first examining the frequency with which owners in distressed firms committed new capital to their firms– via debt, equity, or a hybrid of both – prior to default. Specifically, we search Capital IQ securities and capital issuance reports, Capital IQ statements of cash flow, and Moody's reports and record observations where a defaulted sample firm receives new capital in the two years prior to the default. We then study how observed injections of capital are associated with restructuring outcomes following the default. Tables 10 through 12 report the results of this analysis.

Panel A of Table 10 shows that PE owners are more likely to commit new capital than non PE owners across all forms of infusions, injecting capital in 29.4% of their firms prior to default, compared to 17.7% among non PE-backed firms. PE-backed firms are also more likely to receive non-equity forms of

capital; 33.8% of the injections by PE owners come in the form of debt, a debt-equity mix, or some other form than equity, whereas non PE owners provide non-equity in only 16.9% of their capital injections.

Panel B of Table 10 shows that firms that receive capital injections resolve their distress more quickly than firms that do not receive additional capital (median 8.6 months vs. 11 months), are less likely to file for bankruptcy (65.5% vs. 80.1%), and are more likely to have their owners retain control following the restructuring (16.7% vs. 6.6%). In short, firms receiving capital injections appear to restructure more efficiently, and to benefit the original shareholders.

Table 11 models in a regression format the propensity to inject capital into a distressed firm as a function of PE-ownership and the control variables utilized earlier. Several interesting patterns emerge.. First, holding all else constant, PE-backed firms are 14.6 percentage points more likely to receive a capital injection prior to default than non PE-backed firms, supporting the univariate pattern observed in Panel A of Table 10. Second, PE-backed firms in which the original buyout happened longer ago are less likely to receive capital injections than other PE-backed firms, supporting our earlier interpretation of this variable as a proxy for uncommitted capital. The probability of receiving a capital injection declines by 3.6 percentage points per year since the time the firm was acquired in an LBO. Third, and somewhat surprisingly, PE-backed firms in funds that have successfully raised a new fund within the last 5 years are 11.4 percentage points *less* likely to receive a capital injection (equation (4) of Table 11).

The latter counterintuitive result suggests that sponsors that have recently been more successful in raising new funds – presumably because they have better recent performance – are less likely to invest new money in portfolio firms that are distressed. Indeed, our findings in Tables 6 through 9 provide little indication that more successful PE sponsors – as proxied by whether they have raised a new fund in the last five years–improve the efficiency of the restructuring process. Still, Table 3 provides some evidence that firms owned by more successful sponsors are less likely to default in the first place.

Lastly, Table 12 examines in a regression framework the association between capital infusions, private equity ownership, and default outcomes. The table suggests that capital infusions are related to quicker restructurings, independently of whether the owner of a firm is a PE investor. Holding PE ownership constant, the estimates indicate that a capital infusion is associated with a 13.8 percentage

higher likelihood of an out-of-court restructuring, 10.5 percentage point increase in the likelihood of a pre-pack among bankruptcy filers, and a restructuring that is over three months shorter than for firms that do not receive a capital injection.

The coefficient estimates in Table 12 also tell us something about the variation in the outcome variables explained by capital infusions versus the presence of a PE owner. For instance, the estimates in specification (1) suggest that capital infusions are more important for explaining out-of-court restructurings, not necessarily whether the firm is PE-backed. This may simply reflect that out-of-restructurings are more feasible when the owner contributes capital before or in connection to the restructuring. On the other hand, specification (3) indicates that PE-backing has an independent influence on the length of a restructuring that goes beyond an effect related to capital infusions; PE-backed firms that receive a capital injection resolve distress more than six months faster than non PE-backed firms that receive no capital injection. According to the estimates in specification (3), about half of the increase in speed is explained by the pre-default injection and another half by the fact that the firm is PE-backed.

Together, the findings in Tables 10 through 12 provide support for the idea that the observed speed and efficiency of restructurings among PE-backed firms is related, in part, to the propensity for PE owners to provide fresh capital to distressed firms.

VIII. Robustness and Selection Issues

One caveat that arises when interpreting these results is that PE-backed and non PE-backed firms may be systematically different. Although we have controlled for observable firm characteristics throughout our multivariate analysis, there may still be a concern if there is limited overlap in these characteristics across the PE-backed and non PE-backed subsamples. For example, if PE-backed leveraged borrowers are only small firms below a certain size threshold, while non PE-borrowers are large firms above a certain size threshold, then the PE indicator may pick up differences in size rather than the effect of PE-backing, even when size is explicitly included as a control variable.

To address this concern, we follow a procedure similar Crump et al. (2009), where we first run a prediction model of the determinants of PE backing, and then repeat our analysis on a subsample where observations that either have a too large or too small probability of being PE-backed according to the

prediction model are excluded. The results are presented in Appendix Table A3. The first-stage logit model (1) indicates that PE-backed companies are significantly less likely to be on Compustat, have lower revenue growth, and higher leverage prior to default. We then exclude all observations with a predicted likelihood of being PE-backed lower than 10% and higher than 90% and repeat the analysis of Tables 6-9 and 11. As seen from Table A3, the results are virtually identical, with PE-backing being significantly related to all default outcomes except recovery rates, and with similar magnitudes.

Another concern is that PE funds choose acquisition targets based on unobservable characteristics, which may lead PE-backed and non PE-backed firms to have a systematically different likelihood and/or cost of financial distress, even conditional on observable characteristics. Ex ante, this would lead to a higher debt capacity for PE-backed firms, and PE-backed firms should optimally choose to take on higher debt levels. Our result that PE-backed firms have higher leverage but that there is no difference in default probabilities controlling for leverage, is consistent with this interpretation.

Since there is no plausibly exogenous instrument that can predict PE-backing status, we cannot address endogeneity in the default probability regressions. However, our cross sectional findings that certain PE fund characteristics are related to more efficient outcomes, and the observation of direct actions taken by PEs such as the infusion of capital into portfolio companies, are more difficult to explain by selection, and suggest that at least some of the patterns we document are indeed causal.

For the default outcome analysis, we can address endogeneity concerns by considering defaulted firms where the PE-fund has exited the investment some time before default. If PE fund selection of companies is driven by an unobserved factor that is related to ex ante costs of financial distress, and if this unobserved factor is constant over time, then we should find the same relation between former PE-backing and default outcomes as we find for current PE-backing. In our default sample, 37 are firms which were formerly controlled by a PE fund that exited one year or more before default, and 257 are firms which are currently PE-backed (where we include firms where the PE-fund exited less than a year before default, since these funds may still have played a role in the resolution of financial distress).

We rerun our main analyses replacing the *PE-backed* variable with two dummy variables: *ever PE-backed* which takes a value of one if the firm was ever controlled by a PE fund, and *currently PE-*

backed, which indicates that the firm is currently PE-backed based on the definitions above. An insignificant value of *ever PE-backed* and significant value of *currently PE-backed* would indicate that the result is more likely to be driven by a causal relationship, while the opposite (significant *ever PE-backed* and insignificant *currently PE-backed*) would suggest that the result is more driven by ex ante selection. The results are displayed in Appendix Table A4. For the most part – the likelihood of an out-of-court restructuring, firm survival, equity control, and capital infusions – *ever PE-backed* is insignificant while *currently PE-backed* is still statistically and economically significant, indicating that the effect is driven by the presence of a PE investor rather than selection. The one exception is the speed of distress resolution, where *ever PE-backed* is statistically significant and accounts for the majority of the effect, while *currently PE-backed* is statistically insignificant. Hence, it may be the case that PE funds choose firms with characteristics that make them faster to restructure, while the presence of the PE fund to the time in restructuring is less important.

Finally, our results still provide important insights for the "dark side" versus "bright side" discussion, regardless of whether some findings may be driven by ex ante selection. Even if PE funds ex ante choose firms with lower probability and costs of financial distress (which in itself may be a skill), our results still suggest that the high leverage in PE transactions does not lead to excessive costs of financial distress. Hence, while PE funds may have incentives to use higher leverage in their transactions, our findings show that there is no reason to believe that this behavior leads to excessive deadweight costs compared to the leverage choices of other firms.

IX. Conclusions

We empirically address two opposing views regarding the effect of PE ownership on financial distress: A "dark side" view, according to which PE short-termism and excessive risk taking lead to a higher probability and cost of financial distress; and a "bright side" view, under which PE funds are better at managing distress compared to other owners. Our results are significantly more supportive of the "bright side" view. First, we show that PE-backed firms are no more likely to default than other firms with similar leverage characteristics. When PE-backed firms do become financially distressed, they are more likely to restructure out of court, take less time to complete a restructuring, and are more likely to

survive as an independent going concern, compared to financially distressed peers that are not backed by a PE investor. We find that the better default outcomes are at least partly due to the PE owner's ability to infuse capital into their portfolio companies as they approach distress.

Taken together, our results suggest that PE investors do not exacerbate the risk of financial distress, and when defaults do occur, resolve the distress more efficiently than other firms. This suggests a benefit to PE ownership that extends beyond the qualities considered by Jensen (1989), namely that the presence of a PE owner decreases expected costs of financial distress, and thus increases the debt capacity of firms. We also find that PE investors frequently remain in control of their firm following the restructuring, an occurrence that is rare among non PE owners. Understanding the role that different types of post-distress owners play in turning around troubled firms is an important issue for future research.

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ENDNOTES

[1] See Cumming et al (2007) and Kaplan and Strömberg (2009) for recent reviews of PE research, and Section II.C. below.

[2] Additionally, Ljungqvist et al (2007) find that buyout funds accelerate their investment flows when credit market conditions loosen, and Gorbenko and Malenko (forthcoming) present evidence that financial buyers bid more aggressively in auctions for firms when credit conditions are stronger.

[3] See Robinson and Sensoy (2013) for the structure of PE fund compensation. Axelson et al (2009) provide a formal model of the PE fund and compensation structure, as well as the use of leverage, as an optimal contracting solution to the agency problem between PE funds and their investors. Although the discipline of debt mitigates overinvestment in some states of the world in their model, PE funds will still tend to overinvest during periods when access to debt is more favorable.

[4] For media accounts, see e.g. "Profits for Buyout Firms as Company Debt Soared ," *New York Times* (October 4, 2009) and "Greed and Debt: The True Story of Mitt Romney and Bain Capital," *Rolling Stone* (August 29, 2012). For policy discussions, see e.g. Rasmussen (2008).

[5] Lerner et al (2011) find evidence that PE-owned funds make more efficient long-term investments in innovation. Similarly, Cao and Lerner (2009) find that PE-backed IPOs outperform other IPOs, inconsistent with short-termism.

[6] We define the "PE sponsor" as the manager of the particular PE fund. A given PE sponsor can raise several buyout funds over time, where each fund has a 10-year life and its own committed capital.

[7] Demiroglu and James (2010) show that more reputable PE sponsors pay lower loan rates and are able to obtain higher leverage in their buyout deals. Ivashina and Kovner (2011) show that PE sponsors with long-term relationships with banks obtain loans with lower interest rates and more favorable covenants in their deals. See Malenko and Malenko (2014) for discussion of PE reputation with lenders.

[8] We begin our sample period in 1997 when Moody's began to rate loans; see Sufi (2007) for a description of this process.

[9] Our results are robust to retaining firms that migrate to investment grade in the sample. Only 33 of 2,151 firms migrate from non investment grade to investment grade during our sample period.

[10] A distressed exchange involves exchanging debt for another security of lower priority (such as equity), open market purchases of debt by the borrower at a substantial discount to the face value of the debt, or any other exchange that appears to allow the borrower to avoid default. See Moody's Corporate Default Risk Service (2007).

[11] Examples of companies in the non PE-backed sample include: Bally Total Fitness, Discovery Zone, LA Gear, Six Flags, Spansion, and Visteon.

[12] PE funds still typically retain some portion of their equity after they have taken a company public. The exact timing of when the PE funds sell their remaining shares is not observable. We follow prior research in using the IPO date as the date of PE exit.

[13] We also search for PE ownership in the 7 years prior to the January 1997 start of our panel.

[14] Using an indicator variable for firms which have a stock price available from Compustat as an alternative proxy for dispersed equity ownership produces identical results throughout our analyses.

[15] *Last fund raised < 5 yrs* ago could also be correlated with *months since PE entry* to the extent the last fund raised is the fund owning the PE-backed firm. Still, there is substantial independent variation across these variables. Also, standard covenants in PE fund agreements prohibit a PE fund from using capital from a new fund to invest in a firm still owned by a previous fund.

[16] The Cox model is a semi-parametric hazard model that leaves the "baseline hazard function" unspecificied, allowing for a fairly flexible relation between the likelihood of default and the time that a firm has gone without defaulting. For more details on these models, see Ongena and Smith (2001) and Bharath and Shumway (2008).

[17] The level 64.2% is the *total debt/assets* that solves the equation (where $\hat{\beta}$*s* represent estimates from column 5) :

$$\hat{\beta}_{PE-badked} * 1 + \hat{\beta}_{Totaldebt/assets} * Totaldebt/assets + \hat{\beta}_{PE-backed*Totaldebt/assets} * 1 * Totaldebt/assets$$
$$= \hat{\beta}_{PE-badked} * 0 + \hat{\beta}_{Totaldebt/assets} * Totaldebt/assets + \hat{\beta}_{PE-backed*Totaldebt/assets} * 0 * Totaldebt/assets$$

[18] These estimates assume a baseline hazard rate equal to the unconditional average default rate of 3.9% across the full sample (see the last column of Table 2).

[19] The finding that firms that borrow to finance acquisition have lower default probabilities should not be interpreted as a causal statement. The documented association may relate to the operating performance of the firm pursuing an acquisition program. For a fixed level of leverage, firms with stronger operating performance should be less likely to default and may have stronger incentives to engage in wealth-increasing acquisitions.

[20] Alternatively, a too lenient bankruptcy regime could also allow economically nonviable firms to be continued. While there is some evidence inefficient continuation in Chapter 11, particularly in the 1980's (Hotchkiss, 1995; Weiss and Wruck, 1998), Ayotte and Morrison (2009) argue that increased creditor control in bankruptcy has eliminated this continuation bias, and may rather lead to excessive sales and liquidations in more recent bankruptcy

cases. Accordingly, we believe that the excess liquidation problem is more plausible during the time period we study. Moreover, excess liquidation (rather than excess continuation) relates more closely to the prediction of the "dark-side" view.

[21] In this section, we group *PE-exited* firms as part of *non PE-backed*. Our sample includes only 15 defaults of formerly PE-backed companies, which exit between 63 and 8 months before the default (only two exit within a year of the default). We utilize the formerly PE-backed companies in our robustness tests in Section VIII.

[22] See Hotchkiss and Mooradian (1997); Jiang et al (2012); Ivashina et al (2013); Feldhütter et al (2014).

[23] Similarly, equityholders of large companies filing for Chapter 11 retain control in only 7% of the cases studied by Ivashina et al (2013).

[24] See Zhang (2009) for a description of firm wide creditor recovery rate calculations.

[25] Since the problem with outliers differs across different financial ratios, the winsorizing threshold varies between 1% and 5% for different variables. The results are robust, however, to using a common winsorizing threshold across all variables.

[26] Southern District of NY has also had a reputation for being "manager friendly", allowing more firms to reorganize, particularly in the 1980s. See e.g. Hotchkiss (1995).

[27] Typically, these are firms that provide no disclosures to the SEC. Results are largely unchanged if we instead restrict the sample to the firms with financial information, although we prefer this approach due to its higher statistical power.

[28] Another possibility is that pre-distress owners are more likely to support firms that they know to be in better economic shape. Thus, a positive relation between default outcomes and capital injections could be due to reverse causality. To mitigate this concern, we control for firm performance in the regressions. Also, we relate the likelihood of a capital injection to whether the company is backed by a PE-fund which is more likely to have undrawn capital, which should be largely independent of the financial prospects of the firm.

Table 1: Descriptive statistics for full sample

Descriptive statistics for the full sample of 2,151 firms that raised leveraged loan financing during the period January 1997 to April 2010. A firm enters the sample when it is identified as a leveraged loan borrower by Dealscan or Dealogic, and can be positively identified as rated below investment grade by Moody's. Firms exit the sample upon a default, merger, or upgrade to investment grade. We define a firm to be *PE-backed* when it is acquired through a leveraged or secondary buyout and held in a managed private equity fund for purposes of active control. We obtain ownership and financial information from Moody's, Capital IQ, Dealscan, Dealogic, Deal Pipeline, SEC filings, and other news sources. Variable definitions are provided in Appendix Table A1.

A: Full sample of leveraged loan borrowers (N=2,151)

	Number of firms	% of full sample
PE-backed firm	965	44.9%
Firm defaults	552	25.7%
PE-backed firm defaults	241	11.2%

B: Firm, market, and industry statistics (by firm-year)

	PE-backed			Non PE-backed			PE-exited			Total		
	N	Mean	Median	N	Mean	Median	N	Mean	Median	N	Mean	Median
Financial characteristics												
Rating	2,337	B3	B2	5,839	B1	B1	1,090	B2	B2	9,266	B2	B2
On Compustat	4,098	0.369	0.000	8,196	0.756	1.000	1,677	0.423	0.000	13,971	0.603	1.000
Total assets ($ million)	1,358	4,957	598	4,961	4,737	1,349	668	2,005	748	6,987	4,5197	1,042
Revenues ($ million)	1,409	1,678	545	4,980	3,468	1,108	676	1,356	633	7,065	2,909	903
EBITDA/sales	1,405	0.150	0.130	4,883	-0.112	0.124	676	0.175	0.146	6,964	-0.031	0.129
Total debt/assets	1,358	0.727	0.664	4,957	0.457	0.413	666	0.534	0.511	6,981	0.517	0.465
Loan financing activity in last 5 yrs												
Acquisition financing	4,098	0.485	0.000	8,196	0.412	0.000	1,677	0.557	1.000	13,971	0.451	0.000
Recap	4,098	0.168	0.000	8,196	0.078	0.000	1,677	0.230	0.000	13,971	0.123	0.000
Dividend recap	4,098	0.085	0.000	8,196	0.006	0.000	1,677	0.148	0.000	13,971	0.046	0.000
Market and industry conditions												
S&P 500 return	4,098	5.819	10.880	8,196	8.588	10.880	1,677	4.920	5.490	13,971	7.336	10.880
Industry change in sales	4,098	0.077	0.080	8,196	0.087	0.087	1,677	0.070	0.077	13,971	0.082	0.084
Industry change in EBITDA/sales	4,098	0.000	0.001	8,196	0.000	0.001	1,677	-0.001	0.000	13,971	0.000	0.001
Industry market-to-book ratio	4,098	1.899	1.522	8,196	1.809	1.392	1,677	1.898	1.586	13,971	1.849	1.461

Table 1 (continued)

C: PE sponsor characteristics

	N	Mean	Median
Months since PE entry	4,330	43	36
Last fund raised < 5 yrs ago	4,337	0.850	1.000
PE sponsor age (years)	4,113	13.5	13
PE sponsor older than 10 yrs	4,337	0.571	1.000
PE sponsor is top distressed investor	4,337	0.116	0.000

Table 2: Default frequencies

Default frequencies for the full sample of 2,151 leveraged loan borrowers. A firm enters the sample when it is identified as a leveraged loan borrower by Dealscan or Dealogic, and is rated below investment grade by Moody's. Firms exit the sample upon a default, merger, or upgrade to investment grade. We define a firm to be *PE-backed* when it is acquired through a leveraged or secondary buyout and held in a managed private equity fund for purposes of active control. *PE-exited* firms are formerly PE-backed, where the PE sponsor exited within the prior five years. Defaults include payment defaults on interest or principal, distressed debt exchanges, other out-of-court restructurings, and bankruptcy filings identified by Moody's or reported in other news sources. N is the number of firm-year observations. Detailed variable definitions are provided in Appendix Table A1.

	PE-backed			Non PE-backed			PE-exited			Total		
Panel Year	N	# of defaults	% defaulting	N	# of defaults	% defaulting	N	# of defaults	% defaulting	N	# of defaults	% defaulting
1998	173	2	1.2%	771	10	1.3%	56	1	1.8%	1,000	13	1.3%
1999	245	13	5.3%	901	26	2.9%	67	4	6.0%	1,213	43	3.5%
2000	306	19	6.2%	868	39	4.5%	74	1	1.4%	1,248	59	4.7%
2001	330	30	9.1%	828	41	5.0%	77	5	6.5%	1,235	76	6.2%
2002	321	19	5.9%	789	36	4.6%	80	2	2.5%	1,190	57	4.8%
2003	332	13	3.9%	748	20	2.7%	77	4	5.2%	1,157	37	3.2%
2004	359	11	3.1%	679	16	2.4%	88	0	0.0%	1,126	27	2.4%
2005	369	6	1.6%	621	11	1.8%	132	1	0.8%	1,122	18	1.6%
2006	368	9	2.4%	569	10	1.8%	173	0	0.0%	1,110	19	1.7%
2007	354	4	1.1%	492	4	0.8%	219	0	0.0%	1,065	8	0.8%
2008	343	22	6.4%	397	26	6.5%	254	9	3.5%	994	57	5.7%
2009	325	47	14.5%	299	52	17.4%	212	19	9.0%	836	118	14.1%
2010	273	6	2.2%	235	2	0.9%	168	4	2.4%	676	12	1.8%
All years	4,098	201	4.9%	8,197	293	3.6%	1,677	50	3.0%	13,972	544	3.9%

Table 3: Default probability models

This table shows the results from a Cox proportional hazards model with time-varying covariates. Panel A reports regressions for the sample of 2,151 firms that were borrowers in the leveraged loan market during the period 1997 through 2010. Panel B reports regressions for the subsample of those firms which are PE backed at some time during the sample period. *PE-backed* is an indicator variable that takes a value of one when a firm is owned by a private equity fund. *PE-exited* equals one when a firm is no longer owned by a private equity firm but had a private equity owner within the last five years. Total debt/assets and rating are measured as of the date of the last financing. Variables are as defined in Appendix Table A1. Standard errors are reported in parentheses. Coefficients are statistically significant at the 1% (***), 5% (**), and 10% (*) levels, respectively.

A: Full sample

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PE-backed	0.162*	0.217**	-0.099	-0.035	0.717***	0.016	0.229
	(0.097)	(0.100)	(0.128)	(0.134)	(0.267)	(0.104)	(0.939)
PE-exited	-0.505***	-0.602***	-0.525**	-0.617***	-0.642***	-0.578***	-0.576***
	(0.154)	(0.156)	(0.217)	(0.225)	(0.225)	(0.162)	(0.162)
On Compustat	-0.025	-0.007	-0.989***	-0.959***	-0.884***	-0.060	-0.060
	(0.096)	(0.098)	(0.134)	(0.144)	(0.146)	(0.104)	(0.104)
Industry change in sales	-0.660	-1.144	-0.603	-1.434	-1.562	-0.392	-0.392
	(0.667)	(1.033)	(0.843)	(1.255)	(1.262)	(1.062)	(1.062)
Industry change in EBITDA/sales	-15.477***	-14.791***	-15.447***	-11.177*	-11.101*	-15.374***	-15.371***
	(3.169)	(4.734)	(4.403)	(5.924)	(5.935)	(5.022)	(5.023)
Industry market-to-book ratio	-0.107***	-0.042	-0.138***	-0.015	-0.011	-0.031	-0.031
	(0.040)	(0.066)	(0.051)	(0.075)	(0.074)	(0.066)	(0.066)
Log sales			0.013	0.016	0.030		
			(0.044)	(0.050)	(0.051)		
EBITDA/sales			0.001	0.001	0.001		
			(0.006)	(0.005)	(0.005)		
Total debt/assets			1.728***	1.663***	2.144***		
			(0.168)	(0.181)	(0.230)		
PE-backed*Total debt/assets					-1.016***		
					(0.323)		
Rating						0.329***	0.332***
						(0.021)	(0.025)
PE-backed*rating							-0.010
							(0.044)
S&P 500 return	-0.017***		-0.019***				
	(0.002)		(0.003)				
Recap	0.004	-0.067	-0.283*	-0.323*	-0.337*	0.000	-0.003
	(0.130)	(0.133)	(0.172)	(0.177)	(0.177)	(0.138)	(0.138)
Acquisition financing	-0.007	-0.041	-0.107	-0.156	-0.137	-0.001	-0.001
	(0.088)	(0.090)	(0.111)	(0.114)	(0.115)	(0.097)	(0.097)
Year & industry fixed effects	No	Yes	No	Yes	Yes	Yes	Yes
Likelihood Ratio	140.3	314.9	248.3	356.5	367.5	539.8	539.9
Number of firms	1,890	1,890	1,699	1,699	1,699	1,836	1,836
Number of defaults	538	538	347	347	347	484	484

Table 3 (continued)

B: PE-backed firms only

	(1)	(2)	(3)	(4)
Months since PE entry	0.007**	0.005	0.008 ***	0.008 ***
	(0.003)	(0.004)	(0.003)	(0.003)
Last fund raised < 5 yrs	-0.467**	-0.496*	-0.215	-0.122
	(0.238)	(0.277)	(0.186)	(0.173)
PE sponsor older than 10 yrs	-0.284	-0.143	-0.057	-0.146
	(0.206)	(0.231)	(0.156)	(0.143)
PE sponsor is top distressed investor	0.154	0.307	0.317	0.187
	(0.281)	(0.319)	(0.195)	(0.184)
On Compustat	-1.069***	-1.032 ***	-0.196	-0.044
	(0.206)	(0.241)	(0.171)	(0.150)
Industry change in sales	0.740	-0.774	0.571	0.566
	(1.616)	(2.603)	(1.817)	(1.196)
Industry change in EBITDA/sales	-22.146***	-18.776	-21.950 **	-21.986 ***
	(8.160)	(13.050)	(9.120)	(5.874)
Industry market-to-book ratio	-0.092	-0.130	-0.052	-0.071
	(0.084)	(0.165)	(0.115)	(0.067)
Log revenues	0.091	0.148		
	(0.088)	(0.112)		
EBITDA/sales	-0.861***	-0.872 **		
	(0.247)	(0.385)		
Total debt/assets	1.360***	1.014 ***		
	(0.283)	(0.337)		
Rating			0.302 ***	0.277 ***
			(0.039)	(0.036)
S&P 500 return	-0.018***			-0.018 ***
	(0.005)			(0.003)
Recap	-0.670**	-0.537 *	-0.246	-0.209
	(0.276)	(0.296)	(0.203)	(0.191)
Acquisition financing	-0.296	-0.431 *	-0.002	-0.058
	(0.211)	(0.233)	(0.157)	(0.147)
Year & industry fixed effects	No	Yes	Yes	No
Likelihood Ratio	93	160	237	141
Number of firms	804	804	907	907
Number of defaults	115	115	208	208

Table 4: Restructuring types, outcomes, and recovery rates

Default types and outcomes for of 621 default events of 552 U.S. companies between 1997 and 2011. The sample includes 253 events where the company is controlled by a private equity fund at the time of default (*PE-backed*) and 368 companies that are not (*non-PE-backed*). Restructuring outcomes that are "ongoing" in Panel C are unresolved as of July 2012. Panel E provides recovery rate statistics for the subsample of 267 defaults with data available from Moody's Ultimate Recovery database. Differences between PE- and non PE-backed subsamples are statistically significant using a rank-sum test at the 10% (*), 5% (**), and 1% (***) levels.

A: Restructuring type

		Chapter 11 (excluding pre-packed)	Pre-packaged bankruptcy	Distressed exchange	Other out-of-court	Total
Full sample of defaults	N	358	119	94	50	621
	% of defaults	58%	19%	15%	8%	
PE-backed	N	122	61	45	25	253
	% of defaults	48%	24%	18%	10%	
Non PE-backed	N	236	58	49	25	368
	% of defaults	64%	16%	13%	7%	

B. Number of months in default

All defaults	Time period	Mean	Median		N
Whole sample	1998-2006	16.6	12.8		372
	2007-2009	8.9	7.8		193
	2010-2011	3.7	3.3		15
	1998-2011	13.7	10.3		580
PE-backed	1998-2006	12.0	9.6	***	136
	2007-2009	8.0	6.4	*	96
	2010-2011	2.7	1.9		9
	1998-2010	10.1	7.7	***	241
Non PE-backed	1998-2006	19.2	14.0	***	236
	2007-2009	9.8	9.0	*	97
	2009-2010	5.3	4.1		6
	1998-2010	16.2	11.9	***	339
Chapter 11 only					
Whole sample	1998-2006	19.1	14.5		310
	2007-2009	10.8	9.8		149
	2010-2011	5.1	4.5		11
	1998-2011	16.1	12.2		470
PE-backed	1998-2006	14.4	12.4	***	106
	2007-2009	9.6	8.2	**	71
	2010-2011	4.0	3.9		6
	1998-2010	12.2	9.8	***	183
Non PE-backed	1998-2006	21.5	16.2	***	204
	2007-2009	11.8	11.0	**	78
	2009-2010	6.3	4.7		5
	1998-2010	18.6	13.9	***	339

Table 4 (continued)

C: Restructuring outcome

		Reorganized	Acquired by financial buyer	Acquired by strategic buyer	Liquidated	Ongoing
Whole sample	N	428	36	76	79	2
	% of defaults	69%	6%	12%	13%	0%
PE-backed	N	188	14	29	22	0
	% of defaults	74%	6%	11%	9%	0%
Non-PE-backed	N	240	22	47	57	2
	% of defaults	65%	6%	13%	15%	1%

D: Controlling equity owners at exit from Chapter 11

		Creditors of unknown identity	Bank lenders	Hedge fund	Original PE investor	Original non-PE share-holders	New PE investor	Manage-ment
Whole sample	N	100	53	32	23	6	49	1
	% of bankruptcies	38%	20%	12%	9%	2%	19%	0%
PE-backed	N	43	29	13	23	0	21	0
	% of bankruptcies	33%	22%	10%	18%	0%	16%	0%
Non-PE-backed	N	57	24	19	0	6	28	1
	% of bankruptcies	42%	18%	14%	0%	4%	21%	1%

E: Creditor recovery rates by restructuring outcome

	N	Mean	Median
All defaults			
Reorganized	267	0.58	0.59
Acquired by financial buyer	16	0.38	0.29
Acquired by strategic buyer	43	0.50	0.54
Liquidated	28	0.37	0.31
Total	354	0.54	0.54
PE-backed			
Reorganized	117	0.56	0.54
Acquired by financial buyer	6	0.32	0.19
Acquired by strategic buyer	16	0.51	0.55
Liquidated	10	0.37	0.29
Total	149	0.53	0.52
Non PE-backed			
Reorganized	150	0.60	0.60
Acquired by financial buyer	10	0.41	0.34
Acquired by strategic buyer	27	0.50	0.52
Liquidated	18	0.37	0.33
Total	205	0.55	0.56

Table 5: Defaulted firms, selected characteristics

Descriptive statistics for the sample of 621 default events of 552 U.S. companies that defaulted on their debt between 1997 and 2011. The sample includes 253 PE-backed defaults and 368 non PE-backed defaults. Variable definitions are provided in Appendix Table A1. Differences between the PE- and non-PE subsamples are statistically significant using a rank-sum test at the 10% (*), 5% (**), and 1% (***) levels.

A: Firm characteristics (financials measured at FYE prior to default or year prior, as available)

		Non PE-backed at default	PE-backed at default		Total
Public debt outstanding (dummy)	*N*	368	253		621
	Mean	0.829	0.735	***	0.791
EBITDA/sales (winsorized)	*N*	328	204		532
	Mean	0.060	0.090	***	0.072
	Median	0.056	0.082		0.067
Total debt/assets (winsorized)	*N*	322	192		514
	Mean	0.725	0.951	***	0.810
	Median	0.648	0.862		0.743

B: Industry and macro variables

		Non PE-backed at default	PE-backed at default		Total
Distressed industry (dummy)	*N*	365	252		617
	Mean	0.205	0.254		0.225
Industry median specific assets	*N*	368	253		621
	Mean	0.303	0.278	*	0.293
	Median	0.270	0.254		0.254

C: Bankruptcy subsample characteristics

		Non PE-backed at default	PE-backed at default		Total
Southern District of NY filing (dummy)	*N*	260	179		439
	Mean	0.146	0.117		0.134
Delaware filing (dummy)	*N*	260	179		439
	Mean	0.381	0.553	***	0.451

Table 6: Determinants of company filing for bankruptcy after default

The first three columns present logit regressions of the likelihood of the firm entering bankruptcy versus restructuring out of court for the sample of 621 defaults between 1997 and 2011. The last two columns present logit regressions of the likelihood of the firm filing a pre-packaged bankruptcy for the subsample of Chapter 11 filings. Variable definitions are provided in Appendix Table A1. Financial variables are measured at the fiscal year end prior to default (or year prior if not available). Industry fixed effects are at the Fama-French 49 industry level. "Dummies for missing firm financials" indicates specifications where firm financials are coded as zero when missing, and corresponding dummies are included for missing firm financials. Table shows marginal effects (above) and t-statistics (below), which are statistically significant at the 10% (*), 5% (**), and 1% (***) levels using standard errors clustered by default year.

	(1)	(2)	(3)	(4)	(5)
VARIABLES	Default results in bankruptcy	Default results in bankruptcy	Default results in bankruptcy	Bankruptcy is a pre-pack (Ch.11 only)	Bankruptcy is a pre-pack (Ch.11 only)
PE-backed	-0.073**	-0.055**	-0.133**	0.086**	0.078*
	(-2.160)	(-2.564)	(-1.972)	(2.527)	(1.898)
Months since PE entry			0.002***		
			(4.334)		
Last fund raised < 5 yrs			-0.029		
			(-0.562)		
PE sponsor older than 10 years			-0.008		
			(-0.118)		
PE is top distressed investor			-0.249**		
			(-2.061)		
On Compustat	0.039	0.019	-0.002	0.028	0.041
	(0.827)	(0.472)	(-0.062)	(0.508)	(0.633)
Public debt outstanding	-0.054	-0.026	-0.036	-0.004	-0.004
	(-1.099)	(-0.606)	(-0.848)	(-0.061)	(-0.100)
Distressed industry	-0.126	-0.083	-0.096	-0.094	-0.193***
	(-0.769)	(-0.796)	(-0.862)	(-0.955)	(-2.941)
Industry median specific assets	-0.048			-0.091	
	(-0.284)			(-0.717)	
Distressed industry*specific assets	0.204	0.177	0.184	0.213	0.669**
	(0.687)	(0.609)	(0.630)	(0.572)	(2.426)
Industry market-to-book ratio	-0.228***	-0.220***	-0.221***	0.102	0.068
	(-3.195)	(-3.071)	(-2.903)	(0.953)	(0.371)
Log sales	0.028**	0.029**	0.041***	-0.012	-0.025
	(1.986)	(2.092)	(3.340)	(-0.622)	(-1.177)
EBITDA/Sales	0.013	0.033	0.030	0.528***	0.411**
	(0.101)	(0.313)	(0.291)	(3.421)	(2.085)
Revenue growth	0.120	0.063	0.064	-0.176**	-0.178
	(1.218)	(0.814)	(0.803)	(-2.174)	(-1.559)
Total Debt/Assets	0.042	0.044	0.013	0.189**	0.158
	(0.932)	(0.779)	(0.234)	(2.438)	(1.506)
Moody's default rate, year of default	-2.798***				
	(-3.322)				
S&P 500 return, year of default	-0.001				
	(-1.383)				
Dividend recap			-0.064*		
			(-1.928)		
Year fixed effects	No	Yes	Yes	Yes	Yes
Industry fixed effects	No	Yes	Yes	No	Yes
Dummies for missing firm financials	No	Yes	Yes	No	Yes
Pseudo-R2	0.08	0.15	0.18	0.15	0.20
Observations	500	611	609	377	457

Table 7: Determinants of the time spent in restructuring

Regressions for the number of months in default on *PE-backed* and other control variables for a sample of 621 defaults between 1997 and 2011. Specifications (1) through (3) are Tobit regressions, left censored at zero, while Specifications (4) through (6) are OLS regressions. Variable definitions are provided in Appendix Table A1. Coefficients (with t-statistics below, calculated using standard errors clustered by default year) are statistically significant at the 10% (*), 5% (**), and 1% (***) levels.

	(1)	(2)	(3)	(4)	(5)	(6)
	Months in default	Months in default	Months in default	Months in Ch.11	Months in Ch.11	Months in Ch.11, no prepacks
VARIABLES	(Tobit)	(Tobit)	(Tobit)	(OLS)	(OLS)	(OLS)
PE-backed	-4.148***	-3.534***	-5.051**	-3.689**	-2.718*	-2.975*
	(-3.093)	(-3.432)	(-2.136)	(-2.656)	(-2.076)	(-2.005)
Months since PE entry			0.027			
			(1.128)			
Last fund raised < 5 yrs			1.040			
			(0.466)			
PE sponsor older than 10 years			0.102			
			(0.084)			
PE is top distressed investor			-4.548*			
			(-1.771)			
On Compustat	-0.071	0.935	0.730	-0.838	1.308	2.104
	(-0.030)	(0.475)	(0.369)	(-0.378)	(0.639)	(0.717)
Public debt outstanding	0.368	-0.603	-0.494	1.711	0.049	0.875
	(0.174)	(-0.349)	(-0.2710	(0.649)	(0.022)	(0.271)
Distressed industry	-4.664	-1.969	-2.002	-4.831*	-1.043	-9.411
	(-1.111)	(-0.664)	(-0.670)	(-1.891)	(-0.217)	(-1.170)
Industry specific assets	1.896			2.881		
	(0.312)			(0.563)		
Distressed Ind *specific assets	10.065	5.541	5.777	11.005	4.549	25.516
	(0.769)	(0.490)	(0.530)	(1.068)	(0.281)	(1.057)
Industry market-to-book ratio	-5.732	-8.281**	-7.972**	-2.966	-3.660	-6.561
	(-1.600)	(-2.244)	(-2.192)	(-0.854)	(-0.855)	(-1.207)
Moody's default rate	-48.811			-23.620		
	(-1.148)			(-0.579)		
S&P 500 return	-0.046			-0.032		
	(-0.652)			(-0.441)		
Log sales	1.160*	1.580***	1.691***	1.033	1.310**	1.369*
	(1.666)	(3.605)	(4.184)	(1.638)	(2.600)	(1.892)
EBITDA/sales	2.330	4.869	4.951	1.789	5.500	10.936
	(0.470)	(1.155)	(1.213)	(0.309)	(0.853)	(1.269)
Revenue growth	1.904	-1.471	-1.789	-0.332	-3.699*	-5.973***
	(1.050)	(-0.929)	(-1.208)	(-0.242)	(-2.122)	(-3.156)
Total debt/assets	-4.869**	-2.932	-3.430*	-6.260***	-5.210**	-6.142**
	(-2.435)	(-1.354)	(-1.895)	(-3.819)	(-2.558)	(-2.511)
Delaware filing					-2.298	-0.981
					(-1.588)	(-0.728)
S. District of NY filing					3.923	6.588**
					(1.776)	(2.204)
Dividend recap			3.459			
			(1.408)			
Constant	21.395**	6.641	4.622	20.471**	18.952*	23.755*
	(2.263)	(0.787)	(0.526)	(2.251)	(1.877)	(1.929)
Sigma	14.954***	13.277***	13.253***			
	(11.609)	(10.315)	(10.146)			
Year fixed effects	No	Yes	Yes	No	Yes	Yes
Industry fixed effects	No	Yes	Yes	No	Yes	Yes
Dummies for missing finan.	No	Yes	Yes	No	Yes	Yes
Observations	465	570	568	371	427	316

Table 8: Determinants of defaulted firm surviving as an independent company

Company survives is defined as firms that are reorganized as independent companies or are acquired by a financial buyer. The first three columns show results from logit regressions for the full sample of 621 default events, while the fourth column shows results for the subsample of Chapter 11 bankruptcies. Columns (5) and (6) show results from logit regressions for the likelihood that pre-default equity holders stay in control for the subsample of firms that successfully emerge from Chapter 11. Variable definitions are provided in Appendix Table A1. The table shows marginal effects and t-statistics, which are statistically significant at the 10% (*), 5% (**), and 1% (***) levels using standard errors clustered by default year.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Company survives (all defaults)	Company survives (all defaults)	Company survives (all defaults)	Company survives (Ch.11)	Equity retains control (Ch.11)	Equity retains control (Ch.11)
PE-backed	0.094***	0.089***	-0.017	0.120***	0.066***	0.169*
	(4.154)	(4.088)	(-0.219)	(2.749)	(2.623)	(1.678)
Months since PE entry			0.001			-0.001
			(1.186)			(-1.465)
Last fund raised < 5 yrs			0.078**			-0.010
			(1.981)			(-0.750)
PE sponsor older than 10 years			0.031			-0.019
			(0.470)			(-1.178)
PE is top distressed investor			0.003			-0.018
			(0.037)			(-0.843)
On Compustat	0.007	-0.027	-0.032	0.031	0.011	0.015
	(0.235)	(-0.592)	(-0.719)	(0.508)	(0.646)	(1.035)
Public debt outstanding	0.028	0.080***	0.085***	0.069	-0.018	-0.010
	(0.700)	(2.751	(2.753)	(1.268)	(-0.728)	(-0.488)
Distressed industry	0.069	-0.020	-0.010	-0.138	-0.006	-0.002
	(0.784)	(-0.352)	(-0.177)	(-1.507)	(-0.361)	(-0.118)
Industry specific assets	0.363***				-0.040	-0.027
	(2.675)				(-0.958)	(-0.766)
Distressed Ind*spec assets	-0.426**	-0.284	-0.304	-0.342	0.001	-0.007
	(-2.170)	(-1.360)	(-1.440)	(-1.369)	(0.024)	(-0.232)
Industry market-to-book ratio	0.235	0.282**	0.273**	0.224	-0.012	-0.019
	(1.618)	(2.303)	(2.294)	(1.079)	(-0.230)	(-0.335)
Moody's default rate	2.222**				0.482*	0.454
	(2.303)				(1.667)	(1.607)
S&P 500 return	0.001				0.000	0.000
	(0.606)				(0.271)	(0.132)
Log sales		-0.012	-0.013	-0.008	-0.003	-0.001
		(-0.785)	(-0.813)	(-0.262)	(-0.802)	(-0.356)
EBITDA/sales		0.485***	0.484***	1.059***	-0.101	-0.098**
		(3.085)	(2.983)	(3.550)	(-1.525)	(-2.044)
Revenue growth		-0.078	-0.079	-0.162	0.027	0.015
		(-1.134)	(-1.138)	(-1.473)	(1.361)	(0.705)
Total debt/assets		-0.055	-0.063	-0.098	0.020	0.023
		(-1.227)	(-1.431)	(-1.591)	(0.533)	(0.663)
Delaware filing				0.080	-0.017*	-0.017**
				(1.425)	(-1.748)	(-2.089)
S. District of NY filing				0.114	-0.036***	-0.031**
				(1.137)	(-2.874)	(-2.459)
Dividend recap			0.077			0.027
			(0.872)			(0.568)
Year fixed effects	No	Yes	Yes	Yes	No	No
Industry fixed effects	No	Yes	Yes	Yes	No	No
Dummies for missing firm financials	No	Yes	Yes	Yes	Yes	Yes
Pseudo-R2	0.067	0.191	0.194	0.213	0.197	0.233
Observations	611	611	609	432	325	323

Table 9: Determinants of creditor recovery rates in default

OLS regressions of creditor recovery rates on *PE-backed* and other control variables for a sample of 347 defaults between 1997 and 2011 with recovery rate data from Moody's. Recovery rates are discounted recovery rates at the time of default as defined by Moody's. Coefficients (standard errors clustered by default year) are statistically significant at the 10% (*), 5% (**), and 1% (***) levels.

VARIABLES	(1) Recovery rate	(2) Recovery rate	(3) Recovery rate
PE-backed	0.008	-0.008	-0.067
	(0.333)	(-0.389)	(-1.121)
Months since PE entry			0.001*
			(1.714)
Last fund raised < 5 yrs			0.060
			(1.456)
PE sponsor older than 10 years			-0.047
			(-1.234)
PE is top distressed investor			0.042
			(0.612)
On Compustat	0.012	0.005	0.000
	(0.354)	(0.175)	(0.003)
Public debt outstanding	-0.010	0.048	0.047
	(-0.234)	(1.052)	(1.057)
Distressed industry	0.089	0.036	0.043
	(1.577)	(0.550)	(0.701)
Industry median specific assets	0.302***		
	(4.849)		
Distressed ind*specific assets	-0.390**	-0.277*	-0.292*
	(-2.661)	(-1.809)	(-1.918)
Industry market-to-book	0.193**	0.049	0.035
	(2.394)	(0.300)	(0.239)
Moody's default rate	-0.094		
	(-0.188)		
S&P 500 return	0.002**		
	(3.037)		
Log sales	0.021	0.014	0.014
	(1.369)	(0.725)	(0.740)
EBITDA/Sales	0.122	0.112	0.110
	(0.965)	(0.859)	(0.898)
Revenue growth	-0.134*	-0.099	-0.102*
	(-2.080)	(-1.754)	(-1.775)
Total Debt/Assets	-0.070*	-0.070**	-0.081***
	(-1.845)	(-2.429)	(-3.235)
Dividend recap <5yrs			0.058***
			(2.861)
Constant	0.123	0.718***	0.754***
	(0.809)	(3.369)	(3.711)
Year fixed effects	No	Yes	Yes
Industry fixed effects	No	Yes	Yes
Dummies for missing firm financials	No	Yes	Yes
Observations	311	347	346
Adj. R-squared	0.114	0.117	0.115

Table 10: Capital infusions

Panel A shows the frequency of capital infusions of different types in the two-year period before default for a sample of 621 defaults between 1997 and 2011. Panel B shows restructuring outcomes by whether or not the default was preceded by a capital infusion. Variable definitions are provided in Appendix Table A1. Differences between the infusion versus no infusion subsamples in Panel B are statistically significant using a rank-sum test at the 10% (*), 5% (**), and 1% (***) levels.

A: Capital infusion frequency and type

		Debt	Debt and equity or hybrid	Equity	Other / unknown type	Total
Whole sample	No. of infusions	15	12	103	9	139
	% of all defaults	2.4%	1.9%	16.6%	1.5%	18.1%
	% of infusions	10.8%	8.6%	74.1%	6.5%	100%
PE-backed	No. of infusions	11	6	49	8	74
	% of all defaults	4.4%	2.4%	19.4%	3.2%	29.4%
	% of infusions	14.9%	8.1%	66.2%	10.8%	100%
Non-PE-backed	No. of infusions	4	6	54	1	65
	% of all defaults	1.1%	1.6%	14.7%	0.3%	17.7%
	% of infusions	6.1%	9.2%	83.1%	1.5%	100%

B: Capital infusions and default outcome

Capital infusion before default?		No	Yes	
Number of defaults		482	139	
Months in default	Mean	14.4	11.2	**
	Median	11.0	8.6	
Ch. 11 filing	% of defaults	80.1%	65.5%	***
Remains independent	% of defaults	74.1%	77.0%	
Equity keeps control	% of Ch.11	6.6%	16.7%	***
Recovery rate, %	Mean	54.0%	56.3%	
	Median	53.3%	58.0%	

Table 11: Determinants of capital infusions before default

Logit regressions for the likelihood of receiving an infusion of capital in the two years before default. Coefficients are marginal effects. Standard errors clustered by default year and coefficients are statistically significant at the 10% (*), 5% (**), and 1% (***) levels.

	(1)	(2)	(3)	(4)
VARIABLES	Capital infusion bef. default	Capital infusion bef. default	Capital infusion bef. default	Capital infusion bef. default
PE-backed at default	0.146***	0.332***	0.339***	0.513***
	(3.079)	(4.722)	(5.569)	(12.013)
Months since PE entry		-0.003**	-0.003***	-0.004***
		(-2.507)	(-3.233)	(-5.915)
Last fund raised < 5 yrs				-0.114***
				(-6.309)
PE sponsor older than 10 years				-0.033
				(-0.916)
PE fund is top distressed investor				0.018
				(0.203)
On Compustat	-0.010	-0.005	0.014	0.010
	(-0.238)	(-0.109)	(0.420)	0.294)
Public debt outstanding	-0.134***	-0.136***	-0.076**	-0.077**
	(-3.133)	(-3.510)	(-2.545)	(-2.455)
Distressed industry	0.142	0.120	0.039	0.034
	(1.502)	(1.207)	(0.590)	0.519)
Industry median specific assets	-0.140	-0.146		
	(-0.962)	(-1.029)		
Distressed ind*specific assets	-0.087	-0.014	0.006	0.036
	(-0.428)	(-0.076)	(0.040)	(0.252)
Industry market-to-book ratio	0.356***	0.331***	0.192*	0.213*
	(3.128)	(3.067)	(1.669)	(1.886)
Log sales	0.028***	0.026**	0.027**	0.027***
	(2.617)	(2.467)	(2.452)	(3.006)
EBITDA/Sales	-0.122	-0.159	-0.079	-0.077
	(-0.654)	(-0.903)	(-0.690)	(-0.670)
Revenue growth	0.106**	0.087*	0.069**	0.066*
	(2.264)	(1.920)	(2.066)	(1.871)
Total Debt/Assets	-0.021	0.017	-0.013	-0.016
	(-0.377)	(0.298)	(-0.242)	(-0.287)
S&P 500 return	-0.002***	-0.002**		
	(-2.779)	(-2.345)		
Moody's default rates	0.311	-0.005		
	(0.550)	(-0.008)		
Dividend recap <5years of default				0.152***
				(3.282)
Year fixed effects	No	No	Yes	Yes
FF49 industry fixed effects	No	No	Yes	Yes
Dummies for missing firm financials	No	No	Yes	Yes
Observations	500	499	600	600
Pseudo R-squared	0.075	0.097	0.191	0.206
Adjusted R-squared				

Table 12: Capital infusions and default outcomes

Regressions for restructuring outcomes as a function of receiving an infusion of capital within two years of default and other control variables. Specifications (1) through (4), and (5) through (10) are logit regressions, where marginal effects are reported. Specifications (5) and (6) are left-censored tobit regressions, and specifications (11) and (12) are OLS regressions. Standard errors clustered by default year and coefficients are statistically significant at the 10% (*), 5% (**), and 1% (***) levels.

VARIABLES	Bankruptcy filing	Pre-pack (Ch. 11 only)	Months in default (Tobit)	Survives as independent	Equity in control (Ch.11 only)	Recovery rate
	(1)	(2)	(3)	(4)	(5)	(6)
PE-backed at default	-0.034	0.067*	-3.059***	0.090***	0.062**	-0.013
	(0-1.593)	(1.657)	(-3.409)	(4.089)	(2.470)	(-0.588)
Capital infusion	-0.138***	0.105**	-3.166**	-0.007	0.053	0.036
	(-2.867)	(2.347)	(-2.201)	(-0.288)	(1.451)	(0.868)
On Compustat	0.019	0.043	0.861	-0.027	0.010	0.004
	(0.497)	(0.719)	(0.441)	(-0.596)	(0.651)	(0.163)
Public debt	-0.037	0.002	-0.844	0.080***	-0.012	0.051
	(-0.865)	(0.056)	(-0.487)	(2.775)	(-0.571)	(1.082)
Distressed industry	-0.080	-0.192***	-1.950	-0.019	-0.004	0.037
	(-0.792)	(-2.956)	(-0.697)	(-0.333)	(-0.198)	(0.575)
Distressed ind*specific assets	0.172	0.665**	5.732	-0.285	-0.014	-0.279*
	(0.618)	(2.530)	(0.525)	(-1.349)	(-0.324)	(-1.903)
Industry market-to-book ratio	-0.200***	0.053	-7.638**	0.283**	-0.034	0.039
	(-2.620)	(0.282)	(-2.169)	(2.264)	(-0.913)	(0.242)
Log sales	0.033**	-0.029	1.670***	-0.012	-0.000	0.013
	(2.562)	(-1.311)	(3.774)	(-0.771)	(-0.102)	(0.722)
EBITDA/Sales	0.012	0.408**	4.936	0.484***	-0.095	0.124
	(0.127)	(2.075)	(1.183)	(3.094)	(-1.456)	(1.064)
Revenue growth	0.073	-0.182	-1.210	-0.077	0.024	-0.102*
	(0.989)	(-1.602)	(-0.824)	(-1.119)	(1.425)	(-1.817)
Total Debt/Assets	0.035	0.167	-3.109	-0.056	0.026	-0.069**
	(0.596)	(1.603)	(-1.378)	(-1.230)	(0.741)	(-2.361)
Sigma			13.227***			
			(1.269)			
Year fixed effects	Yes	Yes	Yes	Yes	No	Yes
FF49 industry fixed effects	Yes	Yes	Yes	Yes	No	Yes
Dummies for missing firm financials	Yes	Yes	Yes	Yes	Yes	Yes
Observations	611	457	570	611	325	347
Pseudo (Adjusted) R-squared	0.166	0.202	0.032	0.191	0.228	0.117

Appendix Table A1: Variable definitions

Variable	Description	Primary Source(s)
Bankruptcy is a pre-pack (Chapter 11 only)	Indicator variable that equals one when a firm files a Chapter 11 bankruptcy as a "pre-packaged" or "pre-arranged" deal.	The Deal Pipeline, Dealogic
Capital infusion	Indicator variable set equal to one when a defaulted firm receives an infusion of new capital in the two year period leading to default.	Capital IQ, Moody's
Company survives	Indicator variable that equals one if a company (i) remains a going concern (i.e., does not liquidate) following a reorganization, or (ii) is sold as a going concern to a financial buyer.	The Deal Pipeline, Moody's, various news sources
Default results in bankruptcy	Indicator variable that equals one when a defaulted firm files for Chapter 11 or Chapter 7 bankruptcy protection.	Moody's
Distressed industry	Indicator variable that equals one if firm is in an industry in which the median COMPUSTAT firm has a negative EBITDA-to-Sales margin.	COMPUSTAT
Dividend recap	Indicator variable that equals one if a firm borrowed in prior five years, where proceeds were used primarily to fund a dividend.	Reuters LPC Dealscan
EBITDA/sales	Ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to firm sales.	COMPUSTAT, Capital IQ, Moody's, 10Ks
Industry market-to-book ratio	Median ratio for COMPUSTAT firms of the market value of assets (book value of assets – book value of common equity + market value of common equity) to book value of assets.	COMPUSTAT
Industry median specific assets	Median ratio for COMPUSTAT firms of the book value of machinery and equipment to the book value of total assets.	COMPUSTAT
Last PE fund raised < 5 yrs	Indicator variable that equals one when a PE sponsor raised its last LBO fund within the past five years.	Preqin
Log sales	Natural logarithm of sales	COMPUSTAT, Capital IQ, Moody's, 10Ks
Months in default (months in Chapter 11)	Number of months from default date to date of completion of an out of court restructuring or exchange or confirmation of a bankruptcy plan.	Moody's, The Deal Pipeline
Months since PE entry	Months since the PE-backed company was acquired by the PE sponsor.	Capital IQ, Dealogic, The Deal Pipeline, SEC filings, websites of PE funds and portfolio firms
Moody's default rate	Annual default rate of corporate borrowers tracked by Moody's Investor Service.	Moody's
On Compustat	Indicator variable that equals one if financial data is available Compustat in a given year.	COMPUSTAT

PE-backed	Indicator variable set equal to one in a year when a firm is owned by a managed private equity fund.	Capital IQ, Dealogic, The Deal Pipeline, SEC filings, websites of PE funds and portfolio firms
PE-exited	Formerly *PE-backed* firm, where PE has exited the investment within the prior 5 years	
Non PE-backed	Indicator if *PE-backed* = 0; for default subsample tests (Sections V through VII), *PE-exited* is also included in *non PE-backed*.	
Ever PE-backed	*PE-backed* or *PE-exited* firm	
PE is top distressed investor	Indicator variable that equals one when a PE sponsor is listed as either: (1) A Preqin all-time top-10 "Distressed Private Equity Firm" or a sponsor raising a top-5 largest "Special Situations" or "Turnaround" fund between 2004-2011, or (2) listed in the appendix of Jiang, Li, and Wiang (2011) as a one of the "Top Hedge Fund Players in Chapter 11."	Preqin Special Report: Distressed Private Equity (October 2011) and Jiang, Li, and Wiang (2011)
PE sponsor older than 10 years	Indicator variable that equals one when a PE sponsor raised its first fund more than 10 years prior.	Preqin
Public debt outstanding	Indicator variable that equals one if firm had public debt outstanding.	Moody's
Rating	Moody's credit rating, coded as a numerical variable where Aaa=1, Aa=2, Aa1=3, Aa2=4, Aa3=5, A=6, A1=7, A2=8, A3=9, Baa=10, Baa1=11, Baa2=12, Baa3=13, Ba=14, Ba1=15, Ba2=16, Ba3=17, B=18, B1=19, B2=20, B3=21, Caa=22, Caa1=23, Caa2=24, Caa3=25, Ca=26, and C=27.	Moody's
Recovery rate	Moody's "family" recovery rate, calculated as the total dollar proceeds paid when a defaulted firm is sold or liquidated, or estimated enterprise market value when a firm is reorganized, divided by total liabilities outstanding at default. Recoveries are discounted back to the date of default resolution.	Moody's Ultimate Recovery Database
Revenue growth	Percentage increase in annual sales.	COMPUSTAT, Capital IQ, Moody's, 10Ks
Total debt/assets	Ratio of firm total debt to assets. Total debt is the sum of long-term debt, currently maturing long-term debt, and short-term debt, including short term notes.	COMPUSTAT, Capital IQ, Moody's, 10Ks
S&P 500 return	Annual return on S&P 500 index.	Moody's Investor Service

Appendix Table A2: Sample industry distribution

Fama-French industry group		N, (% of total subsample)				
		Full sample	Ever PE-backed	Non PE-backed	Defaults	No default
1	Agriculture	12 (0.6%)	8 (0.8%)	4 (0.3%)	6 (1.1%)	6 (0.4%)
2	Food Products	39 (1.8%)	16 (1.7%)	23 (1.9%)	9 (1.6%)	30 (1.9%)
3	Candy & Soda	13 (0.6%)	7 (0.7%)	6 (0.5%)	4 (0.7%)	9 (0.6%)
4	Beer & Liquor	4 (0.2%)	0 (0.0%)	4 (0.3%)	0 (0.0%)	4 (0.3%)
5	Tobacco Products	1 (0.0%)	1 (0.1%)	0 (0.0%)	0 (0.0%)	1 (0.1%)
6	Recreation	15 (0.7%)	10 (1.0%)	5 (0.4%)	7 (1.3%)	8 (0.5%)
7	Entertainment	53 (2.5%)	21 (2.2%)	32 (2.7%)	15 (2.7%)	38 (2.4%)
8	Printing and Publishing	44 (2.0%)	29 (3.0%)	15 (1.3%)	17 (3.1%)	27 (1.7%)
9	Consumer Goods	55 (2.6%)	36 (3.7%)	19 (1.6%)	16 (2.9%)	39 (2.4%)
10	Apparel	23 (1.1%)	10 (1.0%)	13 (1.1%)	10 (1.8%)	13 (0.8%)
11	Healthcare	78 (3.6%)	49 (5.1%)	29 (2.4%)	15 (2.7%)	63 (3.9%)
12	Medical Equipment	24 (1.1%)	11 (1.1%)	13 (1.1%)	3 (0.5%)	21 (1.3%)
13	Pharmaceutical Products	18 (0.8%)	8 (0.8%)	10 (0.8%)	3 (0.5%)	15 (0.9%)
14	Chemicals	57 (2.6%)	31 (3.2%)	26 (2.2%)	17 (3.1%)	40 (2.5%)
15	Rubber and Plastic Products	45 (2.1%)	26 (2.7%)	19 (1.6%)	20 (3.6%)	25 (1.6%)
16	Textiles	33 (1.5%)	10 (1.0%)	23 (1.9%)	16 (2.9%)	17 (1.1%)
17	Construction Materials	38 (1.8%)	23 (2.4%)	15 (1.3%)	12 (2.2%)	26 (1.6%)
18	Construction	41 (1.9%)	11 (1.1%)	30 (2.5%)	14 (2.5%)	27 (1.7%)
19	Steel Works Etc	47 (2.2%)	10 (1.0%)	37 (3.1%)	20 (3.6%)	27 (1.7%)
20	Fabricated Products	16 (0.7%)	12 (1.2%)	4 (0.3%)	8 (1.4%)	8 (0.5%)
21	Machinery	71 (3.3%)	33 (3.4%)	38 (3.2%)	16 (2.9%)	55 (3.4%)
22	Electrical Equipment	22 (1.0%)	13 (1.3%)	9 (0.8%)	6 (1.1%)	16 (1.0%)
23	Automobiles and Trucks	36 (1.7%)	15 (1.6%)	21 (1.8%)	16 (2.9%)	20 (1.3%)
24	Aircraft	14 (0.7%)	6 (0.6%)	8 (0.7%)	1 (0.2%)	13 (0.8%)
25	Shipbuilding, Railroad Equipment	8 (0.4%)	5 (0.5%)	3 (0.3%)	1 (0.2%)	7 (0.4%)
26	Defense	5 (0.2%)	3 (0.3%)	2 (0.2%)	0 (0.0%)	5 (0.3%)
27	Precious Metals	2 (0.1%)	0 (0.0%)	2 (0.2%)	0 (0.0%)	2 (0.1%)
28	Non-Metallic and Industrial Metal	11 (0.5%)	4 (0.4%)	7 (0.6%)	4 (0.7%)	7 (0.4%)
29	Coal	15 (0.7%)	5 (0.5%)	10 (0.8%)	2 (0.4%)	13 (0.8%)
30	Petroleum and Natural Gas	110 (5.1%)	25 (2.6%)	85 (7.2%)	14 (2.5%)	96 (6.0%)
31	Utilities	70 (3.3%)	14 (1.5%)	56 (4.7%)	6 (1.1%)	64 (4.0%)
32	Communication	122 (5.7%)	56 (5.8%)	66 (5.6%)	39 (7.1%)	83 (5.2%)
33	Personal Services	39 (1.8%)	24 (2.5%)	15 (1.3%)	6 (1.1%)	33 (2.1%)
34	Business Services	166 (7.7%)	87 (9.0%)	79 (6.7%)	40 (7.2%)	126 (7.9%)
35	Computers	19 (0.9%)	9 (0.9%)	10 (0.8%)	3 (0.5%)	16 (1.0%)
36	Electronic Equipment	52 (2.4%)	32 (3.3%)	20 (1.7%)	3 (0.5%)	49 (3.1%)
37	Measuring and Control Equipment	56 (2.6%)	25 (2.6%)	31 (2.6%)	11 (2.0%)	45 (2.8%)
38	Business Supplies	14 (0.7%)	7 (0.7%)	7 (0.6%)	1 (0.2%)	13 (0.8%)
39	Shipping Containers	44 (2.0%)	23 (2.4%)	21 (1.8%)	15 (2.7%)	29 (1.8%)
40	Transportation	17 (0.8%)	10 (1.0%)	7 (0.6%)	2 (0.4%)	15 (0.9%)
41	Wholesale	64 (3.0%)	31 (3.2%)	33 (2.8%)	20 (3.6%)	44 (2.8%)
42	Retail	113 (5.3%)	57 (5.9%)	56 (4.7%)	29 (5.3%)	84 (5.3%)
43	Restaraunts, Hotels, Motels	145 (6.7%)	70 (7.3%)	75 (6.3%)	49 (8.9%)	96 (6.0%)
44	Banking	98 (4.6%)	37 (3.8%)	61 (5.1%)	24 (4.3%)	74 (4.6%)
45	Insurance	27 (1.3%)	7 (0.7%)	20 (1.7%)	4 (0.7%)	23 (1.4%)
46	Real Estate	34 (1.6%)	11 (1.1%)	23 (1.9%)	5 (0.9%)	29 (1.8%)
47	Trading	35 (1.6%)	3 (0.3%)	32 (2.7%)	5 (0.9%)	30 (1.9%)
48	Almost Nothing	86 (4.0%)	24 (2.5%)	62 (5.2%)	18 (3.3%)	68 (4.3%)
Total		2,151	965	1,186	552	1,599

Appendix Table A3: Robustness – PE vs. non-PE overlapping sample

Specification (2) - (10) shows regressions of default outcomes on *PE-backed* and other variables, where all observations with Pr(PE-backed) less than 0.1 or larger than 0.9 have been excluded from the sample. Pr(PE-backed) are fitted values from specification (1). Coefficients (with t-statistics below, calculated using standard errors clustered by default year) are statistically significant at the 10% (*), 5% (**), and 1% (***) levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
VARIABLES	PE control (logit)	Bankruptcy filing (logit)	Pre-pack in Ch.11 (logit)	Months in def. (Tobit)	Months in Ch.11 (OLS)	Survives as indep. (logit)	Survives in Ch.11 (logit)	Eq. stays in Ch.11 (logit)	Recovery rate (OLS)	Cap.infusion (logit)
PE-backed		-0.071***	0.080*	-3.572***	-3.264**	0.081***	0.105**	0.075***	-0.003	0.159***
		(-2.934)	(1.850)	(-3.604)	(-2.515)	(3.329)	(2.477)	(2.830)	(-0.140)	(3.675)
On Compustat	-0.264***	0.032	0.081	0.587	0.236	-0.015	0.031	0.017	0.006	-0.004
	(-2.873)	(0.759)	(1.279)	(0.287)	(0.104)	(-0.338)	(0.464)	(0.848)	(0.166)	(-0.097)
Public debt outstanding	-0.062	-0.026	0.000	-0.805	0.526	0.065**	0.075	-0.025	0.080**	-0.099***
	(-1.134)	(-0.567)	(0.010)	(-0.451)	(0.203)	(2.057)	(1.507)	(-0.778)	(2.199)	(-3.243)
Distressed industry	0.013	-0.090	-0.201***	-2.718	-2.490	-0.017	-0.009	-0.025	0.047	0.044
	(0.135)	(-0.723)	(-3.445)	(-0.851)	(-0.632)	(-0.245)	(-0.083)	(-1.262)	(0.798)	(0.587)
Industry median specific assets								-0.052		
								(-1.045)		
Distressed ind*specific assets	-0.071	0.164	0.751***	6.116	8.206	-0.292	-0.597*	0.059	-0.267**	-0.046
	(-0.361)	(0.463)	(2.787)	(0.537)	(0.589)	(-1.542)	(-1.646)	(0.843)	(-2.559)	(-0.284)
Industry market-to-book	-0.228	-0.214***	0.017	-7.995**	-4.468	0.320***	0.251	-0.014	0.060	0.246*
	(-1.011)	(-2.829)	(0.093)	(-2.011)	(-0.993)	(2.716)	(1.264)	(-0.247)	(0.350)	(1.869)
Log sales	-0.020	0.036**	-0.030	1.666***	1.521***	-0.012	-0.001	-0.003	0.013	0.034***
	(-0.945)	(2.433)	(-1.306)	(3.338)	(3.131)	(-0.847)	(-0.036)	(-0.747)	(0.677)	(2.746)
EBITDA/Sales	0.188	-0.108	0.391*	3.421	4.801	0.591**	0.769*	-0.118	0.289	0.047
	(1.594)	(-1.078)	(1.813)	(0.877)	(0.932)	(2.137)	(1.821)	(-1.468)	(1.666)	(0.441)
Revenue growth	-0.250***	0.113*	-0.177	-2.829	-4.695*	-0.122**	-0.192**	0.040	-0.114	0.068*
	(-3.826)	(1.884)	(-1.562)	(-1.245)	(-1.858)	(-2.044)	(-2.132)	(1.335)	(-1.351)	(1.901)
Total Debt/Assets	0.372***	0.017	0.111	-3.675	-4.881**	-0.060	-0.088	0.015	-0.067	-0.063
	(3.777)	(0.272)	(1.100)	(-1.619)	(-2.479)	(-1.606)	(-1.577)	(0.326)	(-1.630)	(-0.996)
S&P 500 return								0.000		
								(0.178)		
Moodys default rate								0.494		
								(1.511)		
Delaware filing								-0.021*		
								(-1.882)		
S. Distr. of NY filing								-0.040***		
								(-2.658)		
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
FF49 industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Dummies missing firm financials	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	611	545	420	526	425	561	432	303	318	553
Pseudo (Adj) R-squared	0.179	0.157	0.191	0.032	(0.117)	0.211	0.206	0.197	(0.115)	0.179

Appendix Table A4: Robustness – Currently vs. formerly PE-backed companies

Ever PE-backed is a dummy variable for whether the defaulted firm has been controlled by a PE fund, currently or in the past. *PE-backed* is a dummy variable for whether the firm is currently backed by a PE fund. Coefficients (with t-statistics below, calculated using standard errors clustered by default year) are statistically significant at the 10% (*), 5% (**), and 1% (***) levels.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	Bankruptcy filing (logit)	Pre-pack in Ch.11 (logit)	Months in default (Tobit)	Months in def. (OLS), Ch. 11 only	Survives as independent company	Survives as independent (Ch.11 only)	Equity stay in control (Ch.11 only)	Recovery rate	Capital infusion bef. default
Ever PE-backed	0.097	0.078	-2.650*	-3.655**	-0.099	-0.102	-0.955***	-0.053	-0.020
	(1.377)	(1.187)	(-1.705)	(-2.250)	(-1.436)	(-1.116)	(-36.603)	(-0.907)	(-0.261)
PE-backed	-0.152**	0.007	-1.154	-0.085	0.173***	0.205**	0.978***	0.042	0.185*
	(-1.988)	(0.093)	(-0.624)	(-0.050)	(2.988)	(2.498)	(94.712)	(0.747)	(1.941)
On Compustat	0.020	0.043	0.754	0.424	-0.028	0.006	0.005	0.005	0.006
	(0.498)	(0.666)	(0.385)	(0.214)	(-0.632)	(0.091)	(0.660)	(0.205)	(0.167)
Public debt outstanding	-0.026	-0.007	-0.592	0.818	0.078***	0.094**	-0.010	0.047	-0.080***
	(-0.605)	(-0.160)	(-0.342)	(0.372)	(2.653)	(2.088)	(-0.764)	(1.039)	(-2.629)
Distressed industry	-0.082	-0.189***	-2.248	-1.760	-0.015	-0.056	-0.003	0.035	0.066
	(-0.775)	(-2.845)	(-0.724)	(-0.443)	(-0.274)	(-0.751)	(-0.329)	(0.538)	(0.812)
Median specific assets							-0.019		
							(-0.911)		
S&P 500 return							0.000		
							(0.282)		
Moodys default rate							0.236		
							(1.589)		
Distressed ind*specific assets	0.176	0.652**	6.402	7.385	-0.304	-0.470*	0.001	-0.276*	-0.068
	(0.617)	(2.369)	(0.552)	(0.539)	(-1.533)	(-1.710)	(0.032)	(-1.825)	(-0.401)
Industry market-to-book ratio	-0.216***	0.068	-8.171**	-4.734	0.276**	0.237	-0.005	0.049	0.186
	(-3.128)	(0.372)	(-2.252)	(-1.140)	(2.257)	(1.237)	(-0.187)	(0.295)	(1.621)
Log sales	0.029**	-0.024	1.546***	1.354***	-0.012	0.000	-0.001	0.013	0.031***
	(2.133)	(-1.111)	(3.437)	(3.130)	(-0.773)	(0.007)	(-0.818)	(0.720)	(2.847)
EBITDA/sales	0.021	0.400*	5.386	5.318	0.490***	0.692**	-0.050	0.117	-0.076
	(0.206)	(1.958)	(1.261)	(0.914)	(3.191)	(2.320)	(-1.476)	(0.923)	(-0.666)
Sales growth	0.058	-0.177	-1.591	-3.046*	-0.081	-0.132*	0.013	-0.099	0.080**
	(0.766)	(-1.539)	(-0.935)	(-1.844)	(-1.252)	(-1.785)	(1.357)	(-1.705)	(2.535)
Total debt/assets	0.040	0.155	-2.855	-4.294**	-0.045	-0.047	0.010	-0.068**	-0.048
	(0.681)	(1.490)	(-1.345)	(-2.399)	(-0.899)	(-0.756)	(0.585)	(-2.436)	(-1.039)
Industry fixed effects	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Yes
Dummies missing firm financ.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	611	457	570	462	611	469	325	347	602
Adjusted R-squared	0.153	0.196	0.032	0.133	0.195	0.216	0.201	0.116	0.17