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INSTITUTIONAL TRADING OF SHARES OF DISTRESSED FIRMS AND ACQUISITION OF DISTRESSED FIRMS AS AN ALTERNATIVE TO INDEPENDENT REORGANIZATION

Elana Precourt
University of Rhode Island, elena_precourt@my.uri.edu

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BY

ELENA PRECOURT

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ELENA PRECOURT

APPROVED:

Dissertation Committee:

Major Professor Henry R. Oppenheimer

Bing-Xuan Lin

James J. Opaluch

Nasser H. Zawia
DEAN OF THE GRADUATE SCHOOL

UNIVERSITY OF RHODE ISLAND
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ABSTRACT

This dissertation consists of three essays related to bankruptcy. In the first we explore how institutional investors trade shares of bankrupt firms five years prior to the firms petitioning for Chapter 11 reorganization. In the second we investigate whether or not institutional ownership is related to performance of distressed firms as they attempt to reorganize. Another main theme of this essay is to examine whether or not institutional managers who acquire shares of bankrupt firms within three months from Chapter 11 filings, during bankrupt firms' reorganization, or shortly after bankruptcy proceedings possess ability to process information and to predict successful recovery of distressed firms by acquiring their undervalued shares in advance of improved share performance. The third essay explores changes in market and operating performances of merged bankrupt and distressed firms, analyzes whether or not distressed firms should pursue mergers and acquisitions (M&A) as an alternative to filing for Chapter 11, and evaluates how institutional investors trade shares of the firms that are about to be acquired. The main focus of the dissertation is to analyze how various market players behave as they face consequences of investing in, dealing with, or operating alongside the firms experiencing financial and/or operating difficulties that lead to filing for bankruptcy. In these three essays we intend to explore topics that have not previously been studied and presented in the finance literature.

In the first essay, we utilize a probability model to analyze institutions' propensity to start selling shares of failing firms at some point during the five-year period preceding bankruptcy filings. We develop modifications of the Seyhun and Bradley (1997) methodology to analyze how much investment behavior of institutional investors resembles that of corporate insiders and partition our sample based on the size of trades to determine the magnitude of the results for each trading group. To address the issues of endogeneity and selection bias we use a standard two-stage Heckman model. We find that during the five-year period preceding a bankruptcy filing institutional investors (except those managing investment

companies) are net buyers with a positive abnormal net number of shares traded during the period as compared to a control sample. Institutional managers start to sell shares of bankrupt firms sooner in some firms than in others; these earlier sales are of smaller firms with weaker operating performance, and lower equity risk. We observe strong signs of herding when assessing what prompts the institutions to start divesting failing investments. Institutional investors tend to sell well in advance of a bankruptcy filing firms that have smaller shareholdings of all institutional investors.

In the second essay we concentrate on analyzing institutional share purchases shortly before underperforming firms file for bankruptcy and while they are reorganizing. We determine types of institutions acquiring shares of bankrupt firms and track their investment behavior from the time of purchase to the time institutions start earning positive returns on investment or incur capital losses as a result of bankrupt firms' unsuccessful attempts to reorganize. We analyze market returns of distressed firms and address where necessary the issue of missing return data (Peterson (1989)). We find that during the five-quarter period starting in the quarter of emergence from Chapter 11 institutional investors are net buyers of firms' equity with a significantly larger positive abnormal net number of shares traded during the period as compared to a control sample. We also find that only in the quarter of emergence do the managers trade strategically. Institutional ownership negatively relates to bankrupt firms' post-emergence operating performance improvement and positively relates to the firms' post-emergence market performance recovery. Although the firms with institutional holdings have a better pre-bankruptcy operating performance and are less levered, we find that these characteristics do not relate to the firms' post-emergence operating or market performance improvements.

In the third essay we utilize a probability model to test the likelihood of distressed firms being acquired prior to filing for bankruptcy. Further, we analyze changes in post-merger performance and compare it between the sample and control firms. As part of this analysis we

define post-merger changes in operating cash flows as our dependent variable and have a binary variable measuring timing of acquisitions as one of the controls in the regression. We employ event study methodology to test the market reaction to acquisition announcements and how it affects security prices of targets and bidders. We find that distressed targets sell their assets at a premium or at a discount smaller than bankrupt firms do, thereby benefiting from acquisitions more than bankrupt targets. We also find that abnormal post-merger cash flow and cumulative abnormal return changes are more pronounced for bankrupt than distressed firms, indicating that acquisitions in Chapter 11 add greater economic value for both target and its acquirer than do acquisitions outside of bankruptcy. Insurance companies and, to a lesser extent, independent investment advisors recognize the acquired bankrupt firms' post-merger operating and market performance improvements and increase their ownership in the firms starting two to three quarters prior to the acquisition announcements. However we find that market returns around the day of the announcements do not accurately reflect post-merger changes in the operating cash flow returns. Abnormal market returns are negative for bankrupt targets, suggesting that investors do not anticipate positive changes in firms' future cash flows that we find as part of our analysis. Similarly, positive market reaction to acquisition announcements of distressed firms does not correspond to weak positive changes in their post-acquisition operating cash flow returns. We find post-merger market performance improvements for bankrupt and not distressed firms. In summary, distressed firms get a merger announcement premium and bankrupt firms give it away to their acquirers whose shareholders benefit from acquisition premiums in a year after the mergers.

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DEDICATION

To my husband, children, and parents

PREFACE

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CHAPTER 1

What do Institutional Investors Know and Act on before Almost Everyone Else: Evidence from Corporate Bankruptcies

by

Elena Precourt[1]; Henry R. Oppenheimer[2]

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[1] PhD Candidate, College of Business Administration, The University of Rhode Island, Kingston, RI 02881, Email: elena_precourt@my.uri.edu
[2] Associate Professor, College of Business Administration, The University of Rhode Island, Kingston, RI 02881, Email: hroppenheimer@mail.uri.edu

Abstract

In this paper we analyze investment behavior of institutional managers who hold and trade shares of firms which file for bankruptcy. We find that during the five-year period preceding a bankruptcy filing institutional investors (except those managing investment companies) are net buyers with a positive abnormal net number of shares traded during the period as compared to a control sample. Institutional managers start to sell shares of bankrupt firms sooner in some firms than in others; these earlier sales are of smaller firms with weaker operating performance, and lower equity risk. We observe strong signs of herding when assessing what prompts the institutions to start divesting failing investments. Institutional investors tend to sell well in advance of a bankruptcy filing firms that have smaller shareholdings of all institutional investors. We do not find evidence that institutional stockholders trade strategically and avoid material price declines before they occur. Institutional managers trade consistently with sell recommendations issued by security analysts. However, on average analysts do not materially downgrade their recommendations for the failing firms until only a few months before a Chapter 11 bankruptcy filing; consequently the institutional managers' decision to divest of shares of the firms may be too-little-too-late.

I. Introduction

An informed investor is compensated for the costly investigation into asset's value by his or her ability to identify and acquire assets that yield greater potential returns on the investments (Rock (1986)).[3] Some academics argue that institutional investors are prone to behave rationally and to appear as "intelligent" investors who stabilize security prices by offsetting irrational trades by individual investors (Lakonishok et al. (1994)). Because of the size of the investments and their time horizons,[4] institutional investors have strong incentives to gather costly information about firms whose shares they acquire for their portfolios and to decide whether contemporaneous weak performance is an indication of poor firm quality or a result of desirable long-term firm investment (Admati et al. (1994), Maug (1998), Edmans (2009)).

In this paper we analyze the investment behavior of institutional investors and quarterly changes in their investment holdings of firms during five years prior to these firms filing for reorganization. The existing empirical literature on institutional trading does not provide concrete evidence as to how sophisticated the investment strategies are that institutions employ in their overall trading. While some researchers argue that institutional investors are capable of picking winners and exhibit fully rational herding behavior that promotes price discovery and predicts stock returns (Nofsinger and Sias (1999), Sias (2004)), others conclude that managers mechanically acquire stocks with certain desirable characteristics and price levels (Falkenstein (1996)) and irrationally engage in herding causing

[3] Or identify and divest assets that have low or negative potential returns.

[4] According to Hotchkiss and Strickland (2003) who investigate investor composition, low turnover institutional investors (those with average holding period of 3 years or longer) own the greatest percentage of shares outstanding (mean of 27.4% and median of 27.5%); high turnover managers, with holding period of less than 1.5 years, hold on average 10.8% of shares outstanding (with median of 8.7%). Maug (1998) finds that information cost and cost of monitoring inversely relates to market liquidity and that frequently traded shares reduce institutional investors' incentives to gather information through monitoring because the share liquidity allows institutions to sell their holdings more easily. We believe that the marginal benefits institutional investors gain from information gathering and analysis must exceed their marginal costs for the investors to consider these expenditures.

temporary price bubbles (Dreman and Lufkin (2000)) and future price corrections (Gutierrez and Kelley (2009)). Irrespective of that, we can, to this point, find no empirical evidence relevant to institutional holdings/trading of companies as they approach bankruptcy.

It is well established that the investment returns of firms in financial distress are invariably quite negative and equity holders suffer significant capital losses starting several years prior to Chapter 11 filings (Clark and Weinstein (1983)). Firms usually start experiencing financial difficulties long before petitioning for reorganization in the federal court by filing Chapter 11 (Altman (1968), Aharony, Jones, and Swary (1980), Clark and Weinstein (1983)) and investors continue to suffer sizable losses up to the time of filing (Clark and Weinstein (1983)). Aharony et al. (1980) observe negative cumulative differential portfolio return starting roughly four years before bankruptcy with investors having to continuously adjust for declining solvency over the four-year period.

The analysis presented in this paper is intended to provide a first examination of whether institutional investors utilize information they acquire to accurately time transactions during the five years prior to Chapter 11 filings. If institutional investors accurately process valuable information they possess (or should possess) regarding the future stock performance of the firms in which they invest, we conjecture that because of their in-depth knowledge they would engage in sell-offs prior to the filings. Timing of a sell-off, however, is of a greater importance than the mere fact that the investors dispose of the holdings sometime during the five-year period. Do the institutional investors divest long before a struggling firm goes under, prior to its share price significantly declining? Or do they hold on to the shares of distressed firms until it is well established that bankruptcy is inevitable (thus achieving the same negative results as other investors)? In addition, do institutions behave differently if other institutional managers are holding shares of the same firms and does the magnitude of

these (other institutional) holdings matter?[5] We attempt to answer these questions and expect to observe investment behavior that closely resembles that of corporate insiders, when the latter sell (postpone purchase) before significant stock-price decreases and buy (postpone sales) before significant price increases (Jaffe (1974), Seyhun (1986), Seyhun and Bradley (1997)). Investors may liquidate their positions because they feel that they possess adverse information about the firms' prospects that, if it became public, would cause immediate downward adjustment in the firms' share price (Scholes (1972)) or they may divest their portfolios of the underperforming shares because other large investors are doing so (Dreman and Lufkin (2000)).

Institutional investors expend considerable sums of money to obtain information on the firms whose securities they own or are considering purchasing. Institutions utilize both internal analysis and other, purchased, research. They may also use sell-side analyst research and recommendations in their decision making process. Sell side analysts tend to have an "upward bias" in their recommendations toward buy while internal research does not suffer from this upward bias. Hence, if a firm is deteriorating and sell-side recommendations are becoming more negative the internal research in the vast majority of cases would also become more negative, perhaps even sooner than analyst recommendations. Reasonable logic suggests institutional investors use this information when deciding whether to purchase or sell shares of firms subsequently filing for bankruptcy. If we rely on the assumption that institutional holders are informed about soundness of their investments, we expect to see fewer purchases of securities of failing firms as they approach bankruptcy and more sales of the underperforming investments as early as several years prior to bankruptcy filings. To analyze behavior of the institutional investors as the firms approach bankruptcy, we evaluate quarterly changes in institutional holdings starting five years (twenty calendar quarters) prior

[5] This question addresses the issue of institutional herding during five years preceding bankruptcy filings. It also addresses institutional independence of analysis.

to Chapter 11 filings. We further contrast these quarterly net changes with those for the firms of similar size that do not file for reorganization. We determine "abnormal" institutional trading by comparing changes in the quarterly institutional holdings for the distressed firms that petition for Chapter 11 reorganization to those for all other firms.[6]

As part of this research we also focus on whether institutional trading behavior is consistent with analysts' sell recommendations issued for the distressed firms held by the institutions during 20 quarters preceding bankruptcy filings. While analysts strive to increase institutional ownership in the firms they follow, institutional demand for information about particular firms affects analysts' decision about which firms to follow (O'Brien and Bhushan (1990)). We are interested in learning about whether institutional investors' buy/sell decisions are consistent with analysts' recommendations, and if so, whether this trading behavior is warranted.

We examine the investment behavior of institutional investors in light of two contrasting pieces of evidence: (1) institutional investors possess valuable information and act as informed investors and (2) they invest in securities of distressed firms, possibly disregarding the empirical evidence that these investments lack profitability and result in significant capital losses.[7] Although the investment behavior of institutional shareholders has been studied in the past, our paper is the first to examine changes in institutional holdings of the securities of firms approaching bankruptcy and to provide evidence of the institutions' ability to timely recognize failing investments. In addition, our results have implications

[6] Henceforth, firms that file Chapter 11 are sample firms and institutional holdings of them are sample holdings, and firms that do not file are control firms and institutional holdings of these firms are control holdings.

[7] On November 1, 2012 The *Wall Street Journal's* professional edition with Factiva announced the launch of Vega-Chi trading platform solely for institutional investors. The platform focuses on high yield and distressed securities only and offers institutional investors the ability to trade directly with each other. This launch indicates that institutional investors have an appetite for shares of distressed firms and risky investments. Previously, in the October 22, 2012 issue of the *Journal*, Nick Elliott reports that according to the Institutional Shareholder Services (ISS) annual survey, investors rank "risk oversight" in sixth place on a list of nine other topics, two notches down from previous ISS surveys in 2010 and 2011, when it ranked as the fourth-highest concern.

regarding the consequences of retail investors replicating investment behaviors of institutions in attempt to achieve greater returns.

The remainder of our paper is structured as follows. In Section II, we provide the necessary background on bankruptcy, the behavior of institutional investors and the interrelation between changes in institutional holdings and sell recommendations issued by security sell-side analysts. In Section III we describe our data and in Section IV we present our hypotheses. We develop our test methodology and report regression results in Section V. Section VI concludes our paper.

II. Chapter 11 Filings, The Investment Behavior of Institutional Investors, and Effects of Analyst Coverage and Management Reporting on Institutional Holdings

i. Corporate Financial Distress and Firms' Chapter 11 Petitions

Firms usually start experiencing financial difficulties long before petitioning for reorganization in federal court by filing Chapter 11 (Altman (1968), Aharony, Jones, and Swary (1980), and Clark and Weinstein (1983)). It is also important to note that firms file for Chapter 11 for various reasons. Altman and Hotchkiss (2006) list several reasons for corporate failures:

- Chronically sick industries (e.g., agriculture, textiles, department stores).
- Deregulation of key industries (e. g., airlines, financial services, healthcare, energy).
- High real interest rates in certain periods.
- International competition.
- Overcapacity within an industry.
- Increased leveraging of corporate America.
- Relatively high new business formation rates in certain periods.

We refine this list by offering two more reasons for firms to file for bankruptcy:

- High and/or frequently incurred litigation costs caused by product liability and/or other issues.
- Recurring union disputes resulting in rising operating and administrative costs.

In reality firms need not wait until they become financially insolvent to file for Chapter 11. Firm management can take advantage of the filing in an effort to amend firm's obligations and to avoid (or at least to deal with) costs and issues that threaten its existence.

What determines the success of a firm's reorganization? Hotchkiss and Mooradian (2004) study a comprehensive sample of 1,770 public companies that filed for Chapter 11 between 1979 and 2002 and find that 79 percent of the firms in their sample reached resolution of the case by June 2004 while the remaining 21 percent were either still in bankruptcy as of June 2004 or ended in liquidation. The firms that converted from Chapter 11 to Chapter 7 after failed efforts to reorganize were typically smaller firms. Hence, firm size (measured by prepetition assets) is an important characteristic related to the firm's success in reorganizing and emerging from Chapter 11 rather than converting to Chapter 7 and subsequently liquidating (Hotchkiss (1993)). In addition, Dahiya et al. (2003) find that availability of debtor-in-possession (DIP) financing to large companies is an important determinant of the reorganization versus liquidation outcome.

Hotchkiss (1995) finds that about 40 percent of firms emerging from bankruptcy continue to experience operating losses for several years following emergence. Hotchkiss (1995) uses return on assets and profit margin to assess firms' operating performance. She observes substantially lower firm performance than that of firms in similar industries: "The firms showed some positive growth in revenues, assets, and number of employees in the post-bankruptcy period, but showed little improvement in profitability, especially in comparison to industry groups. Performance varied little over the five-year post-bankruptcy period, which

suggests the firms did not simply need more time to recover".[8] Furthermore, Maksimovic and Phillips (1998) find that industry conditions (high-growth vs. declining) are an important determinant not just of the frequency of bankruptcy, but of economic decisions such as asset sales in bankruptcy. Finally, Hotchkiss and Mooradian (1997) find that whether firms return to profitability after Chapter 11 also depends on their ownership structure, governance, and the involvement of outside (vulture) investors. The participation of outside investors strongly and positively relates to post-bankruptcy success.

ii. Investment Behavior of Institutional Managers

Most large shareholders are institutional investors, rather than individual investors. Further, in many firms these large investors own substantial stakes, including, in aggregate, a majority of the outstanding shares. Institutional shareholders actively monitor firms in which they invest. Monitoring is costly and more difficult for smaller investors (Black (1992), Wahal (1996), DelGuercio and Hawkins (1998), Gillan and Starks (2000), Noe (2002), Woidtke (2002), Cremers and Nair (2005), and Almazan et al. (2005)). However, the extent of the institutional investors' monitoring may be limited by the free-rider problem due to the private cost of monitoring (Shleifer and Vishny (1986)), fiduciary duties and responsibilities (Badrinath et al. (1989), Gillan and Starks (2000)), and potential business relations with the firms (banks, insurance companies, and trusts are especially sensitive to this issue) (Brickley, Lease, and Smith (1988)).

Arbel et al. (1983) find that institutions typically avoid investing in thinly traded stock and in firms with small capitalizations. Institutional investors avoid taking greater risks associated with investment in small firms such as greater return volatility and lower liquidity. These constraints that affect investment decisions of institutions may lead to market segmentation, herding behavior, and continuous neglect of certain securities (Arbel et al. (1983), Nofsinger and Sias (1999)). Similarly, Falkenstein (1996) believes that managers

[8] *Corporate Financial Distress and Bankruptcy*, Altman and Hotchkiss (2006), 3rd edition, p. 84.

acquire stocks with certain desirable characteristics and price levels. He observes that managers have preference for stocks with high visibility and low transaction costs and avoid investments with low idiosyncratic volatility.[9]

Institutional investors engage in a positive-feedback trading and institutional herding[10] impacts share prices more than the herding behavior of individual investors (Nofsinger and Sias (1999), Sias (2004), Choi and Sias (2008)). Nofsinger and Sias (1999) focus on four issues: (1) the cross-sectional relation between changes in institutional ownership and stock returns, (2) post-herding returns, (3) relation between changes in institutional ownership and lag returns (indicators of feedback trading) and stock return momentum, and (4) differentiation between price-impact of herding and intra-period positive-feedback trading. They find that securities institutional investors add to their portfolios outperform those they sell and that this phenomenon does not stem from momentum strategies. They conclude that institutions' herding behavior is fully rational and observe no evidence of returns reversal in the two years following the herding period. Sias (2004) complements this literature on institutional herding by demonstrating that the fraction of institutions buying securities in a quarter positively correlates with the demand for the securities in the previous quarter, directly evidencing herding behavior. He finds that herding promotes price discovery and correctly predicts stock returns.

In contrast, Gutierrez and Kelley (2009) find that stocks with "buy" herds realize negative abnormal returns two to three years after the herding. This finding suggests that buy herds cause overvaluation and result in future price correction and this contrasts with the earlier conclusions that herding promotes price discovery. Gutierrez and Kelley (2009) do not

[9] Falkenstein (1996) explains this occurrence with fund managers taking advantage of the option-like payoff to their relative performance by avoiding the lowest volatility stocks rather than investing in the most highly volatile stocks.

[10] Nofsinger and Sias (1999, footnote 1, p.1,) define feedback trading as a special case of herding that "results when lag returns, or variables correlated with lag returns (e.g., earnings momentum, decisions of previous traders, changes in firms characteristics, etc.), act as the common signal; herding is a group of investors trading in the same direction over a period of time."

observe the same relation between "sell" herds and future returns; the "sell" herds do not predict future returns. They explain these asymmetric findings for "buy" and "sell" herds by concluding that price impact of the latter is temporary while price impact of the former is permanent.

Alternatively, some researchers suggest that institutional herding is a result of irrational psychological behavior and causes temporary price bubbles (Dreman and Lufkin (2000)). Scharfstein and Stein (1990) describe managers' herding and feedback trading as a fad often encouraged by agency problems: "managers simply mimic the investment decisions of other managers, ignoring substantive private information." (p. 465)

Several researchers provide evidence that higher institutional ownership has an effect on stock prices and returns (Brown and Brooke (1993), Gompers and Metrick (1999)), negatively impacts bid-ask spreads (Jennings et al. (2002)), and negatively (positively) correlates with stock return volatility among non-dividend (dividend) paying stocks (Rubin and Smith (2009)). Gompers and Metrick (2001) find that institutions demand stock characteristics that differ from the rest of the market: "institutions invest in stocks that are large, more liquid, and have had relatively low returns during the previous year." (pp. 1-2) They state that the increase in institutional share holdings of large stocks leads to higher demand for large, more liquid stocks, thereby affecting stock market prices and returns. Consistent with the research findings that support managers' superior investment abilities, Gompers and Metrick (1999) present evidence that level of institutional ownership forecasts returns, with forecasting power the strongest when institutional inflows are the highest.

iii. How the information issued by analysts impacts institutional holdings

Analysts' decisions to follow firms and institutional investors' decisions to hold shares of the same firms in their portfolios are interrelated: institutions pay close attention to the recommendations and analysts base their decision to provide coverage on, among other things, size of the institutional holdings (O'Brien and Bhushan (1990), Gompers and Metrick

(1999), Hotchkiss and Strickland (2003), Malmendier and Shanthikumar (2007)). The relationship between institutions and analysts is a supplier-customer type of relationship; while analysts strive to increase institutional ownership in the firms they follow, institutional demand for information about particular firms affects analysts' decision about which firms to follow (O'Brien and Bhushan (1990)). O'Brien and Bhushan (1990) find that the analyst following increases more in relatively neglected firms, to avoid competition from preexisting analyst following, and in firms whose volatility has declined, while institutional ownership increases with firm size, prior analyst following, and with increased market risk. Consistent with this, Mola et al. (2013) find that analysts are more likely to stop covering firms with small market capitalization, high book-to-market ratios, low liquidity, low trading volume, and low institutional holding.

Malmendier and Shanthikumar (2007) analyze the reaction of two types of traders, large and small, to upward bias of analyst recommendations (especially when it comes to affiliated analysts). They find that large investors adjust their responses to analyst recommendations and exert buy pressure when strong buy recommendations are issued, no pressure when buy recommendations are issued, and sell pressure when hold recommendations are issued. The researchers observe that institutions discount their reaction even further for recommendations issued by affiliated analysts.

Hotchkiss and Strickland (2003) assess trading behavior and reaction of institutional investors to security analysts' forecast errors. The objective of their study is to determine whether institutional investors cause price destabilization as a result of an overreaction to unexpected earnings news. They find that institutions, such as income-oriented banks, whose managers are less pressured to invest based on short-term performance are less sensitive to analysts' missed forecasts and earnings surprises and would consider sell-off only when the stock no longer meets their investment guidelines. On the other hand, when a stock is owned by aggressive growth and/or momentum types of institutions, the magnitude of the reaction to

the earnings announcements that are not in-line with earlier analysts' performance predictions is greater. Hotchkiss and Strickland (2003) conclude that institutional investors "act as 'traders' rather than 'owners'. They have short expected holding periods and focus on predicting near-term price movements instead of long-term prospects." (p. 1470)

Conversely, Bartov et al. (2000) find that mispricing following earnings announcements is least pronounced for stocks held by institutional investors, whose interpretation of the process underlying earnings is far more accurate than that of unsophisticated investors. Bartov et al. (2000) describe stock prices as reflecting a weighted average of both sophisticated and unsophisticated investors' expectations of and reactions to the earnings announcements and conclude that greater involvement of institutional investors leads to smaller observed post-announcement abnormal returns. The authors relate this occurrence to the level of the investor's erudition and dub institutional investors sophisticated and informed.

III. Sample Selection and Data Analysis

i. Corporate bankruptcy

We use *Thompson Financial Services SDC Platinum* database to obtain our sample of U.S. firms that filed for Chapter 11 reorganization and emerged from bankruptcy during the period of October 1993 through December 2011. The total initial sample consists of 1,831 firms filing for reorganization during this period. We do not restrict the sample by industry or regulatory requirements.

[Insert Table 1 here]

As shown in Table 1, and not surprisingly, the frequency of bankruptcy filings rises during two recessionary periods, 1999-2003, peaking in 2001, and 2008-2009. The recession of the early 2000s followed the dotcom boom of the late 1990s and was further exacerbated by a number of large accounting frauds (Enron, WorldCom, Tyco, and others). The second increase in the frequency of Chapter 11 filings occurs right around the mortgage meltdown

that triggered the recession of the late 2000s and resulted in many bankruptcies in the financial industry.[11] On average, the firms that filed during these two periods are larger than those filing during non-recessionary periods of this study.[12] We find that the durations in bankruptcy tend to be between one and two years, with some indication of shorter periods during the most recent years. Of 1,831 firms sampled, 1,790 filed for bankruptcy once during October 1993-December 2011, 39 filed twice, and 2 filed for bankruptcy three times.

ii. Firm characteristics and institutional ownership

Using a sample of 13f quarterly filings obtained from Thomson Reuters' Institutional (13f) Holdings – s34 we analyze changes in institutional holdings for firms filing and emerging from bankruptcy between 1993 and 2011 during the five years (twenty quarters) preceding the filings.[13] After identifying firms in the initial sample whose shares were held by institutional investors during the 1988-2011 time period, our sample is reduced from 1,831 firms to 1,142 firms.[14] During the twenty-quarter period we consider for each firm, most of them were held by more than one manager resulting in 124,844 quarterly institutional holding observations for the 1,142 firms in the sample.[15]

We utilize Compustat to obtain the market value of equity, cash, total assets, current assets, total liabilities, current liabilities, sales, operating income before depreciation, net income, pretax income, interest expense, working capital, retained earnings, common equity, deferred taxes, investment tax credit, and volatility (standard deviation of stock monthly returns). We derive several performance measure ratios using Compustat data: sales divided by total assets; operating income before depreciation divided by total assets (operating ROA);

[11] It should be noted that in the 2008-2009 there were a few very large bankruptcies such as Lehman Brothers and General Motors which strongly affect both the mean and standard deviation of the size measures.
[12] The largest median size is in 2009; the second largest is in 2011.
[13] Thomson Reuters adjusts the reported holdings and net changes for stock splits (including reverse stock splits which are a more frequent occurrence in the case of bankrupt firms), and we use the split-adjusted values.
[14] There were 689 firms (or 38% of 1,831 firms in the initial sample) that were not held by institutions during 1988-2011 time period.
[15] The mean (median) number of institutional investors per firm is 109 (56).

net income divided by total assets (ROA); total liabilities divided by total assets; total liabilities divided by market value of equity; current assets divided by current liabilities (current ratio); cash divided by current liabilities (cash ratio); and a sum of common equity, deferred taxes, and investment tax credit divided by market capitalization (B/M ratio). Altman's Z-score (Altman (1968)) is defined as 3.3x((pretax income + interest expense)/total assets) + 0.999x(sales/total assets) + 0.6x(market capitalization/total liabilities) + 1.2x(working capital/total assets) + 1.4(retained earnings/total assets).

We use Center for Research in Security Prices (CRSP) to obtain stock market related data. Following Seyhun and Bradley's (1997) methodology to capture shares' abnormal performance we determine market-adjusted abnormal return as quarterly holding period return adjusted for the NYSE/Amex/Nasdaq value-weighted return and share turnover as trading volume divided by total shares outstanding. Market adjusted returns capture the extent of underperformance of shares of the firms approaching bankruptcy and are used in studies similar to ours (Seyhun and Bradley's (1997), Brav et al (2000), Kadiyala and Rau (2004)). Brown and Warner (1985) describe "market adjusted returns" (p.7) as one of the methods and models of the return-generating process. In addition, risk adjusted returns are an unreliable measure of abnormal returns for the firms in distress.

There are multiple studies that investigate the relationship between bankruptcy risk and systematic risk. However, results of these studies are contradictory: for example, Lang and Stulz (1992) demonstrate that bankruptcy risk is positively related to systematic risk, while Opler and Titman (1994) and Dichev (1998) find that bankruptcies are most due to idiosyncratic factors, suggesting that bankruptcy risk is unrelated to systematic risk and that bankruptcy risk is not rewarded by higher returns. We also report trading volume and bid-ask spread obtained from CRSP.

Institutions are required to file 13f forms with the Securities and Exchange Commission (SEC) on a quarterly basis.[16] Thomson Reuters continues reporting 13f data for several quarters after an institutional manager stops filing with the SEC. The data provider maintains original filing date (date on the holding report in the SEC's EDGAR, the regulator's electronic record database) and changes reporting date for the repeating holdings. We eliminate all observations from the 13f data file for which filing date does not match reporting date, thereby determining the last quarter of actual 13f filings.

In addition, Thomson Reuters does not provide net change holdings for the institutions no longer filing 13f forms with the SEC; instead the data provider reports zero change in holdings for these institutions. To address this issue, we calculate the sell-off amounts as a negative of the prior quarter's holdings and report them as a net change for the quarter when no 13f report is filed with the SEC for the first time.[17] By refining the data in that manner, we have an accurate reflection of institutional holdings and their changes.

[Insert Table 2 here]

In Panel A of Table 2 we provide descriptive statistics for the sample firms. We report annual measures starting with year t-5, where year t=0 is the year of bankruptcy filing. While the median market value starts declining significantly in year t-4, the mean market

[16] The SEC's institutional investment manager filing mandate is as follows: "An institutional investment manager that uses the U.S. mail (or other means or instrumentality of interstate commerce) in the course of its business, and exercises investment discretion over $100 million or more in Section 13(f) securities (explained below) must report its holdings on Form 13F with the Securities and Exchange Commission (SEC). Form 13F is required to be filed within 45 days of the end of a calendar quarter. The Form 13F report requires disclosure of the name of the institutional investment manager that files the report, and, with respect to each section 13(f) security over which it exercises investment discretion, the name and class, the CUSIP number, the number of shares as of the end of the calendar quarter for which the report is filed, and the total market value." The SEC defines an institutional investor as "(1) an entity that invests in, or buys and sells, securities for its own account; or (2) a natural person or an entity that exercises investment discretion over the account of any other natural person or entity. Institutional investment managers can include investment advisers, banks, insurance companies, broker-dealers, pension funds, and corporations."

[17] The institutions may not necessarily sell their entire holdings when they stop the SEC's 13f reporting. Some institutions may sell-off and some may have their holdings fall under the SEC's reporting threshold requirement. By assuming that all institutions that stop the reporting sell-off their shareholdings we obtain more conservative results in our analysis of timeliness of institutional selling of shares of struggling firms as they approach bankruptcy.

value does not decline significantly until year t-1, suggesting there are many large firms in the sample which actually have an increase in the value during the period prior to a bankruptcy filing.[18] Both mean and median total assets and sales increase from t-5 through t-1 and median total assets and sales are higher at t=0 than in any other year. The firms become more levered from year t-4 to year t-1 (both mean and median debt-to-assets ratio increase during this period) with the ability to meet current obligations (measured by current and cash ratios) declining during this period, especially from t-3 on.[19] The firms also struggle operationally– both mean and median operating ROA and ROA are decreasing from year t-4 to year t-1.[20] The debt-to-equity ratio grows steadily from year t-4 to year t-1 and increases dramatically from year t-1 to year t=0. The firms' median book-to-market ratios are below unity for all years presented in the table and are decreasing starting in year t-4. Mean and median Altman's Z-scores fall below 1.8, the upper limit of the range for high probability of bankruptcy, in year t-3 and continue to decline. By most operational measures there are ample financial data suggesting firms are in deep trouble. Finally, trading volume and share turnover increase gradually earlier in the five-year period and then sharply as bankruptcy filing approaches.

In Panels B and C we summarize characteristics of and changes in institutional ownership during the five-year period. We report means and medians of ownership percentages for various institutional groups. To obtain the results in Panel B, we determine quarterly institutional ownerships of each security and then average them for four quarters of each year prior to a bankruptcy filing. We report these average annual institutional holdings

[18] An unanswered question at this point is whether some of these firms execute SEOs during this five year period, which may partially drive the unexpected lack of a decline in mean market capitalization until year t-1. In addition, we observe an increase in the number of firms from year t-5 to t-2 and then a sharp decrease from year t-2 to the quarter of bankruptcy.

[19] However, both current and cash ratios are unexpectedly high at t=0. These results may be because we lose smaller firms from our sample during the later quarters (we lose about 1/4 of the firms from t-2 to t-1 and then another 2/3 of the firms from t-1 to t=0). Hence, increases in total assets, sales, and debt-to-assets ratio as the firms approach bankruptcy filings is indication of having larger firms in the sample, which are allowed a bigger leverage than smaller firms that are no longer in the sample.

[20] Again, with some t=0 improvement.

for all 13f filers as a percentage of total shares outstanding as of each of the five annual periods before filing and the quarter of filing. Then, we report the largest institutional holding as a percentage of total institutional holdings, and the largest five and ten institutional holdings as a percentage of total institutional holdings. As reported in Panel B, means and medians for all institutional holdings remain relatively unchanged from -20, -17 through -8, -5 quarter horizons (years t-5 through t-2). Mean (median) 13f holdings declines by about 28 percent (38 percent) from -8, -5 to -4, -1 and by 62 percent (77 percent) from -4, -1 to the quarter of filing. One should keep in mind when evaluating these results that some changes in 13f holdings reported for quarter 0 occur after Chapter 11 filings, making these changes reactive and not proactive, as one would expect from informed and sophisticated investors.[21] We also find that the proportional ownership (of the total institutional ownership) of the largest, the five largest and the ten largest institutions tends to grow during this period–simply put, the institutional ownership tends to become more concentrated among fewer institutions. Thus institutions as a group do not divest themselves of these securities particularly quickly prior to a bankruptcy filing (irrespective of financial indicators), and some of them maintain meaningful ownership in these securities quite close to a bankruptcy filing.[22] The descriptive evidence to this point does not suggest the increased trading is divestiture by institutional investors.

In Table 2, Panel C, we categorize institutional ownership by manager type and weigh the ownership by the total shares outstanding as of each corresponding quarter period. The largest ownership share belongs to independent investment advisors with mean percentage holdings between 14 and 18 percent during the five-year period and decreasing to about 6 percent in the quarter of filing. While institutions in the other classifications hold smaller

[21] Some occur before Chapter 11 filing, but well after public knowledge that filing is either certain or near certain; thus these too are reactive, not proactive.

[22] Using the median holdings, the largest institution (five largest institutions) held 7.56 percent (20.25 percent) of struggling firms five years prior to filing and by year t-2 this had only been reduced to 7.35 percent (17.22 percent). In year t-1 it was 5.59 percent (11.83 percent).

percentages of firm shares outstanding than do the independent investment advisors, their pattern of holdings during the five-year period through filing does not seem to be different from the independent investment advisors' pattern.

iii. Corporate bankruptcies and institutional trading

A purpose of our paper is to determine whether institutional investors holding shares of distressed firms sell the investments well before the bankruptcy filings and before the market becomes fully aware of the firms' financial and/or operating issues. To accomplish this goal, we group the institutional trading data by firm filing for reorganization and by quarter when either shareholding or net holding change are not equal zero. In Table 3 we report the number of firms classified as net buyers, non-traders, or net sellers for each quarter horizon preceding filings of the reorganization petitions.[23]

[Insert Table 3 here]

Several aspects of aggregate activity for our sample firms are quite interesting. First, the proportion of our sample with net institutional ownership/trading grows as bankruptcy filing approaches. Second, the balance between net buying and net selling is slightly tilted toward net buying during the years t-5 through t-4. Third, while the balance becomes somewhat tilted toward net selling by year t-2, heavy net selling does not seem to occur until t-1 (and, of course, it is heavy during t=0). In aggregate, the results reported in Table 3 indicate that institutional investors as a group do not engage in selling of shares of the firms that subsequently file for Chapter 11 any earlier than two years prior to the filing of Chapter 11 reorganization petitions. In addition, some types of institutions (investment companies and their managers, independent investment advisors, and institutions in "All other" category) may engage in short selling during the pre-filing period in anticipation of the share price decline.

[23] Not all firms had institutional ownership every quarter (or even year); thus the number of firms reported in Table 3, in any given year is fewer than the sample size of 1,142.

In Table 3 we also report similar statistics for control firms. We first collect a sample consisting of all other firms not filing for bankruptcy during this time period.[24] Frequently, in the empirical literature, a control sample consists of the same-industry firms of comparable size. We eschew this standard method of identifying control firms and utilize a modification of Seyhun and Bradley's (1997) methodology. Seyhun and Bradley (1997) point out two limitations of the conventional method: (1) firms filing bankruptcy become significantly smaller as they approach the filing date,[25] and (2) non-filer firms in the same industry are likely to experience financial difficulty along with the filers. To construct their control sample for each insider portfolio (all insiders, executives, and officers), Seyhun and Bradley (1997) calculate the mean annual equity values of all firms not in their sample and reporting insider trading activity during 1975-1992. They rank these firms according to their total market equity and divide them into deciles. Then, they calculate insider trading activity over the entire period for each size decile. They obtain 6,480 data points of insider trading activity– one for each of the three portfolios, 10 size deciles, and 216 calendar months. They then compare the insider trading activity (for all insiders, executives and officers separately) of each firm for each month with the relevant decile in the relevant month.

Unlike Seyhun and Bradley (1997), however, who build control portfolios based on mean annual equity values of all non-filing firms, we, for every quarter preceding a bankruptcy filing, size match each firm in our sample with all other firms that are not in our sample and whose shares are held by institutional investors based on a 90 percent to 110 percent range of our sample firms' total assets. The matching methodology we utilize is

[24] By excluding firms that have filed for bankruptcy within reasonably long period of time from sample firm's filing we possibly introduce a selection bias. In addition, for firms that filed for bankruptcy earlier in our sample period (for example, in 1993) we exclude many more firms that did not file from that point in time on until 2011, when our sample period ends (in our example this time period is 1993-2011), than for firms that filed for bankruptcy close to the end of our sample period (for example if a firm filed in 2010, this "exclusion" period would only be 2010-2011). In 1993, the total population of firms on CRSP consisted of 30,068 firms. During the following eighteen years (from 1993 through 2011) 1,831 firms (or 6% of the total population) filed for Chapter 11.

[25] Though, interestingly, that is not the case in our sample.

similar to that employed by Seyhun and Bradley (1997) and designed to allow us to compare the institutional trading of our sample firms with the institutional trading of similarly sized firms which did not file for bankruptcy during the period of this study.

First, we obtain data on institutional holdings during 1988-2011 for all firms that are not in our sample. Then, we identify only firms in our sample which either have institutional holdings in a given quarter or report a net holding change in a quarter. Finally, for each quarter, we size match the sample firms with holdings and/or net holding changes with all other firms not in the sample with holdings and/or net holding changes based on a 90 percent to 110 percent range of our sample firms' total assets. Many firms in the sample are matched with multiple control firms and every firm has at least one control firm. Our control sample consists of 14,635 firm observations[26] whose shares are held by institutional investors at one point or another during twenty quarters prior to corresponding sample firms' bankruptcy filings. We analyze institutional holdings and net changes in those holdings for each firm in the control sample during the twenty-quarter period preceding the filings of each corresponding sample firm. A summary of the net buying/selling activity for the control firms is presented in the final three columns of Table 3. In aggregate we find that for the control firms there is more net selling than net buying activity during the four years prior to and the year of bankruptcy filing. There tends to be more non-trading activity in the control firms than in the sample firms When comparing net selling activities of sample and control groups, we find that proportions of sample and control firms with net selling activities are similar (for instance, in year t-4, 48% of sample firms and 47% of control firms have net selling activities; in year t-3, 50% of sample firms and 53% of control firms have net selling activities; and in year t-2, 55% of sample and 52% of control firms have net selling activities), and the

[26] We have 11,459 firms in our control sample. These firms have not filed for bankruptcy between 1993 and 2011. Some firms are in the control sample more than once.

difference in net selling activity for sample and control institutions is quite pronounced in year t-1, with a lot more net selling in the sample (66%) than control (49%) firms.

To test statistical significance of trading by the institutions reported in Table 3, we calculate "abnormal" trading for each firm in the sample. First, we eliminate observations with zero holdings for all four quarters in a year for both sample and control firms.[27] Our measure of "expected" institutional quarterly trading activity is net change of institutional holdings for firms in the control sample. Abnormal trading is calculated as the difference in the net institutional holding changes for the sample firms in a certain quarter before filing and the net institutional holding changes for corresponding control firm(s) in the same quarter. Once we obtain quarterly abnormal institutional trading, we then average these measures across four quarters in a year preceding quarter 0 and report mean annual abnormal trading for each event time in Table 4. We also report abnormal trading for quarters -4, -3, -2, -1, and 0, the quarter of Chapter 11 filings. Sample institutional abnormal purchases are positive numbers and abnormal sales are negative numbers. We present a summary of abnormal trading activity in Table 4.

[Insert Table 4 here]

The results reported in Table 4 are striking. During the four years, t-5 through t-2, in aggregate, the institutional investors of firms that ultimately file for bankruptcy are net buyers of these firms as compared to the control firms (there is slight net selling in t-3). The net buying in year t-2, during which there are clear indicators, in aggregate, of financial decline (see Table 2), is large. Institutions are net buyers in the fourth quarter prior to the quarter of filing and consistent net sellers during quarters q-3 through q=0. However, the behavior of these investors is not uniform across the broad institutional investor classes. The managers of

[27] We do that to avoid comparing changes in institutional holdings, for example, for sample firms that have zero holdings for all four quarters in a given year with corresponding control firms with quarterly holdings in the same year. We also ensure that net changes in the first quarter of each year that reflect share sell-off are included in that year's data (those firms may not have an institutional holding during the remainder of the year).

investment companies are heavy net sellers (compared to their control sample counterparts) during all periods except quarter q-4. In contrast those classified as "all others" (admittedly, a catch-all conveying little information) are net buyers in all five of the prior years (including relatively high net purchasing activity in both years t-2 and t-1 and quarter q-4). Banks are relatively heavy sellers in years t-3 and t-1, but relatively heavy purchasers in year t-2. Irrespective of their activities during the five years prior to a bankruptcy filing, massive selling occurs during the quarter of bankruptcy filing in each institutional investor classification, far dwarfing the prior five years of activities, indicating that the institutions do massive divestiture during the quarter of filing.[28] The significant abnormal net selling begins in quarter q-3 and continues through the quarter of filing for all manager types with exception of manager types 5, "All others", (selling is not statistically significant for this group until q-1) and 2, insurance companies, (abnormal net selling is not statistically significant for this group in q-2). These results are consistent with the notion from extant research that describes institutions as investors that exhibit herding as a result of irrational psychological behavior. Institutions appear to be significant net buyers (with exception of investment companies and their managers) of the distressed firms' shares in the quarters and years preceding a bankruptcy filing, until third quarter before the filing. The amount of net buying is statistically significant and economically material during this time period. To some these results may seem surprising, given the amount of information we presume these investors obtain and the level of investment sophistication expected from institutions.

We report on number of institutional managers whose shareholdings fell under (sell-off) or rose above (buy-in) the SEC's threshold for the 13f reporting during the twenty-quarter pre-filing time period, starting with quarter q-19 through quarter q=0. For managers' buy-ins we report total number of shares held and mean share prices as of quarter of the buy-ins. For

[28] Care must be exercised in looking at quarter 0 results; because of the nature of the data, we do not know what proportion of these net sales is before or after the bankruptcy filings.

managers' sell-offs we also report total number of shares held and mean share prices as of quarter prior to the quarter of sell-offs. Mean share price is an average of open and close prices of a quarter. We report these numbers for all institutions as well as for each manager type.

[Insert Table 5 here]

We observe that number of all institutional managers buying-in rises from quarter q-16 to quarter q-9, is unchanged from quarter q-8 to quarter q-6, and declines from quarter q-5 to quarter q=0. We observe the greatest decline in the number of buy-ins of 48.5% from quarter q-1 to quarter q=0 (this decline, for example, is 19% from q-3 to q-2 and 21% from q-2 to q-1). Number of sell-offs slowly increases from quarter q-19 forward and then remains unchanged between quarters q-5 and q-2 and then increases again from quarter q-2 to quarter q=0. This increase is 38% from quarter q-1 to quarter q=0. Total number of buy-in shares increase from quarter q-16 to q-13 and then again from q-12 to q-9 and then declines from 1,223 million shares in q-4 to 483 million in q=0; buy-in mean share price also declines from $24.78 in q-10 to $2.28 in q=0. When comparing buy-ins and sell-offs we observe that the number of managers buying-in and total number of shares held in the quarter of buy-in are either greater or about equal to the number of managers selling-off and total number of shares held prior to the quarter of sell-off until quarter q=-5; this ratio, however, becomes lower as Chapter 11 approaches and operating and market conditions of the firms deteriorate, as we described in Table 2. These results are also consistent with those reported in Table 4, where we observe negative abnormal net number of shares traded in the quarter period -4, -1, and in the quarter of filing, q=0 (abnormal net trading is negative for investment companies in all 21 quarters). The results are qualitatively similar for each manager type. We find that the number of managers' buy-ins starts to decline consistently in quarter q-5 for banks, investment advisors, and managers in "All others" category, manager types 1, 4, and 5, and in quarters q-8 and q-9 for insurance and investment companies, manager types 2 and 3, respectively. We

also observe that total number of shares held in the quarter of buy-ins starts declining in q-1 for banks and independent investment advisors, manager types 1 and 4, in q-4 for insurance and investment companies, manager types 2 and 3, and in q-6 for managers in "All others" category, manager type 5. The number of managers' sell-offs start to increase consistently in quarter q-2 for banks, insurance and investment companies, manager types 1, 2, and 3, and in quarter q-1 for independent investment advisors and managers in "All others" category, manager types 4 and 5. Total number of shares held in the quarter prior to the quarter of sell-offs goes up starting in q-4 for banks and independent investment advisors, manager types 1 and 4, in q-8 for insurance and investment companies , manager types 2 and 3, and in q-2 for managers in category "All others", manager type 5.

In summary, institutional investors engage in net buying activities for quite some time during five years preceding bankruptcy filings. Until about one year before the filings institutions initiate positions in deteriorating firms instead of eliminating them. In the year preceding quarter of bankruptcy filings and in the quarter of the filings institutional managers become net sellers with a negative abnormal net number of shares traded.

iv. Analyst recommendations for failing firms

We utilize the Institutional Brokers Estimate System (I/B/E/S) to gather analyst recommendations data for the sample. The I/B/E/S data starts in October 1993; consequently, in order to obtain data on recommendations for a five-year period prior to Chapter 11 filing, we eliminate observations with filing dates before October 1998. For each quarter preceding a bankruptcy filing we determine the total number of recommendations issued by analysts providing coverage and the average rating received by a sample firm in a particular quarter.[29] We then average the quarterly ratings and frequencies of the coverage for each five four-quarter periods to obtain annual mean analyst recommendation and recommendation

[29] Many analyst recommendations are issued more frequently than once a quarter. However, our institutional trading data is quarterly. For comparison purposes we compute mean quarterly recommendations and total number of recommendations in the quarter.

frequency for each sample firm. In Table 6 we summarize mean analyst recommendations and frequencies issued for all sample firms and then for groups of firms held by manager type.[30]

[Insert Table 6 here]

Five years before bankruptcy filing, on average these firms have a rating of 2.22 (slightly worse than a Buy of 2.00). The vast majority (86%) of the ratings are Strong Buy, Buy or Hold. Malmendier and Shanthikumar (2007) analyze the reaction of large institutional investors to upward bias of analyst recommendations and find that large investors adjust their responses to analyst recommendations and exert buy pressure when strong buy recommendations are issued, no pressure when buy recommendations are issued, and sell pressure when hold recommendations are issued. Based on these findings we conjecture that Buy and Hold recommendations in our sample are upward biased. Over the next three years, on average there is a slight deterioration of overall rating to 2.40 during year t-2. However, ratings for all five manager types are still Hold or better. The aggregate rating does not change dramatically until period -4, -1, but even at this point, one year prior to bankruptcy filing, analysts are still, on average, issuing recommendations of slightly stronger than Hold (2.88 versus Hold of 3.00). More specifically, in the fourth quarter prior the quarter of filing, mean ratings for all firms held by institutions and for each manager type are above 2.5, an upper limit of buy category of Strong Buy and Buy ratings, but still better than Hold. These recommendations are the weakest for manager type 5, category titled "all others", in quarters q-4 through q-1 (mean changes from 2.87 in q-4 to 3.14 in q-1). Downgrades in rating strength are relatively large from quarter q-1 to q=0. In the quarter of the filing, the mean recommendation strength is Hold or weaker. Not surprisingly, mean recommendations issued before bankruptcy filings in the quarter q=0 are stronger (3.48) than those issued after the

[30] In I/B/E/S analyst recommendations are delineated as: 1 = Strong Buy, 2 = Buy, 3 = Hold, 4 = Underperform, and 5 = Sell.

filings (3.65). Approximately 40% of recommendations issued after the filings are Hold or stronger. There are no meaningful differences in rating strengths among firms held by different types of institutions.

IV. Development of Hypotheses

The data to this point suggest that with the exception of investment funds and their managers, institutions are net buyers of these firms until about one year prior to the firms' Chapter 11 filings. Investment companies and their managers are significant net sellers for the entire five-year period through the quarter of filing. Finally, for all institutional classes there is more net selling in the quarter of filing and three preceding quarters than in all prior quarters combined. In many aspects these results are surprising. To determine factors that influence institutional investors' decision to postpone sale of the securities of the firms approaching bankruptcy we develop and test the following hypothesis:

H1: Institutional investors delay selling shares of bankrupt firms that are larger, more liquid, less risky, less levered, and are more heavily held by other institutional investors. They also favor investments with relatively stronger market and operating performance than the rest of the firms.

Given the net purchase/selling results to this point, it is important to learn when the institutional investors' buying and selling of individual firms occurs. Thus, we offer a hypothesis that examines the relation between the timing of institutional investors' trading and security returns. Although we find that, in aggregate, institutions are not in a rush to sell shares of distressed firms, perhaps considering these investments undervalued in the market instead of operationally underperforming, we further analyze institutions' investment behaviors and determine whether they sell the investments before the stock price declines and purchase the shares after the stock price has fallen. If the selling occurs after the price declines, then the institutional managers would incur losses just as other shareholders would with investments in the securities of the same firms. Hence:

H2: Institutional investors sell shares of distressed firms to avoid capital losses. This behavior is similar to that of insiders, when they sell (postpone purchases) before significant stock-price decreases and buy (postpone sales) before significant price increases.

From the summary of data presented in Table 6 we observe that security analysts materially revise their recommendations downward for the first time during the year prior to filing and then again materially during quarter q=0. We investigate whether the timing of institutional share sell-offs and the timing of analyst recommendation downgrades are coincidental or whether the former is a reaction to the latter. To make this determination we develop and test our third hypothesis:

H3: Net quarterly changes in institutional holdings become negative, consistent with sell recommendations issued by sell-side security analysts.

V. Test Methodology and Presentation of Regression Results

i. Timing of institutional selling of bankrupt firms

We would like to discern between two schools of thought when it comes to the investment behavior of institutional managers: 1) the notion that institutional investors are informed and sophisticated investors capable of outperforming the market, and 2) conversely, the argument that institutions exhibit irrational herding behavior.[31] We provide a clear evidence of institutional managers' inability to timely recognize failing investments held in their portfolios.

Our first hypothesis is concerned with what drives the delay in institutions selling the firms that ultimately file for bankruptcy protection. First we define a dependent variable which measures when the institutions of a firm became "net sellers". As a first step in this definition, we determine abnormal net changes in holdings for each institutional manager in

[31] Overriding both schools is the concept of monitoring. Institutions may own securities and inadequately monitor their operational performance (as opposed to using available information poorly), thus not selling when they "should" sell. As the results of Table 4 indicate there is net buying activity through year t-2, suggesting the possibility of not only poor monitoring, but, in that process, using information suggesting purchase of these firms.

each quarter approaching bankruptcy filing. We then calculate mean annual abnormal net changes in institutional holdings. For instance, for year t-5 the average abnormal net holding change consists of abnormal net holding changes in quarters -20 through -17. We define our dependent variable to equal to 0, 1, 2, 3, 4, or 5, depending on the year when an institution first became a net seller based on its mean abnormal net change trading figure as compared to the trading in the preceding years. We assess each mean abnormal net change based on the following criteria: for example, if an institution is a net seller for the first time in year t-3 (or quarters -12 through -9),[32] then we assign 3 as a dependent variable for that manager; if that same institution is a net buyer in the following year, year t-2 (same as quarter period -8 ,-5), and the amount of the average abnormal net purchase is greater than the absolute value of the sum of abnormal net changes for all prior periods, then we change the dependent variable for this manager from 3 to 0; if, however, the amount of the average abnormal net purchase in year t-2 is less than the absolute value of the sum of abnormal net changes for prior periods or the manager is a net seller in year t-2, then the dependent variable remains equaling to 3.[33] We repeat this process for every period for each institutional manager with either holdings or net changes not equaling zero during a year.[34]

Our dependent variable takes values 0 through 5; an ordered probability (logit) model is a suitable tool for our analysis. By using an ordered logit model we estimate change in log odds of institutional investors starting to sell earlier in the five-year period preceding bankruptcy filings.

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[32] The institution would have been either non-trader or net buyer in years -5 and -4.

[33] Another situation that we encounter when determining the dependent variable for each institutional manager in the sample is when a manager becomes, for instance, a net seller for the first time in year -5 (dependent variable equals to 5), then he or she either does not trade or still sells in years -4 and -3 (in this case the dependent variable remains 5), and then buys in year -2; in this situation the "selling behavior" is still wiped out if the purchase in year -2 exceeds the absolute value of the sum of all selling or non-trading in years -5, -4, and -3; if this is not the case, then the manager's dependent variable is not changed.

[34] We delete quarters when both holding and net change are zero to prevent comparing zero change in the sample's institutional ownership that is due to zero holding with control sample's ownership with holdings in the same quarter; this comparison would lead to an understatement of abnormal net selling for institutions in the sample.

We regress our dependent variable on several firm and market characteristics for all managers in the sample; subsequently we divide our sample into several sub-samples to assess trading behavior of each type of institutional manager in our sample. We measure our independent variables as of the year of the dependent variable. As explanatory variables we choose natural logarithms of total assets (LNAT), market capitalization (LNMKTVL), and sales (LNSALES), as well as the following ratios: return on assets (ROA), debt-to-assets (LTAT), current ratio (CURR), asset turnover (STOAT), debt-to-equity (DTEQ), and book-to-market (BM). We also utilize standard deviation of security returns measured over one year period as an annual risk measure (RISK), stock return adjusted for the NYSE/Amex/Nasdaq value-weighted return (ARVW), and share turnover as trading volume divided by total shares outstanding (LQDT). We include two sets of variables that measure institutional herding behavior to describe the relation between trading by other institutions and the possibility of managers in the sample initiating selling shares of distressed firms in the earlier years: the number of 13f holders in the quarter of institutional trading (NUM13F) within the year of dependent variable and its lagged value (NUM13FLAG) in the year prior to the year of dependent variable, the total number of shares held by institutions in the quarter of institutional trading as a percentage of shares outstanding (IHPC) and its lagged value (IHPCLAG), and the number of shares held by the largest ten institutional owners in the quarter of institutional trading as a percentage of total shares outstanding (TENPC) and its lagged value (TENPCLAG). Because 13f institutional stock owners are not obligated to report their holdings until after the quarter end, we use lagged values to measure effect of those holdings on the current quarter's institutional trading. However, due to the possibility of information sharing among institutions or information leakage, the changes in institutional holdings could become known to other institutions (and possibly to the market) during the quarter of the trading. To measure impact of this "preliminary" trading information

dispersion, we consider contemporaneous measures of institutional investments and their changes.

[Insert Table 7 here]

In Table 7 we report ordered log-odds (logit) regression coefficients (also known as maximum likelihood estimates), odds ratio estimates (for more intuitive interpretation of the results), and corresponding p-values (reported in parenthesis). We categorize results reported in the table by manager type and find that they are qualitatively identical, where statistically significant, to those for the entire sample. At the bottom of Table 7 we also present likelihood ratios, their degrees of freedom, and associated p-values corresponding to the conclusion that at least one of the regression coefficients in the model is not equal to zero. The majority of the regression coefficients appears to be significantly different from zero; however, several coefficient estimates are not economically material (those with point estimates close to one).

Institutions start selling securities of firms with smaller asset size earlier in the five-year period—for a one unit increase in the natural logarithm of total assets, the odds of institutions start selling in the earlier years are 0.91 times lower than for the years closer to the quarter of bankruptcy, given all other variables are held constant. Institutions also sell less risky and more levered firms, and firms with lower ROA and current ratios sooner during the five-year period (the odds decrease by 0.87 for one unit increase in the risk measure and the odds increase by 1.1 for one unit increase in the debt-to-assets ratio; the odds decrease by 0.94 for one unit increase in ROA ratio and by 0.99 for one unit increase in current ratio). The coefficient estimate on share volume (LQDT) is not different from zero in the regression. Based on the regression results, to this point we cannot reject our first hypothesis that institutional investors delay selling shares of bankrupt firms that are larger, less levered, and operationally stronger, as indicated by higher ROA and current ratios. However, institutions sell shares of less risky firms sooner during the five-year period.

Surprisingly, the institutional managers sell firms sooner with a higher natural logarithm of sales and asset turnover ratio (for one unit increase in each of these variables the odds of selling well in advance of a bankruptcy filing are 1.03 and 1.06, respectively, greater than for the later years, holding all other variables constant). Even more surprising, institutional shareholders are likely to sell shares of distressed firms with greater value-weighted market adjusted abnormal returns sooner during the five-year period (point estimate for this variable is economically material 1.3). Institutions also hold on to the shares of distressed firms with smaller market capitalization while sell those with smaller total assets.

Institutions exhibit herding behavior. We find that the odds of the institutions selling shares of distressed firms during the earlier years of the five-year period rise with greater prior quarter's number of 13f filers (by 1.008 for each unit increase, which is not economically material) and percentage of shares held by institutional investors (by an economically material 1.75); the odds fall with an increase in the current quarter's number of 13f filers (by 0.99, which is not economically material), percentage of shares held by all institutions (by economically significant 0.86), and percentage of shares held by the largest ten institutions (by also economically significant 0.44). We find, however, interpretation of the coefficients for contemporaneous measures of institutional holdings to be more intuitive; in addition, two of the three lagged values of the variables are either statistically or economically insignificant. Perhaps, the fact that information on institutional trading becomes known to other institutions before the required filing with the SEC may drive our results. This evidence supports our first hypothesis that institutional investors delay selling shares of bankrupt firms that are held by other institutional investors.

In summary, we find that institutional investors delay selling shares of bankrupt firms that are larger, with lower debt-to-total assets ratio, higher debt-to-equity, ROA, and current ratios, and higher equity risk. Institutional investors tend to sell shares of distressed firms with fewer 13f filers and lower percentage of institutional holdings sooner. Looking at these

findings in aggregate, it seems as institutional investors ignore several important operating and market performance indicators and closely follow trading strategies of other institutions holding the shares. Our findings support conclusions made in the extant literature suggesting that institutions exhibit herding investment behavior and that the institutional herding is a consequence of an irrational psychological behavior resulting in significant capital losses.

ii. Institutional trading around periods of quarterly abnormal holding period returns

We now examine the relation between the timing of institutional trading and security returns to test our second hypothesis. Seyhun and Bradley (1997) find that stockholders of bankrupt firms suffer significant capital losses in the years before filing and find that corporate insiders of firms filing bankruptcy petitions and trading large number of shares sell stock before prices fall and buy stock after prices have fallen. The data in Table 4, however, indicate that institutional managers are net buyers of the shares of failing firms during the five-year period preceding the filings (the average abnormal net number of shares purchased per firm for quarterly period -20, -1, inclusive, is a positive 4,863). Giving institutions the benefit of a doubt, we attempt to further investigate this result and find out whether institutional selling (buying) of bankrupt firms occurs before (after) stock price declines. If the institutions in our sample do not act strategically and, instead, sell (buy) shares after (before) the prices fall, then they would incur capital losses.

To test our second hypothesis we utilize a modification of the methodology developed by Seyhun and Bradley (1997). First, to measure the timing of institutional trading, we partition abnormal holding period returns before and after institutional trading using a dummy variable technique. We begin with calculating quarterly abnormal holding period returns between 1988 and 2011 by subtracting quarterly value-weighted market returns from each firm's returns in the same quarter. Then, for each quarter holding period, we determine the net abnormal trading by institutional managers in the quarter preceding the holding period and the

net abnormal trading by the managers in the quarter immediately following the holding quarter period.[35]

Next we run the following regression for each quarter-manager combination.

$$AHPR_t = \beta_0 + \beta_1 DB_{i,t} + \beta_2 DA_{i,t} + \varepsilon_t, \text{ for } i = 1, 3 \text{ and } t = -19 \text{ to } 0,$$

where $AHPR_t$ = abnormal holding period return in quarter *t*; $DB_{i,t}$ = dummy variable that takes on a value of 1 if institutional managers are net buyers, 0 if they are non-traders, and -1 if they are net sellers during the quarter before the holding period, *t*; and $DA_{i,t}$ = dummy variable that takes on a value of 1 if managers buy, 0 if they do not trade, and -1 if they sell during the quarter after the holding period, *t*.

As Seyhun and Bradley (1997) indicate, if the institutional investors sell shares of stocks before their prices fall, then β_1 should be positive and significant; if institutions sell after the prices fall, then β_2 should be positive and significant. If, however, the institutional investors believe that the market price has fallen and that the investment is now undervalued, they would be enticed to buy shares of this security; this would result in a negative, statistically significant estimate for β_2.

[Insert Table 8 here]

In Table 8 we report time-series estimates of the coefficients of the estimating equation for all institutions in the sample, by manager type, and by year prior to bankruptcy filing, with the final rows being for the aggregated five-year period. The signs of the coefficients for before-holding period trading (DB) are mixed during the five-year period we analyze. While one might argue that there is an indication of strategic trading in year t-1 (DB's coefficient is 0.007), the overall five-year coefficient is -0.0013 which is significant and suggestive, for the period, of purchasing before prices fall. Further, the estimates for coefficients on after-holding-period abnormal trading (DA) are positive from t-4 forward (and

[35] As in Table 4, abnormal trading is calculated as the difference in the net institutional holding changes for the sample firms in a certain quarter before filing and the net institutional holding changes for corresponding control firm(s) in the same quarter.

in aggregate for the entire period), suggesting that institutions sell shares of distressed firms after prices fall. Turning to our results by manager type, we find qualitatively similar results as for all managers in the sample.[36]

To analyze trading size effects of large transactions as more informative trades, we compare returns across firms by partitioning the number of shares traded into three groups: small, medium, and large. The upper and lower bounds of each group are determined based on the highest and the lowest number of shares traded in each group. We divided all institutional net holding changes onto three groups and find the highest and the lowest number of net shares traded in each group as follows: (1) we find absolute values of the net sales, (2) we then sort all institutional trades based on their size, (3) we assign the largest 10% of all quarterly net changes to the large trading size category, and equally divide the remaining transactions between medium (45% of transactions) and small (remaining 45% of transactions) categories, finally (4) we assign the smallest transaction in the large trading category as a lower bound for this category, amounts of the largest and the smallest transactions in the medium trading size category as an upper and a lower bounds, respectively, and amount of the largest transaction in the small trading size category as an upper bound. We repeat the same partitioning for each manager type. In the first panel of Table 8(a) we present regression results for all institutional managers, categorized by quarter horizon relative to the filing and by trading size and in the following five panels we present the same results for each manager type.

[Insert Table 8(a) here]

Interestingly, in the largest transaction size category the coefficients for before-holding period trading (DB) are negative and statistically significant for all institutional

[36] Earlier we had found investment funds and their managers (type =3) had, in contrast with all other institutions, engaged in heavy selling throughout this time period. However, their results, as presented in Table 8, are not different from other institutions; they do not seem to sell prior to losses the firms suffer.

investors and manager types 1 (banks), 2 (insurance companies), and 5 (all others) during the five-year period we analyze. While one would expect large trades to be more informative, we find that these transactions are indication of institutional share purchases before the prices decline. The overall five-year coefficient is -0.01, which is statistically significant. The estimates for coefficients on after-holding-period abnormal trading (DA) are not different from zero. We reject our second hypothesis that institutional investors sell shares of distressed firms to avoid capital losses and that they invest similarly to insiders who sell (postpone purchase) shares before significant stock-price decreases and buy (postpone sales) before significant price increases.

iii. Do institutions trade consistently with changes in recommendations issued by investment analysts?

Finally, we consider our third hypothesis relating to institutional trading and analyst recommendations. Do institutions trade consistently with sell-side analyst recommendations knowing well that the analysts, especially affiliated ones, have a tendency to issue overly optimistic and/or upward biased recommendations? We answer this question by considering the relationship of analysts' sell recommendations and changes in institutional holdings of distressed firms as they approach bankruptcy.

The bankrupt firms are not a random sample of firms and consequently managers' decisions to trade shares of these firms (ultimately) is endogenously determined. In addition, it is difficult to establish causality between institutional selling of shares of distressed firms and changes in analyst recommendations. Do institutions sell in response to security analysts' bleak outlook on the firms' future performance or do the analysts cease to follow firms as a result of institutional divestiture? Due to the relationship of an endogenously chosen binary treatment (sell recommendations, in our case) with another endogenous continuous variable (net changes in institutional holdings), we evaluate the potential impact of selection bias using a standard two-stage Heckman model (Heckman (1976), Greene (1997), Chapter 20) for our

dependent variable. In Table 9, Panel A, we first present results of a basic regression (OLS) with quarterly net change in institutional holdings as a dependent variable. Then, in Panel B, we report results of a probit regression (in "Probit parameters" columns) that models the propensity of a sell-side security analyst to issue sell recommendations for the firms approaching bankruptcy filings and results of a cross-sectional regression with the inverse-Mills ratios,[37] λ, as an explanatory variable to correct for self-selection bias.

As indicated above, we use net changes in institutional holdings as our dependent variable in both OLS and second-pass Heckman model regressions.[38] However, prior to using this measure in a regression we normalize it for each manager *i* in a quarter *t* by subtracting its yearly mean $(\overline{NC}_{i,y(t)})$ and dividing the difference by its yearly standard deviation $(SD(NC_{i,y(t)}))$:

$$NCNORM_{i,t} = \frac{NCi,t - \overline{NC}i,y(t)}{SD(NCi,y(t))}$$

This normalization allows us to compare trading behavior over time and deals with year-fixed effects in the regression framework.

Analysts may issue recommendations more frequently than once a quarter, and because 13f data are quarterly, we average every quarter's recommendations to obtain an appropriate (mean quarterly) measure for our regressions. Assuming that institutions immediately react to recommendations after their announcement during a quarterly-period, we use contemporaneous quarterly mean analyst recommendations as one of our control variables. We create a dummy variable (ARSELL) that takes on a value of 1 if mean quarterly recommendations are equal or greater than 3.5 (based on the data obtained from I/B/E/S, mean recommendation of 3.5 or greater approach recommendations such as Underperform (4) or Sell (5)), and 0 otherwise, and use this variable as an independent variable in our basic

[37] Inverse-Mills ratio used to take account of a possible selection bias and is calculated as σ x ρ obtained from the probit regression.

[38] We use net holding changes instead of abnormal net changes used in the earlier two regressions because of a different nature of analysis we are trying to perform. Sale, non-trading, or purchase properly measures institutions' response to analyst sell recommendations, while abnormal net changes (vs. other institutions in control firms) in institutional holdings could distort the true actions by the institutions as a reaction to the recommendations.

regression and as a binary dependent variable in our probit regression in the two-stage Heckman model regression. We also introduce as explanatory variables in the OLS regression the percentage quarterly change in the shares outstanding (DSHR), the natural logarithm of the market values (LNMKTVL), the quarterly change in the abnormal value-weighted holding period returns (DARVW), the quarterly change in the share volume as a percentage of total shares outstanding (DLQDT), the quarterly change in the total institutional ownership as a percentage of shares outstanding (DIHPC), the risk measure (BETA), and the current quarter's coverage ratio defined as total assets divided by total liabilities (ATLT). We use these control variables in the second-pass Heckman model regression by selecting only those observations where binary variable ARSELL equals 1 and including the inverse-Mills ratios, λ. For control variables in the probit model we use normalized lagged value of the net changes in institutional holdings (NTNORMLAG),[39] natural logarithm of the market values (LNMKTVL), current quarter's abnormal value-weighted holding period return (ARVW), share volume as a percentage of total shares outstanding (LQDT), total institutional ownership as a percentage of shares outstanding (IHPC), beta (BETA), coverage ratio (ATLT), operating income divided by revenues ratio (OIREV), and earnings per share (EPS).

[Insert Table 9 here]

Based on the results reported in Table 9, during the five-year period preceding bankruptcy filings institutional managers' net holding changes are negative in the quarters with analyst recommendations of Underperform or Sell (average recommendation of 3.5 or higher). The majority of the control variables reported in Table 9, Panel A, are statistically significant. For the five-year period the coefficient estimate on ARSELL is negative and significant; net institutional changes in holdings of a firm are negative during periods where

[39] We use the same formula to derive normalized lagged value of net changes in institutional holdings as for the normalized net changes in institutional holdings *($NCNORM_{i,t}$)*. This control variable in the probit regression measures likelihood of analysts' issuing a sell recommendation as a reaction to changes in institutional holdings.

analyst recommendations for the firm are "sell". We find that market value and beta are also inversely related to the net changes in the institutional holdings with coefficient estimates of -0.007 and -0.019, respectively. Net holding changes increase by 8.5 percent (p-value of 0.0453) with an increase in shares outstanding, by almost 30 percent (p-value of <0.0001) with an increase in the percentage of shares owned by institutions (suggestive of herding behavior), and by 0.5 percent (statistically significant with p-value of <0.0001, however not economically material) with greater debt coverage ratio. For the most part, estimates of the coefficients remain qualitatively consistent from year to year.

From the "Probit parameters" columns in Table 9, Panel B, we find that analysts are less likely to issue sell recommendations when there are positive changes in the prior quarter's institutional holdings. However, the likelihood of analysts issuing sell recommendation rises with greater current quarter's total shares held by institutions as a percentage of shares outstanding. In addition, the likelihood of issuing a sell recommendation strongly depends on and positively relates to firms' systematic risk. The analysts are less likely to issue sell-type recommendations for the firms with greater market value, bigger coverage ratio, higher share volume, and stronger market performance indicated by larger value-weighted abnormal holding period returns. We expected to see an inverse relationship between the dependent variable in the probit model and the performance-related explanatory variables such as operating income divided by revenues and earnings per share. Only in year t-5 do we observe a negative sign on the EPS variable's estimate of the coefficient.

The second-pass Heckman regression coefficient estimates indicate the presence of an upward selection bias toward the coefficient on ARSELL in net institutional holding changes: the coefficient λ, which is computed from the inverse-Mills ratio based on the probit regression, is positive and statistically significant. More important, the significantly positive coefficients on majority of the variables from the OLS regressions remain. The two coefficient estimates, DARVW and DLQDT, that are not different from zero in the earlier

OLS regressions, are now statistically significant and equal -0.23 and -15.06 (with p-value of <0.0001 for both), respectively. These results indicate that net institutional holding changes decline, indicating smaller purchases or larger sales, with increase in liquidity and abnormal holding period returns. Another puzzling result we observe in the regression for the five-year period is that beta and coverage ratio switch signs from the earlier basic regression for the same period (although it is consistent with the OLS results in years t-3 and t-2). These results suggest that the institutions prefer riskier firms with higher debt. In summary, by re-performing our OLS regressions using two-pass Heckman model, we show that, although apparent differences in the net institutional holding changes across different time-windows are not explained away by a self-selection bias, there is some sensitivity in our results to the selection-bias correction. Institutions react to analysts' sell recommendations by either reducing purchases or increasing sales of the shares of bankrupt firms.

VI. Conclusion

In this paper we analyze the investment behavior of institutional managers who hold firms which subsequently file bankruptcy petitions. We find that during the five-year period preceding a bankruptcy filing managers are net buyers with a positive abnormal net number of shares (versus the control sample) traded during the period. When analyzing institutional trading behavior for five years prior to bankruptcy filing we find that institutional investors do not sell heavily until the year prior to filing and during the quarter of filing. As opposed to the group as a whole, investment company managers are heavy sellers during the entire period.

Irrespective of these findings we attempt to assess the likelihood of institutions starting to sell earlier during the five-year period preceding a bankruptcy filing in relationship to important firm-specific operating and market variables. The propensity of institutional managers to start selling shares of bankrupt firms sooner appears to positively correlate with firm's leverage; it negatively correlates with firm's size, ROA, market debt-to-equity and current ratios, as well as its riskiness. We observe strong signs of herding when assessing

what prompts the institutions to start selling and find that smaller shareholdings of all institutional investors and of the largest ten institutional investors, as well as fewer institutions owning the same security tend to increase the likelihood of institutional managers to start selling shares well in advance of a bankruptcy filing.

Given institutional managers do not seem to sell early in the pre-bankruptcy process we attempt to find signs of a sound logic in the institutions' investment strategy. We evaluate the timing of institutional managers' trading and determine whether they sell securities of bankrupt firms before the share prices fall significantly avoiding great capital losses. We fail to find evidence that institutional stockholders trade strategically and avoid material price declines before they occur.

We find that institutional managers react to sell recommendations issued by security analysts. However, the sell-side analysts do not start downgrading their recommendations for the failing firms until only few months before a Chapter 11 bankruptcy filing; consequently, the managers' response to these recommendations may be too-little-too-late.

In our analysis of institutional investment behavior we do not find convincing evidence that would persuade us to believe in sophistication, ingenuity, and astuteness of institutions' investment strategies–at least as it might pertain to firms during the five years prior to filing Chapter 11 petitions. As much and as hard as we have tried finding signs of any of these qualities, we disappoint ourselves with findings of irrational herding behavior and delayed reaction to the signs of trouble that bankrupt firms start showing several years before they file for reorganization. We provide support for earlier findings that suggest that institutional herding is a result of irrational psychological behavior and those managers' herding and feedback trading are a fad possibly encouraged by agency problems.

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Table 1
Firms Filing Chapter 11 during Period October 1993-October 2011, Categorized by Year

Year	No. of Ch 11 Filings	Percent	Mean Duration (in days)	Median Duration (in days)	Frequency of Emergence from Ch 11	Total Assets (in mill.) 1 yr. prior to filing Chapter 11			
						No. of Firms	Mean	Median	Std Dev
1993	22	1.2	454	404	2	21	313.03	125.79	422.01
1994	49	2.68	483	389	28	42	176.89	66.60	261.71
1995	52	2.84	556	482	34	49	436.51	169.84	833.82
1996	53	2.89	441	344	46	46	274.35	164.10	292.09
1997	47	2.57	526	364	54	44	337.16	113.10	775.02
1998	72	3.93	552	351	47	56	540.72	238.50	1,186.77
1999	114	6.23	474	376	76	96	582.36	166.05	1,087.44
2000	156	8.52	551	440	110	118	700.93	289.95	1,105.28
2001	249	13.6	522	427	122	126	1,558.45	316.67	4,561.83
2002	218	11.91	455	360	226	158	2,387.81	322.76	9,665.54
2003	158	8.63	444	357	225	118	901.70	200.71	2,473.75
2004	81	4.42	393	317	167	69	717.71	286.50	2,078.83
2005	78	4.26	416	363	101	60	2,261.64	148.75	6,121.49
2006	54	2.95	311	286	88	43	598.14	194.96	1,508.77
2007	58	3.17	401	358	70	42	1,254.86	62.21	4,014.16
2008	115	6.28	384	358	70	72	7,895.27	179.43	59,267.13
2009	171	9.34	316	272	139	139	3,749.37	452.12	15,250.31
2010	70	3.82	214	161	151	51	819.82	205.00	1,786.10
2011	14	0.76	144	126	75	12	443.78	391.15	448.06
All Years	1,831	100	442	352	1,831	1,362	1,697.64	218.87	15,036.25

The table presents number of firms filing Chapter 11 annually between October 1993 and October 2011. The data reported here comes from *Thompson Financial Services SDC Platinum* database. The sample consists of all U. S. firms that filed Chapter 11 and completed reorganization during the period regardless of their industry and the regulatory requirements under which they operate (financial and utility firms are included in the sample).

Table 2
Descriptive Statistics for the Sample Firms

Panel A: Firm Characteristics

Time horizon (in years):	-5		-4		-3	
	Mean	Median	Mean	Median	Mean	Median
Performance indicators:	(n=563)		(n=636)		(n=667)	
Total assets ($ mill)	1,142.690	134.361	1,181.950	134.674	1,316.860	159.204
Sales ($ mill)	528.105	120.034	536.977	113.172	573.207	124.006
Sales/totla assets	1.192	1.033	1.141	0.953	1.101	0.901
Operating ROA	-0.294	0.068	-0.108	0.060	-0.123	0.054
ROA	-0.427	0.000	-0.231	-0.012	-0.305	-0.039
Total liabilities/total assets	0.794	0.639	0.737	0.667	0.888	0.696
Market debt/equity ratio	9.335	1.095	4.423	1.242	6.473	1.326
Current ratio	2.698	1.665	2.732	1.669	2.475	1.635
Cash ratio	0.892	0.169	0.997	0.164	0.865	0.155
Altman Z-score	2.080	2.357	2.776	2.093	0.951	1.710
Volatility	0.564	0.574	0.571	0.560	0.671	0.600
Market-adjusted return	-0.002	-0.012	-0.004	-0.014	-0.008	-0.018
Market characteristics:	(n=225)		(n=285)		(n=377)	
Market value of equity ($ mill.)	354.965	108.302	373.715	97.463	432.532	85.684
B/M ratio	0.046	0.523	0.283	0.568	-0.295	0.503
Trading volume (thousands of shares)	54.506	12.882	61.987	15.196	75.046	17.606
Share turnover	0.001	0.001	0.001	0.001	0.002	0.001
Bid-ask spread	0.569	0.305	0.339	0.250	0.388	0.255

(Table 2, Panel A continues)

Panel A: Firm Characteristics

Time horizon (in years):	-2		-1		0	
	Mean	Median	Mean	Median	Mean	Median
Performance indicators:	(n=656)		(n=481)		(n=129)	
Total assets ($ mill)	1,545.650	174.900	2,316.000	156.513	844.058	205.622
Sales ($ mill)	590.159	150.378	788.164	165.593	622.449	284.091
Sales/totla assets	1.153	0.932	1.342	1.065	1.388	1.255
Operating ROA	-0.369	0.022	-0.710	-0.021	-0.308	0.018
ROA	-0.484	-0.092	-1.165	-0.227	-0.434	-0.300
Total liabilities/total assets	1.132	0.743	2.081	0.891	1.766	1.096
Market debt/equity ratio	16.941	2.081	51.869	6.447	213.518	79.535
Current ratio	2.021	1.542	1.322	0.934	3.407	1.344
Cash ratio	0.583	0.121	0.331	0.070	1.339	0.131
Altman Z-score	1.411	1.234	-3.945	-0.158	-5.191	-0.399
Volatility	0.685	0.635	0.780	0.698	0.786	0.660
Market-adjusted return	-0.036	-0.044	-0.097	-0.103	-0.189	-0.239
Market characteristics:	(n=446)		(n=354)		(n=94)	
Market value of equity ($ mill.)	426.250	62.675	349.341	22.526	96.913	4.640
B/M ratio	-1.158	0.457	-11.221	0.240	-82.031	-3.434
Trading volume (thousands of shares)	99.636	19.941	158.554	23.336	498.382	35.548
Share turnover	0.002	0.001	0.002	0.001	0.004	0.002
Bid-ask spread	0.359	0.262	0.285	0.180	0.211	0.188

(Table 2, Panels B and C continues)

Panel B: Institutional Ownership

Time horizon (in quarters):	-20, -17 (n=582)		-16, -13 (n=667)		-12, -9 (n=780)	
	Mean	Median	Mean	Median	Mean	Median
All 13(f) institutions as a percentage of all shares outstanding	32%	27%	32%	26%	31%	25%
Largest institution as a percentage of all institutional holdings	37%	28%	38%	29%	41%	32%
Largest 5 institutions as a percentage of all institutional holdings	73%	75%	74%	75%	75%	78%
Largest 10 institutions as a percentage of all institutional holdings	85%	92%	86%	93%	87%	94%

Panel C: Ownership by Manager Type

Time horizon (in quarters):	-20, -17 (n=582)		-16, -13 (n=667)		-12, -9 (n=780)	
	Mean	Median	Mean	Median	Mean	Median
1=Banks	5%	2%	5%	2%	5%	2%
2=Insurance companies	2%	1%	2%	1%	2%	1%
3=Investment co. and their mgrs	5%	2%	4%	2%	5%	2%
4=Independent inv. advisors	17%	12%	17%	13%	18%	14%
5=All others	3%	0%	3%	1%	4%	1%

(Table 2, Panels B and C continues)

Panel B: Institutional Ownership

Time horizon (in quarters):	-8, -5 (n=885)		-4, -1 (n=913)		Quarter 0 (n=881)	
	Mean	Median	Mean	Median	Mean	Median
All 13(f) institutions as a percentage of all shares outstanding	29%	21%	21%	13%	8%	3%
Largest institution as a percentage of all institutional holdings	44%	35%	50%	43%	66%	66%
Largest 5 institutions as a percentage of all institutional holdings	77%	82%	83%	91%	95%	100%
Largest 10 institutions as a percentage of all institutional holdings	88%	96%	92%	99%	98%	100%

Panel C: Ownership by Manager Type

Time horizon (in quarters):	-8, -5 (n=885)		-4, -1 (n=913)		Quarter 0 (n=881)	
	Mean	Median	Mean	Median	Mean	Median
1=Banks	5%	2%	4%	2%	2%	0%
2=Insurance companies	2%	1%	2%	0%	0%	0%
3=Investment co. and their mgrs	4%	2%	3%	1%	1%	0%
4=Independent inv. advisors	17%	13%	14%	9%	6%	2%
5=All others	5%	1%	4%	1%	1%	0%

This table presents firm characteristics and institutional ownership descriptive statistics for the sample of 124,844 quarterly institutional holding observations for 1,142 firms that file Chapter 11 and emerge from bankruptcy reorganization between October 1993 and December 2011. The sample of 13f quarterly holdings is obtained for the period starting in the fourth quarter of 1988 (or five years preceding the earliest Chapter 11 filing in our sample) through the third quarter of 2011 (or quarter of the latest filing in the sample). Data on performance characteristics is obtained from Compustat and CRSP. Data on quarterly institutional (13f) holdings comes from Thomson Reuters' Institutional (13f) Holdings – s34. Panel A reports total assets (in millions of $), sales (in millions of dollars), and several ratios: sales divided by total assets; operating income before depreciation divided by total assets (operating ROA); net income divided by total assets (ROA); total liabilities divided by total assets; total

liabilities divided by market value of equity (market debt/equity); current assets divided by current liabilities (current ratio); cash divided by current liabilities (cash ratio); and a sum of common equity, deferred taxes, and investment tax credit divided by market capitalization (B/M ratio). It also contains Altman's Z-score defined as 3.3x((pretax income + interest expense)/total assets) + 0.999x(sales/total assets) + 0.6x(market capitalization/total liabilities) + 1.2x(working capital/total assets) + 1.4(retained earnings/total assets), volatility (standard deviation of stock monthly returns), market-adjusted abnormal return defined as quarterly holding period return adjusted for the NYSE/Amex/Nasdaq value-weighted return, share turnover measured as trading volume divided by total shares outstanding, trading volume (in thousands of shares), and bid-ask spread. The totals in the panel are provided starting with year 5 before a firm files Chapter 11 and ending with year 0, year of the bankruptcy filing. Panel B includes data on institutional ownership reported for the five time horizons, consisting of four quarters each, and for quarter 0, quarter of filing. The ownership in the panel is reported for all 13f filers as a percentage of shares outstanding, and for three size-type ownership categories as a percentage of total shares owned by institutions – the largest, the largest five, and the largest ten. Panel C breaks down the data by time horizons and by manager types: 1=banks, 2=insurance companies, 3=investment companies and their managers, 4=independent investment advisors, and 5=all others. The ownerships for each manager type are reported as percentages of total shares outstanding. In parenthesis, n is a number of observations.

Table 3: Net Trading Behavior of Institutional Investors before Filing for a Bankruptcy Petition, 1988-2011

Quarter horizons	Total sample firms	All sample firms			Total control firms	All control firms		
		Net buyers	Non-traders	Net sellers		Net buyers	Non-traders	Net sellers
-20, -17	582	312	16	254	3,213	1,453	503	1,258
-16, -13	667	328	22	317	3,529	1,384	496	1,649
-12, -9	780	361	25	394	3,630	1,232	467	1,931
-8, -5	885	365	38	482	3,787	1,326	493	1,968
-4, -1	913	258	53	602	3,636	1,363	506	1,768
0	881	88	61	732	2,784	1,179	188	1,417

This table reports number of firms where institutional shareholders are net buyers, non-traders, or net-sellers for institutions in the sample and for benchmark group of institutions. The sample of net changes in 13f quarterly holdings is obtained for the period 1988-2011. Data on quarterly institutional (13f) holdings comes from Thomson Reuters' Institutional (13f) Holdings – s34. The results are reported for each quarter horizon preceding a bankruptcy filing and for quarter 0, quarter of filing. Included are total number of institutions by period used in determining groups of three types of traders for both sample and control group. Institutions are considered as net buyers if the number of shares purchased exceeds the number of shares sold, as non-traders if no shares are traded in the quarters with holdings, and as net sellers if the number of shares sold exceeds the number of shares purchased.

Table 4: Mean Quarterly Abnormal Net Number of Shares Traded per Firm over the Indicated Horizon

Quarter horizons	All	Manager type 1	2	3	4	5
-20, -17	7,424	-523	6,995	-38,970	9,543	29,443
	(<.0001)	(0.1379)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
-16, -13	5,351	898	14,281	-11,336	6,462	9,953
	(<.0001)	(0.0002)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
-12, -9	-166	-6,010	-2,634	-18,099	-2,118	14,635
	(0.4173)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
-8, -5	9,387	4,243	15,162	-23,837	1,330	34,019
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
-4	19,489	12,259	4,657	7,373	14,468	45,989
	(<.0001)	(0.0485)	(0.5604)	(0.7836)	(0.0321)	(<.0001)
-3	-36,519	-20,189	-17,675	-57,494	-32,692	-60,005
	(0.0007)	(<.0001)	(0.0054)	(0.0033)	(<.0001)	(0.2146)
-2	-17,916	-14,942	-7,683	-90,052	-17,096	-3,407
	(<.0001)	(0.0003)	(0.5705)	(0.0026)	(0.0006)	(0.5111)
-1	-28,531	-26,455	-25,052	-113,842	-24,702	-13,419
	(<.0001)	(<.0001)	(0.0088)	(0.0935)	(0.0001)	(0.0477)
0	-116,389	-60,769	-67,610	-281,639	-159,141	-53,682
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
-20, -1	4,863	2,109	2,433	-15,608	4,356	16,805
	(<.0001)	(0.0514)	(0.1303)	(0.0035)	(0.0003)	(<.0001)
-16, -1	2,242	-445	1,619	-23,836	1,683	15,334
	(0.1260)	(0.8133)	(0.4101)	(0.0009)	(0.3805)	(0.0012)
-12, -1	-942	-1,478	-2,188	-29,531	-2,809	14,094
	(0.5861)	(0.4619)	(0.3387)	(0.0005)	(0.2248)	(0.0105)
-8, -1	450	140	472	-28,399	-1,490	14,547
	(0.7971)	(0.9145)	(0.8565)	(0.0014)	(0.4197)	(0.0267)
-4, -1	-4,287	-8,211	-1,837	-55,152	-5,301	12,702
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
-2, -1	-23,224	-20,699	-16,368	-101,947	-20,899	-8,413
	(<.0001)	(<.0001)	(0.0476)	(0.0057)	(<.0001)	(0.0529)

Mean quarterly abnormal net number of shares traded per sample firm as compared to that per control firm is included in this table. The data on sample and control net holding changes is obtained for the period 1988-2011 from Thomson Reuters' Institutional (13f) Holdings – s34. The results are reported for each quarter horizon preceding a bankruptcy filing, for quarter 0, quarter of filing, and for periods of 20, 16, 12, 8, and 2 quarters before the filing. The data are also categorized by manager types: 1=banks, 2=insurance companies, 3=investment companies and their managers, 4=independent investment advisors, and 5=all others. Institutional purchases are coded as positive numbers and sales as negative numbers. The sample trades are adjusted by the number of shares traded by institutions holding shares of

control firms of similar size in the same quarter to arrive at an abnormal net number. P-values are reported in parentheses.

Table 5: Number of Managers Going Above and Below the SEC's Threshold for 13f Reporting, Categorized by Manager Type

Quarter	Description	All managers		Manager type									
				1		2		3		4		5	
		Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold
-19	# of managers	5,628	4,131	914	675	320	213	396	273	2,979	2,353	1,019	617
	# of shares (in mill.)	865	545	83	38	26	23	80	49	519	338	158	96
	Ave. share price	22.04	19.80	21.43	17.07	22.36	19.29	22.39	19.86	22.12	20.29	22.11	21.06
-18	# of managers	5,255	4,708	892	738	270	230	317	368	2,862	2,592	914	780
	# of shares (in mill.)	736	654	52	81	26	20	91	81	448	389	119	83
	Ave. share price	21.33	21.10	19.47	19.91	22.00	20.10	22.12	19.72	21.51	21.54	22.10	21.70
-17	# of managers	5,421	4,946	805	795	282	273	384	343	2,918	2,767	1,032	768
	# of shares (in mill.)	946	725	51	64	33	27	109	93	542	433	211	107
	Ave. share price	22.14	19.76	19.98	18.29	21.56	17.23	24.73	20.28	22.19	20.14	22.90	20.59
-16	# of managers	5,371	5,207	837	844	285	297	388	341	2,834	2,823	1,027	902
	# of shares (in mill.)	733	797	48	54	26	30	65	86	442	487	151	140
	Ave. share price	21.64	20.16	18.98	18.14	21.39	18.13	21.08	20.99	22.31	20.76	22.21	20.50
-15	# of managers	5,654	5,086	882	814	323	257	389	361	2,913	2,713	1,147	941
	# of shares (in mill.)	810	978	60	68	33	41	87	96	451	641	179	131
	Ave. share price	24.16	18.86	23.86	16.38	23.63	15.29	28.49	17.43	23.69	19.67	24.25	20.18
-14	# of managers	5,981	5,030	876	779	285	255	440	357	3,178	2,734	1,202	905
	# of shares (in mill.)	1,018	762	61	59	36	22	141	109	584	453	195	119
	Ave. share price	22.54	20.61	20.29	17.67	21.64	18.35	23.31	20.54	22.89	21.37	23.19	21.51
-13	# of managers	6,338	5,282	1,007	807	360	261	456	360	3,248	2,784	1,267	1,070
	# of shares (in mill.)	1,112	798	86	70	65	26	113	76	580	461	269	165
	Ave. share price	22.64	19.64	21.23	18.05	23.86	15.76	25.08	21.91	23.09	19.99	21.40	20.10

(Table 5 continues)

Quarter	Description	All managers		Manager type									
				1		2		3		4		5	
		Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold
-12	# of managers	6,612	5,410	1,035	838	348	281	505	366	3,447	2,891	1,277	1,034
	# of shares (in mill.)	937	783	71	64	36	27	105	88	522	458	203	145
	Ave. share price	21.83	20.84	20.86	20.10	21.38	17.17	24.41	22.73	22.26	21.27	20.58	20.56
-11	# of managers	7,010	5,887	1,120	870	362	310	501	428	3,644	3,166	1,383	1,113
	# of shares (in mill.)	1,119	928	81	65	42	42	117	114	662	532	217	174
	Ave. share price	24.11	19.58	23.18	16.55	22.40	18.01	25.62	21.21	24.76	20.24	23.04	19.87
-10	# of managers	8,098	6,441	1,298	929	430	347	573	440	4,152	3,437	1,645	1,288
	# of shares (in mill.)	1,553	996	133	93	60	28	209	88	828	585	323	203
	Ave. share price	24.78	21.02	24.37	17.78	24.74	18.44	26.62	23.38	25.68	21.57	22.18	21.77
-9	# of managers	9,123	6,819	1,332	1,045	465	346	558	474	4,887	3,530	1,881	1,424
	# of shares (in mill.)	2,750	1,078	509	92	242	32	330	120	1,203	606	466	228
	Ave. share price	23.25	20.29	23.25	18.72	21.41	18.40	25.16	20.38	24.11	21.04	20.89	20.00
-8	# of managers	7,850	7,224	1,164	1,067	439	342	506	509	3,987	3,825	1,754	1,481
	# of shares (in mill.)	1,421	1,108	106	76	39	31	190	113	737	632	349	256
	Ave. share price	21.59	19.43	20.82	18.46	20.98	17.28	23.99	18.27	22.20	20.45	20.15	18.39
-7	# of managers	7,665	7,767	1,108	1,113	400	397	458	501	3,901	4,113	1,798	1,643
	# of shares (in mill.)	1,344	1,368	82	91	37	39	123	152	736	783	366	303
	Ave. share price	20.14	19.32	18.01	17.46	18.75	16.74	19.40	20.71	21.39	19.88	19.23	19.40
-6	# of managers	7,907	7,886	1,148	1,136	374	411	481	510	4,075	3,873	1,829	1,956
	# of shares (in mill.)	1,551	1,416	101	98	71	43	188	176	806	770	384	329
	Ave. share price	18.99	17.39	15.99	20.04	17.37	13.72	19.63	15.32	20.18	17.33	18.36	17.26

(Table 5 continues)

Quarter	Description	All managers		Manager type									
				1		2		3		4		5	
		Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold	Above SEC thre-shold	Under SEC thre-shold
-5	# of managers	6,638	8,227	1,016	1,169	330	429	389	532	3,352	4,280	1,551	1,817
	# of shares (in mill.)	1,188	1,575	75	130	33	46	95	185	655	852	329	361
	Ave. share price	14.47	17.95	12.80	14.40	13.13	13.83	14.59	17.20	15.21	18.46	14.22	20.22
-4	# of managers	6,047	8,296	899	1,306	265	477	323	519	3,111	4,197	1,449	1,797
	# of shares (in mill.)	1,223	1,546	61	130	70	50	106	215	664	821	321	331
	Ave. share price	10.99	12.68	8.77	10.83	11.13	8.66	10.55	12.19	11.07	13.70	12.26	12.87
-3	# of managers	4,925	8,057	736	1,301	200	435	244	518	2,466	4,042	1,279	1,761
	# of shares (in mill.)	908	2,108	72	157	19	94	93	234	435	1,095	290	528
	Ave. share price	10.64	9.96	9.00	8.22	8.10	7.36	13.26	9.83	11.17	10.58	10.46	10.52
-2	# of managers	3,986	8,181	619	1,397	183	515	162	521	1,938	4,013	1,084	1,735
	# of shares (in mill.)	807	2,164	41	185	16	127	39	302	422	1,119	289	431
	Ave. share price	7.06	8.59	5.15	7.12	5.16	6.43	6.04	7.15	7.31	9.09	8.19	9.72
-1	# of managers	3,145	9,213	507	1,740	100	639	147	560	1,520	4,249	871	2,025
	# of shares (in mill.)	817	2,928	70	276	11	142	29	340	437	1,487	269	684
	Ave. share price	5.78	5.37	4.96	3.81	5.58	3.84	5.68	5.30	5.79	5.91	6.29	6.08
0	# of managers	1,582	12,716	274	2,751	40	978	75	817	791	5,378	402	2,792
	# of shares (in mill.)	483	6,736	14	1,076	4	692	27	996	289	2,744	149	1,228
	Ave. share price	2.28	4.39	1.49	3.39	2.72	3.71	1.81	4.43	2.05	4.64	3.32	5.10

Number of institutional managers whose shareholdings either fell below or rose above the SEC's threshold for 13f reporting during period analyzed is included in this table. Number of shares held (in mill.) and share prices for managers' buy-ins are as of quarter of the buy-ins. Number of share held (in mill.) and share prices for managers' sell-offs are as of quarter prior to the quarter of the sell-offs. The data are obtained

for the period 1988-2011 from Thomson Reuters' Institutional (13f) Holdings – s34. The results are reported for each quarter preceding a bankruptcy filing, starting with quarter q-19, and for quarter q=0, quarter of filing. The data are also categorized by manager types: 1=banks, 2=insurance companies, 3=investment companies and their managers, 4=independent investment advisors, and 5=all others.

Table 6: Average Analyst Ratings and Average Frequency of Coverage, October 1993-December 2011

Quarter horizons	All	Manager type				
		1	2	3	4	5
-20, -17	2.21928	2.18838	2.17528	2.13428	2.17978	2.35659
-16, -13	2.26278	2.21437	2.21838	2.17418	2.21518	2.43889
-12, -9	2.30288	2.26568	2.26008	2.22328	2.26238	2.45649
-8, -5	2.405010	2.36379	2.37289	2.35229	2.374410	2.530711
-4, -1	2.882110	2.85709	2.87579	2.85599	2.855410	2.973411
-4	2.69653	2.64343	2.66743	2.64443	2.64833	2.86764
-3	2.76283	2.75793	2.78683	2.73583	2.73653	2.82673
-2	2.86014	2.84123	2.85403	2.84803	2.84194	2.92045
-1	3.02444	2.97044	3.02004	2.98984	2.99254	3.13704
0	3.54004	3.54403	3.54383	3.53913	3.54014	3.53254
Before filing date	3.48301	3.49261	3.48601	3.49791	3.48721	3.44911
After filing date	3.64542	3.63952	3.65192	3.61592	3.63952	3.68122

The table reports quarterly averages of analyst ratings and totals of recommendation frequencies. The data on analyst recommendations, frequency of analyst coverage and its timing are obtained from the Institutional Brokers Estimate System (I/B/E/S). The data are reported for each quarter horizon preceding a bankruptcy filing and for quarter 0, quarter of filing. The mean ratings are categorized by manager type: 1=banks, 2=insurance companies, 3=investment companies and their managers, 4=independent investment advisors, and 5=all other.

Table 7: Propensity of Institutional Investors to Sell Well in Advance of a Bankruptcy Filing

			Manager type									
	All		1		2		3		4		5	
Variables	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates
Intercept 5	-2.4058 (<.0001)	-	-2.6923 (<.0001)	-	-2.2398 (<.0001)	-	-2.3554 (<.0001)	-	-2.2576 (<.0001)	-	-2.5011 (<.0001)	-
Intercept 4	-1.5556 (<.0001)	-	-1.7932 (<.0001)	-	-1.4193 (<.0001)	-	-1.5355 (<.0001)	-	-1.4434 (<.0001)	-	-1.5890 (<.0001)	-
Intercept 3	-0.9453 (<.0001)	-	-1.1757 (<.0001)	-	-0.8246 (0.0016)	-	-0.9404 (0.0002)	-	-0.8477 (<.0001)	-	-0.9412 (<.0001)	-
Intercept 2	-0.4131 (<.0001)	-	-0.6487 (<.0001)	-	-0.3117 (0.2314)	-	-0.4215 (0.0990)	-	-0.3063 (0.0034)	-	-0.4094 (0.0113)	-
Intercept 1	-0.0826 (0.2431)	-	-0.3181 (0.0480)	-	-0.0054 (0.9835)	-	-0.1035 (0.6853)	-	0.0236 (0.8216)	-	-0.0621 (0.7007)	-
LNAT	-0.0973 (<.0001)	0.907	-0.1411 (<.0001)	0.868	-0.1915 (<.0001)	0.826	-0.1078 (0.0031)	0.898	-0.0847 (<.0001)	0.919	-0.0547 (0.0269)	0.947
LNSALES	0.0286 (0.0007)	1.029	0.0729 (0.0001)	1.076	0.1041 (0.0016)	1.110	0.0695 (0.0211)	1.072	0.0206 (0.0994)	1.021	-0.0268 (0.1715)	0.974
STOAT	0.0553 (<.0001)	1.057	0.0170 (0.4202)	1.017	0.0391 (0.2662)	1.040	-0.0012 (0.9719)	0.999	0.0479 (0.0005)	1.049	0.1303 (<.0001)	1.139
ROA	-0.0609 (<.0001)	0.941	-0.0332 (0.1203)	0.967	-0.0474 (0.1806)	0.954	-0.1334 (0.0004)	0.875	-0.0493 (0.0007)	0.952	-0.1063 (<.0001)	0.899

(Table 7 continues)

	All		Manager type 1		2		3		4		5	
Variables	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates
LTAT	0.0880	1.092	0.1037	1.109	0.1644	1.179	0.0745	1.077	0.0586	1.060	0.0934	1.098
	(<.0001)		(<.0001)		(<.0001)		(0.1190)		(0.0008)		(<.0001)	
DTEQ	-0.0016	0.998	-0.0024	0.998	-0.0022	0.998	-0.0017	0.998	-0.0020	0.998	0.0001	1.001
	(<.0001)		(<.0001)		(0.0327)		(0.0574)		(<.0001)		(0.8719)	
CURR	-0.0018	0.998	0.0063	1.006	-0.0090	0.991	0.0182	1.018	-0.0116	0.988	0.0101	1.010
	(0.5262)		(0.3236)		(0.4132)		(0.0702)		(0.0062)		(0.1614)	
ARVW	0.2557	1.291	0.3523	1.422	0.4313	1.539	-0.0250	0.975	0.1776	1.194	0.4275	1.533
	(<.0001)		(<.0001)		(0.0016)		(0.8578)		(0.0015)		(<.0001)	
LNMKTVL	0.0743	1.077	0.0718	1.074	0.0856	1.089	0.0439	1.045	0.0795	1.083	0.0589	1.061
	(<.0001)		(<.0001)		(0.0003)		(0.0545)		(<.0001)		(<.0001)	
BM	0.0034	1.003	0.0006	1.001	0.0031	1.003	0.0080	1.008	0.0025	1.002	0.0064	1.006
	(<.0001)		(0.6898)		(0.2390)		(0.0130)		(0.0178)		(<.0001)	
LQDT	3.4131	1.511	6.7121	2.674	-6.3675	0.201	6.1301	2.461	-4.6810	0.626	-3.5888	0.728
	(0.8566)		(0.2174)		(0.4639)		(0.4565)		(0.8910)		(0.4621)	
RISK	-0.1388	0.870	-0.0937	0.911	-0.0951	0.909	-0.2069	0.813	-0.1172	0.889	-0.2149	0.807
	(<.0001)		(<.0001)		(0.0046)		(<.0001)		(<.0001)		(<.0001)	
NUM13F	-0.0121	0.988	-0.0150	0.985	-0.0101	0.990	-0.0134	0.987	-0.0137	0.986	-0.0057	0.994
	(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	

(Table 7 continues)

	All		Manager type 1		2		3		4		5	
Variables	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates	Estimates	Point esti-mates
IHPC	-0.1520	0.859	0.0393	1.040	-0.7539	0.471	-0.0802	0.923	-0.0204	0.980	-0.4267	0.653
	(0.0122)		(0.7814)		(0.0011)		(0.7181)		(0.8202)		(0.0011)	
TENPC	-0.8249	0.438	-1.1398	0.320	-1.2273	0.293	-0.9023	0.406	-0.7692	0.463	-0.3537	0.702
	(<.0001)		(<.0001)		(0.0028)		(0.0245)		(<.0001)		(0.1729)	
NUM13FLAG	0.0078	1.008	0.0106	1.011	0.0060	1.006	0.0095	1.010	0.0091	1.009	0.0023	1.002
	(<.0001)		(<.0001)		(0.0007)		(<.0001)		(<.0001)		(0.0222)	
IHPCLAG	0.5621	1.754	0.5073	1.661	1.2105	3.355	0.5336	1.705	0.3768	1.458	0.7536	2.125
	(<.0001)		(0.0004)		(<.0001)		(0.0174)		(<.0001)		(<.0001)	
TENPCLAG	-0.0701	0.932	0.4534	1.574	0.2163	1.241	-0.0259	0.974	-0.2198	0.803	-0.4291	0.651
	(0.5205)		(0.0757)		(0.5915)		(0.9474)		(0.1623)		(0.1033)	
LogLikelihood	6,364		1,364		476		463		3,284		991	
	(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
Degrees of freedom	18		18		18		18		18		18	
No. of observations	203,175		41,448		14,984		14,993		92,170		39,580	

Reported are estimates of the coefficients from ordered logit model. The results are reported for all institutions, and then categorized by manager type: 1=banks, 2=insurance companies, 3=investment companies and their managers, 4=independent investment advisors, and 5=all others. Dependent variable in the regression is determined based on the quarterly abnormal net trading totals. The value of dependent variable ranges from 0 to 5 depending on when an institution became a net seller for the first time. Explanatory variables are as follows: natural logarithms of total assets (LNAT), market capitalization (LNMKTVL), and sales (LNSALES), return on assets (ROA), debt-to-assets (LTAT), current ratio (CURR), asset turnover (STOAT), debt-to-equity (DTEQ), and book-to-market (BM), risk (RISK), value-weighted abnormal return (ARVW), share turnover (LQDT), number of 13f holders (NUM13F) and its lagged value (NUM13FLAG), total number of shares held by institutions as

percentage of total shares outstanding (IHPC) and its lagged value (IHPCLAG), and number of shares held by the largest ten institutional owners as percentage of total shares outstanding (TENPC) and its lagged value (TENPCLAG). P-values are reported in parentheses.

Table 8: The Timing of Institutional Trading

Quarter horizons	All			Manager type 1			2		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.00367	0.0024	-0.0053	-0.0058	0.0029	-0.0043	-0.0051	0.0043	-0.0066
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0156)	(0.0004)	(<.0001)	(0.0244)	(0.0007)
-16, -13	-0.00551	-0.0008	0.0012	-0.0067	0.0022	0.000002	-0.0081	-0.0022	0.0023
	(<.0001)	(0.0751)	(0.0052)	(<.0001)	(0.0238)	(0.9987)	(<.0001)	(0.1508)	(0.1407)
-12, -9	-0.00464	-0.0046	0.0021	-0.0057	-0.0056	0.0014	-0.0079	-0.0028	0.0013
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.2290)	(<.0001)	(0.1237)	(0.4896)
-8, -5	-0.03684	-0.0020	0.0012	-0.0371	-0.0020	0.0002	-0.0395	-0.0044	0.0007
	(<.0001)	(<.0001)	(0.0163)	(<.0001)	(0.0770)	(0.8752)	(<.0001)	(0.0179)	(0.7154)
-4, -1	-0.1047	0.0070	0.0088	-0.1043	0.0099	0.0079	-0.1054	0.0034	0.0092
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0002)	(<.0001)	(0.2882)	(0.0090)
-20, -1	-0.0332	-0.0013	0.0028	-0.0338	-0.0003	0.0025	-0.0348	-0.0019	0.0028
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.6208)	(<.0001)	(<.0001)	(0.0515)	(0.0058)

(Table 8 continues)

Quarter horizons	Manager type								
	3			4			5		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.0010	0.0040	-0.0039	-0.0036	0.0019	-0.0052	-0.0018	0.0014	-0.0068
	(0.4510)	(0.0552)	(0.0673)	(<.0001)	(0.0187)	(<.0001)	(0.0352)	(0.2737)	(<.0001)
-16, -13	-0.0002	-0.0028	0.0036	-0.0039	-0.0012	0.0018	-0.0099	-0.0020	-0.0005
	(0.8276)	(0.0959)	(0.0374)	(<.0001)	(0.0626)	(0.0055)	(<.0001)	(0.0427)	(0.6476)
-12, -9	-0.0013	-0.0041	0.0042	-0.0032	-0.0042	0.0036	-0.0076	-0.0051	-0.0010
	(0.2447)	(0.0333)	(0.0302)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.3206)
-8, -5	-0.0380	-0.0056	0.0006	-0.0362	-0.0005	0.0010	-0.0369	-0.0035	0.0033
	(<.0001)	(0.0037)	(0.7678)	(<.0001)	(0.4852)	(0.2020)	(<.0001)	(0.0010)	(0.0026)
-4, -1	-0.1079	0.0077	0.0060	-0.1069	0.0073	0.0088	-0.0991	0.0043	0.0101
	(<.0001)	(0.0229)	(0.1102)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0134)	(<.0001)
-20, -1	-0.0301	-0.0018	0.0035	-0.0322	-0.0008	0.0032	-0.0358	-0.0033	0.0020
	(<.0001)	(0.0866)	(0.0011)	(<.0001)	(0.0354)	(<.0001)	(<.0001)	(<.0001)	(0.0007)

The table reports estimated coefficients from institution-by-institution regressions of actual quarterly holding period returns minus value-weighted index return from the Center for Research in Security Prices (CRSP) on the abnormal number of shares traded in the quarterly intervals before and after the holding period. The results are reported for all institutions, and then categorized by manager type: 1=banks, 2=insurance companies, 3=investment companies and their managers, 4=independent investment advisors, and 5=all others. Abnormal trades are coded as one of the three dummy variables: -1 if sales, 0 if no trading, and 1 if purchases. P-values are reported in parentheses.

Table 8(a): The Timing of Institutional Trading, Categorize by Transaction Size

Quarter horizons	All								
	T < 107,500			107,500 <= T < 1,271,050			T >= 1,271,050		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.00385	0.0045	-0.0078	-0.0128	0.0042	-0.0098	-0.0170	0.0109	0.0001
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.0276)	(<.0001)	(0.0020)	(0.2846)	(0.9900)
-16, -13	-0.00504	-0.0016	0.0004	-0.0068	-0.0056	-0.0015	-0.0287	-0.0056	-0.0002
	(<.0001)	(0.0007)	(0.4183)	(<.0001)	(<.0001)	(0.2721)	(<.0001)	(0.2602)	(0.9702)
-12, -9	-0.00323	-0.0016	0.0029	-0.0036	-0.0022	0.0054	-0.0040	0.0054	0.0071
	(<.0001)	(0.0014)	(<.0001)	(<.0001)	(0.0882)	(<.0001)	(0.0954)	(0.2092)	(0.1007)
-8, -5	-0.02265	-0.0028	0.0011	-0.0258	-0.0077	0.0038	-0.0184	-0.0056	0.0106
	(<.0001)	(<.0001)	(0.0529)	(<.0001)	(<.0001)	(0.0077)	(<.0001)	(0.2283)	(0.0290)
-4, -1	-0.0917	0.0055	0.0106	-0.1098	0.0004	-0.00172	-0.1306	-0.0123	-0.0115
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.8363)	(0.4266)	(<.0001)	(0.0539)	(0.1091)
-20, -1	-0.0318	-0.0007	0.0029	-0.0398	-0.0045	0.0002	-0.0561	-0.0084	-0.0041
	(<.0001)	(0.0215)	(<.0001)	(<.0001)	(<.0001)	(0.8167)	(<.0001)	(0.0037)	(0.1815)

(Table 8(a) continues)

Quarter horizons	Manager type 1								
	T < 44,473			44,473 <= T < 588,400			T >= 588,400		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.0049	0.0045	-0.0071	-0.0094	0.0094	-0.0057	-0.0081	0.0029	-0.0063
	(<.0001)	(0.0041)	(<.0001)	(0.0002)	(0.0151)	(0.1377)	(0.3760)	(0.8515)	(0.6799)
-16, -13	-0.0066	0.0008	-0.0007	-0.0085	-0.0025	0.0012	-0.0281	-0.0084	0.0000
	(<.0001)	(0.4912)	(0.5485)	(<.0001)	(0.3475)	(0.6501)	(<.0001)	(0.2360)	(0.9952)
-12, -9	-0.0056	-0.0017	0.0028	-0.0038	-0.0017	0.0057	-0.0124	-0.0038	0.0019
	(<.0001)	(0.1246)	(0.0150)	(0.0285)	(0.5265)	(0.0365)	(0.0010)	(0.5630)	(0.7820)
-8, -5	-0.0223	-0.0030	-0.0005	-0.0277	-0.0041	0.0007	-0.0266	-0.0063	0.0033
	(<.0001)	(0.0206)	(0.7217)	(<.0001)	(0.1738)	(0.8184)	(<.0001)	(0.3640)	(0.6620)
-4, -1	-0.0909	0.0079	0.0091	-0.1076	0.0013	0.0074	-0.1214	-0.0114	0.0062
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.7476)	(0.1079)	(<.0001)	(0.3292)	(0.6247)
-20, -1	-0.0321	0.00012	0.0020	-0.0400	-0.0009	0.0034	-0.0527	-0.0102	0.0009
	(<.0001)	(0.8497)	(0.0025)	(<.0001)	(0.5724)	(0.0433)	(<.0001)	(0.0262)	(0.8568)

(Table 8(a) continues)

Quarter horizons	Manager type 2								
	T < 32,992			32,992 <= T < 515,080			T >= 515,080		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.0036	0.0082	-0.0072	-0.0141	0.0076	-0.0120	-0.0102	-0.0124	-0.0338
	(0.0319)	(0.0010)	(0.0031)	(<.0001)	(0.1767)	(0.0307)	(0.2759)	(0.4507)	(0.0407)
-16, -13	-0.0072	-0.0039	0.0007	-0.0109	-0.0034	-0.0015	-0.0273	-0.0041	-0.0098
	(<.0001)	(0.0306)	(0.6884)	(<.0001)	(0.3381)	(0.6756)	(<.0001)	(0.7395)	(0.4340)
-12, -9	-0.0059	0.0003	0.0025	-0.0052	-0.0019	0.0044	-0.0091	0.0011	0.0191
	(<.0001)	(0.8669)	(0.2067)	(0.0204)	(0.6066)	(0.2345)	(0.1472)	(0.9211)	(0.0709)
-8, -5	-0.0252	-0.0055	-0.0006	-0.0303	0.0005	0.0042	-0.0325	-0.0154	0.0129
	(<.0001)	(0.0090)	(0.7648)	(<.0001)	(0.9007)	(0.3331)	(<.0001)	(0.1691)	(0.2635)
-4, -1	-0.0899	0.0027	0.0133	-0.1108	-0.0073	-0.0036	-0.1374	-0.0157	-0.0076
	(<.0001)	(0.3408)	(<.0001)	(<.0001)	(0.2148)	(0.5893)	(<.0001)	(0.3903)	(0.7158)
-20, -1	-0.0324	-0.0013	0.0030	-0.0404	-0.0023	0.0006	-0.0576	-0.0128	0.0001
	(<.0001)	(0.2442)	(0.0080)	(<.0001)	(0.3178)	(0.8009)	(<.0001)	(0.0734)	(0.9893)

(Table 8(a) continues)

Quarter horizons	Manager type 3								
	T < 98,309			98,309 <= T < 1,440,556			T >= 1,440,556		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.0018	0.0057	-0.0083	-0.0121	0.0029	-0.0066	-0.0317	-0.0263	0.0113
	(0.3237)	(0.0343)	(0.0019)	(0.0010)	(0.6130)	(0.2503)	(0.0028)	(0.1660)	(0.5633)
-16, -13	0.0001	-0.0015	0.0028	0.0032	-0.0056	0.0001	-0.0255	0.0137	-0.0160
	(0.9677)	(0.4476)	(0.1527)	(0.1992)	(0.1667)	(0.9755)	(0.0010)	(0.3185)	(0.2557)
-12, -9	0.0007	-0.0033	0.0035	-0.0021	-0.0021	0.0099	-0.0024	0.0114	-0.0016
	(0.5636)	(0.1030)	(0.0882)	(0.3840)	(0.6192)	(0.0171)	(0.7138)	(0.3520)	(0.8982)
-8, -5	-0.0220	-0.0053	0.0010	-0.0244	-0.0124	0.0063	-0.0304	-0.0009	0.0092
	(<.0001)	(0.0236)	(0.6638)	(<.0001)	(0.0062)	(0.1570)	(<.0001)	(0.9402)	(0.4640)
-4, -1	-0.0917	0.0069	0.0097	-0.1124	-0.0055	-0.0008	-0.1198	-0.0095	-0.0026
	(<.0001)	(0.0245)	(0.0056)	(<.0001)	(0.3640)	(0.9055)	(<.0001)	(0.5965)	0.8945
-20, -1	-0.0279	-0.0004	0.0032	-0.0341	-0.0070	0.0036	-0.0556	0.0002	-0.0069
	(<.0001)	(0.7179)	(0.0075)	(<.0001)	(0.0030)	(0.1350)	(<.0001)	(0.9815)	(0.3907)

(Table 8(a) continues)

Quarter horizons	Manager type 4								
	T < 86,925			86,925 <= T < 1,141,500			T >= 1,141,500		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.0039	0.0036	-0.0077	-0.0115	0.0026	-0.0113	-0.0198	0.0222	-0.0067
	(<.0001)	(0.0003)	(<.0001)	(<.0001)	(0.2812)	(<.0001)	(0.0064)	(0.1063)	(0.6270)
-16, -13	-0.0039	-0.0014	0.0011	-0.0035	-0.0059	-0.0023	-0.0264	-0.0129	0.0063
	(<.0001)	(0.0584)	(0.1368)	(0.0012)	(0.0005)	(0.1948)	(<.0001)	(0.0544)	(0.3776)
-12, -9	-0.0018	-0.0011	0.0041	-0.0025	-0.0043	0.0032	-0.0024	0.01006	0.0137
	(<.0001)	(0.1372)	(<.0001)	(0.0152)	(0.0111)	(0.0620)	(0.4605)	(0.0758)	(0.0185)
-8, -5	-0.0214	-0.0004	0.0022	-0.0252	-0.0096	0.0028	-0.0177	0.0036	0.0093
	(<.0001)	(0.6169)	(0.0098)	(<.0001)	(<.0001)	(0.1335)	(<.0001)	(0.5976)	(0.1890)
-4, -1	-0.0927	0.0059	0.0113	-0.1085	0.0038	-0.0033	-0.1337	-0.0083	-0.0129
	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.1282)	(0.2410)	(<.0001)	(0.3134)	(0.1681)
-20, -1	-0.0306	0.0002	0.0037	-0.0371	-0.0050	-0.0010	-0.0558	-0.0029	-0.0030
	(<.0001)	(0.5890)	(<.0001)	(<.0001)	(<.0001)	(0.3398)	(<.0001)	(0.4479)	(0.4609)

(Table 8(a) continues)

Quarter horizons	Manager type 5								
	T < 46,243			46,243 <= T < 748,100			T >= 748,100		
	Intercept	DB	DA	Intercept	DB	DA	Intercept	DB	DA
-20, -17	-0.0016	0.0042	-0.0078	-0.0121	0.0117	-0.0123	-0.0159	-0.0134	-0.0052
	(0.1589)	(0.0145)	(<.0001)	(<.0001)	(0.0012)	(0.0005)	(0.0558)	(0.3117)	(0.6944)
-16, -13	-0.0074	-0.0041	-0.0011	-0.0138	-0.0042	-0.0040	-0.0254	-0.0062	0.0017
	(<.0001)	(0.0003)	(0.3550)	(<.0001)	(0.0912)	(0.1108)	(<.0001)	(0.4621)	(0.8465)
-12, -9	-0.0047	-0.0023	-0.0003	-0.0043	0.0001	0.0047	-0.0142	0.0012	0.0027
	(<.0001)	(0.0337)	(0.7974)	(0.0013)	(0.9864)	(0.0298)	(0.0003)	(0.8659)	(0.6911)
-8, -5	-0.0246	-0.0051	0.0013	-0.0236	-0.0060	0.0026	-0.0168	-0.0163	-0.0046
	(<.0001)	(<.0001)	(0.3121)	(<.0001)	(0.0136)	(0.2841)	(<.0001)	(0.0271)	(0.5551)
-4, -1	-0.0880	0.0055	0.0116	-0.0995	-0.0026	0.0012	-0.1185	-0.0152	-0.0164
	(<.0001)	(0.0006)	(<.0001)	(<.0001)	(0.4243)	(0.7357)	(<.0001)	(0.1358)	(0.1544)
-20, -1	-0.0340	-0.0023	0.0022	-0.0407	-0.0047	0.0001	-0.0539	-0.0175	-0.0064
	(<.0001)	(0.0004)	(0.0009)	(<.0001)	(0.0006)	(0.9515)	(<.0001)	(0.0002)	(0.1942)

The upper and lower bounds of each trading size group are determined based on the highest and the lowest number of shares traded in each group.

Table 9: Institutional Response to Analysts' Sell Recommendations

Panel A: Ordinary least squares with heteroskedasticity-consistent p-values

	Quarter horizons					
Variables	-20, -1	-4, -1	-8, -5	-12, -9	-16, -13	-20, -17
OLS model	OLS parameters	OLS parameters	OLS parameters	OLS parameters	OLS parameters	OLS parameters
Intercept	0.047	0.010	0.181	0.115	-0.118	-0.030
	(<.0001)	(0.391)	(<.0001)	(<.0001)	(<.0001)	(0.392)
ARSELL	-0.023	-0.020	-0.091	-0.033	0.032	-0.016
	(<.0001)	(0.060)	(<.0001)	(0.001)	(0.001)	(0.180)
DSHR	0.085	0.080	0.173	0.075	-0.025	0.630
	(0.045)	(0.0003)	(<.0001)	(0.533)	(0.705)	(0.007)
LNMKTVL	-0.007	0.002	-0.025	-0.012	0.014	-0.005
	(<.0001)	(0.276)	(<.0001)	(0.0004)	(0.0002)	(0.266)
DARVW	0.002	0.016	-0.009	-0.010	0.064	0.054
	(0.817)	(0.366)	(0.549)	(0.587)	(0.184)	(0.163)
DLQDT	0.568	-0.959	-2.374	1.485	5.276	-7.316
	(0.635)	(0.617)	(0.296)	(0.506)	(0.186)	(0.228)
DIHPC	0.297	0.416	0.429	0.141	0.523	0.264
	(<.0001)	(<.0001)	(<.0001)	(0.0002)	(<.0001)	(0.026)
BETA	-0.019	0.005	-0.043	-0.044	-0.023	0.028
	(<.0001)	(0.187)	(<.0001)	(<.0001)	(0.005)	(0.013)
ATLT	0.005	0.006	0.008	0.006	0.007	0.003
	(<.0001)	(0.219)	(<.0001)	(0.001)	(<.0001)	(0.740)
Adj. R^2	0.0021	0.0044	0.007	0.0031	0.0032	0.0019
No. of observations	161,799	30,917	47,648	37,853	26,826	18,555

(Table 9 continues)

Panel B: Two-pass Heckman model regressions (with selection ARSELL=1 for the second-pass)

Variables		Quarter horizons											
		-20, -1		-4, -1		-8, -5		-12, -9		-16, -13		-20, -17	
Probit model	Heckman model	Probit para-meters	Heckman para-meters	Probit model	Heckman para-meters	Probit model	Heckman para-meters	Probit model	Heckman para-meters	Probit model	Heckman para-meters	Probit model	Heckman para-meters
Intercept	Intercept	-0.366	-0.521	-0.362	-0.678	-0.198	-0.192	-0.241	0.548	0.077	-0.685	-0.888	0.123
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.003)	(0.009)	(<.0001)	(<.0001)	(0.209)	(<.0001)	(<.0001)	(0.031)
NTNOR-MLAG	DSHR	-0.114	0.118	-0.098	-0.006	-0.094	-0.570	0.028	0.784	-0.169	-0.529	-0.026	2.356
		(<.0001)	(0.059)	(<.0001)	(0.933)	(<.0001)	(0.125)	(0.014)	(<.0001)	(<.0001)	(0.266)	(0.108)	(<.0001)
LN-MKTVL	LN-MKTVL	-0.197	-0.076	-0.181	-0.083	-0.377	-0.074	-0.240	0.128	-0.165	-0.009	-0.095	-0.026
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.175)	(<.0001)	(0.004)
ARVW	DARVW	-0.776	-0.234	-0.067	0.024	-1.902	-0.339	-1.629	0.625	-0.365	0.201	-1.194	0.258
		(<.0001)	(<.0001)	(0.301)	(0.660)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.003)	(0.150)	(<.0001)	(0.046)
LQDT	DLQDT	-34.660	-15.061	-15.372	-11.058	-44.242	0.179	-85.189	-7.935	-67.311	-12.892	8.990	-28.562
		(<.0001)	(<.0001)	(<.0001)	(0.003)	(<.0001)	(0.988)	(<.0001)	(0.336)	(<.0001)	(0.121)	(0.463)	(0.039)
IHPC	DIHPC	0.496	0.499	0.549	0.759	1.256	0.203	-0.063	0.517	0.014	0.122	0.210	0.017
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.372)	(0.100)	(<.0001)	(0.738)	(0.665)	(0.001)	(0.867)
BETA	BETA	0.145	0.038	0.038	0.039	0.255	-0.037	0.290	-0.098	0.179	0.091	0.311	0.044
		(<.0001)	(<.0001)	(0.001)	(0.000)	(<.0001)	(0.076)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.023)
ATLT	ATLT	-0.057	-0.022	0.001	-0.008	-0.003	0.000	-0.015	0.014	-0.155	-0.057	-0.163	-0.075
		(<.0001)	(<.0001)	(0.877)	(0.281)	(0.688)	(0.995)	(0.001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
OIREV	λ	0.011	0.419	0.009	0.640	0.009	0.272	0.001	-0.483	0.074	0.292	2.264	0.019
		(<.0001)	(<.0001)	(<.0001)	(<.0001)	(0.003)	(<.0001)	(0.524)	(<.0001)	(<.0001)	(<.0001)	(<.0001)	(<.0001)
EPS		0.014		0.003		0.049		0.023		0.082		-0.295	
		(<.0001)		(0.010)		(<.0001)		(<.0001)		(<.0001)		(<.0001)	
LogLikelihood		-59,677		-13,650		-14,168		-7,721		-12,211		-7,431	
No. of observations		157,049		30,387		46,474		36,612		25,690		17,886	

This table reports cross-sectional regressions to explain institutional managers' reaction to the issuance of sell recommendations. The data on analyst recommendations are obtained from the I/B/E/S. Market and accounting related measures are obtained from CRSP and Compustat, respectively. Dependent variable is a normalized net change in institutional holdings. The regression results are reported for the entire five-year period and for each quarter horizon preceding a quarter of a bankruptcy filing. Specifications in Panel A are estimated using ordinary least squares (OLS) with heteroskedasticity-consistent robust p-values reported in parentheses under each estimate. Control variables are as follows: dummy variable (ARSELL) that takes on a value of 1 if mean quarterly recommendations are equal or greater than 3.5, and 0 otherwise; percentage quarterly change in the shares outstanding (DSHR), a natural logarithm of the market values (LNMKTVL), a quarterly change in the abnormal value-weighted holding period returns (DARVW), a quarterly change in the share volume as a percentage of total shares outstanding (DLQDT), a quarterly change in the total institutional ownership as a percentage of shares outstanding (DIHPC), a risk measure (BETA), and a current quarter's coverage ratio (ATLT). Adjusted R^2s and number of observations used are reported for each regression. Specifications in Panel B are estimated using two-stage Heckman model regression. The first regression is a probit regression of the probability that a sell-side analyst issues a sell recommendation with ARSELL for dependent variable. The following additional control variables are used in the probit model that were not used in OLS: normalized lagged values of net holding changes (NCNORMLAG); value-weighted abnormal holding period return (ARVW); share volume as a percentage of shares outstanding (LIQD); percentage of shares outstanding owned by institutions (IHPC); operating income divided by revenues (OIREV); and earnings per share (EPS). The inverse-Mills ratio (λ) is computed from the probit model and used in the second-pass Heckman regressions for normalized net institutional holding change. Independent variables from OLS regression were used in the second-pass Heckman model. LogLikelihood values and number of observations used are reported for the regression. P-values are reported in parentheses.

CHAPTER 2

Investing in Shares of Bankrupt Firms: Evidence from Investments by Institutional Investors Shortly Before, During, and After Chapter 11 Proceedings

by

Elena Precourt[40]; Henry R. Oppenheimer[41]

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[40] PhD Candidate, College of Business Administration, The University of Rhode Island, Kingston, RI 02881, Email: elena_precourt@my.uri.edu
[41] Associate Professor, College of Business Administration, The University of Rhode Island, Kingston, RI 02881, Email: hroppenheimer@mail.uri.edu

Abstract

In this paper we analyze the investment behavior of institutional managers who hold and trade shares of bankrupt firms shortly before they file for Chapter 11 protection, during their reorganization, and after the firms emerge from bankruptcy. We also investigate whether or not institutional ownership is related to performance of bankrupt firms as they attempt to reorganize. We observe that institutional ownership increases in the four quarters following the bankruptcy filings. We find that during the five-quarter period starting in the quarter of emergence from Chapter 11 institutional investors are net buyers of firms' equity with a significantly larger positive abnormal net number of shares traded during the period as compared to a control sample. We evaluate institutions' ability to identify undervalued shares of bankrupt firms with a potential of earning positive returns as the firms reorganize, emerge, and return to profitability. We find that only in the quarter of emergence do the managers trade strategically. Institutional ownership negatively relates to bankrupt firms' post-emergence operating performance improvement and positively relates to the firms' post-emergence market performance recovery. Although the firms with institutional holdings have a better pre-bankruptcy operating performance and are less levered, we find that these characteristics do not relate to the firms' post-emergence operating or market performance improvements.

I. Introduction

Why would anyone consider investing in shares of operationally and/or financially unhealthy firms? Do those investors who invest in the risky shares of evidently distressed and/or bankrupt firms follow the motto 'Good things happen to those who hustle' (Anais Nin)[42]? Or are these investors blissfully unaware of the brewing troubles and "unavoidable destiny" of the firms? What about sophisticated and informed investors such as institutions? How do their share holdings change as the firms approach and then file for Chapter 11 protection, work through reorganization, and emerge from bankruptcy proceedings? And do these holdings play a role in the effectiveness of bankrupt firms' restructuring and their speed of returning to profitability? Although it has been shown that, in general, bankrupt firms underperform operationally and in the stock market and investors holding shares of bankrupt firms incur significant capital losses, we may find that institutions are capable of identifying undervalued equity and timing purchases and sales of distressed securities.

We investigate whether or not institutional ownership is related to performance of distressed firms as they attempt to reorganize. Another main theme of this paper is to examine whether or not institutional managers who acquire shares of bankrupt firms in the quarter prior to Chapter 11 filings, during bankrupt firms' reorganization, or shortly after firms emerge from bankruptcy proceedings possess the ability to strategically trade shares of distressed or bankrupt firms to achieve positive returns. In summary, the purpose of this paper is twofold: to analyze the relationships between institutional holdings and performance of bankrupt firms and to evaluate whether or not institutional investors are capable of identifying undervalued investments that results in future positive returns. We also determine proportions of shares outstanding owned by retail investors, corporate insiders, and institutional investors and

[42] Equity of bankrupt firms possesses the key characteristics of lottery-type-stock (Kumar (2009)), with a high probability of relatively small loss (in dollars, while a complete loss remains -100%) and a low probability of an extremely large gain.

analyze how these holdings change as the firms approach bankruptcy filings and emerge as reorganized entities.

The relationship between institutional investment decisions and the operating and market performances of struggling firms before, during, and after bankruptcy filings have not been systematically analyzed. We do not know if the operating and stock market performances of failing firms with institutional shareholders differ from that of failing firms without investments from institutions. We do know that higher institutional ownership has a positive effect on stock prices and returns (Brown and Brooke (1993), Gompers and Metrick (1999)). Does this finding apply to special situations such as institutional investments in bankrupt firms?

Do bankrupt firms with institutional investments shortly before the filings and during the reorganization fare better operationally and in the stock market than those without institutions as shareholders? Do firms held by institutional investors shortly after their emergence as reorganized enterprises experience the same difficulties as their previously bankrupt counterparts without investments from institutions? Do the firms whose shares are held by institutions emerge leaner, with lower debt burden, and more efficient[43] from bankruptcy and return to profitability sooner than do the firms without institutional investments? Do the firms with institutional investments spend less time in Chapter 11, which helps them reduce bankruptcy costs? To answer these questions we analyze how institutional investments relate to the operating and stock market performance of distressed firms, particularly those acquired and/or held by institutional investors before they file for bankruptcy, during their reorganization, and just after they emerge from Chapter 11. In addition, we analyze changes in institutional holdings once the firms emerge from bankruptcy and determine whether or not shares of these firms have higher buy-and-hold abnormal returns

[43] In particular we evaluate firms' post-emergence sales, total assets, return on assets, cash flow, and current and debt ratios.

than do firms emerging from bankruptcy without institutional investments. We expect to observe a positive relationship between institutional holdings and distressed firms' restructuring and performance improvement. We conjecture that the firms with institutional holdings reorganize and return to profitability sooner than their counterparts without investments from institutions.

We also analyze whether or not institutional investors tend to acquire and hold firms in greater concentration that fare less badly operationally and in the stock market prior to petitioning for reorganization and/or recover sooner after emerging from bankruptcy. Hotchkiss (1995) finds that about forty percent of firms emerging from bankruptcy continue to experience operating losses for several years following emergence. "The firms showed some positive growth in revenues, assets, and number of employees in the post-bankruptcy period, but showed little improvement in profitability, especially in comparison to industry groups." (Altman and Hotchkiss (2006), p.84) Are managers capable of recognizing distressed firms that return to or exceed their pre-bankruptcy operating and market performance levels or do they acquire securities of firms that continue to struggle after they reorganize and emerge from bankruptcy? Hotchkiss (1995) uses return on assets and profit margin to assess firms' operating performance. In this study we consider both operating and market performance measures of bankrupt firms, and analyze performance changes occurring around bankruptcy filing and emergence.

The existing empirical literature on institutional trading does not, however, provide concrete evidence as to how profitable the investment strategies are that institutions employ in their overall trading. While some researchers argue that institutional investors are capable of picking winners and exhibit fully rational herding behavior that promotes price discovery and predicts stock returns (Nofsinger and Sias (1999), Sias (2004)), others conclude that institutional managers mechanically acquire stocks with certain desirable characteristics and price levels (Falkenstein (1996)) and irrationally engage in herding causing temporary price

bubbles (Dreman and Lufkin (2000)) and future price correction (Gutierrez and Kelley (2009)). Irrespective of that, we can, to this point, find no empirical evidence relevant to profitability of institutional holdings/trading of companies as they approach bankruptcy, proceed through reorganization, and emerge from Chapter 11.

i. Investing in securities of distressed firms

It is well established that the security returns associated with the immediate period around bankruptcy filings are almost always quite negative and investors in filing firms almost invariably suffer losses. Firms usually start experiencing financial difficulties long before petitioning for reorganization or liquidation in the Federal court by filing Chapter 11 or Chapter 7, respectively, (Altman (1968), Aharony, Jones, and Swary (1980), Clark and Weinstein (1983), Campbell et al. (2008)) and investors continue to suffer losses up to the time of filing (Clark and Weinstein (1983)). Consequently, most bankruptcy filings are not surprises in that most firms suffer from the throes of financial and/or operating distress for some time before the filings; many are rumored to be contemplating this drastic action well before the actual physical filing. That said, one would expect investors, especially those perceived as informed, to start to divest themselves of the securities of distressed firms well before bankruptcy filings.

Some firms, however, file for Chapter 11 for reasons other than financial and/or operating difficulties. These firms are usually those facing hundreds and even thousands of lawsuits or union disputes. For example, asbestos lawsuits and labor contract disputes put significant financial pressures on the firms and often result in Chapter 11 filings. These firms are often financially and operationally healthy and pursue bankruptcy in order to maintain their viability and to enable them to keep operating.[44] Institutional managers may have a great

[44] For example, W. R. Grace, chemical and building product maker, faced mounting asbestos-related liabilities and in 2001 looked to Chapter 11 as a way to maintain its viability (when the firm was close to exiting Chapter 11 its share price was around mid to high $90's). It took seven years for W.R. Grace to complete reorganization and in February 2014 the firm exited bankruptcy and, unlike Federal Mogul,

insight about these other reasons and take the opportunity to acquire shares of the filing (but not distressed) firms at the time when their shares are more affordable and perhaps undervalued.

Extant literature provides several reasons as to why anyone should be interested in trading bankrupt firm securities. First, the distressed securities market offers an opportunity of gaining sizable ownership in a restructured firm. Buyers of distressed securities may be seeking to obtain an equity stake in the distressed firm when they purchase its debt securities that are subsequently replaced by new equity with possibly all prepetition equity disappearing. As an example, vulture capitalists purchase relatively inexpensive debt of bankrupt firms with a goal of taking control of the firms (Hotchkiss and Mooradian (1997)).[45]

Second, investing in bankrupt equity may be a fully rational investment decision. The decision to purchase bankrupt stocks is similar to investing in call options (Li and Zhong (2009)). To some extent the equity of bankrupt firms closely resembles a deep out-of-the money option (Merton (1974)).

A third reason for investing in bankrupt equity is investor irrationality and the human propensity to gamble that's reflected in their investment decisions (Kumar 2009). Kumar (2009) studies the trading of stocks resembling state lotteries—stocks that for a very low cost offer a tiny probability of a huge future reward and a large probability of a relatively small

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Lear, and many other companies, did not wipe out its existing shareholders. Federal Mogul, Lear, Pfizer/Quigley, Kellogg Brown & Root/DII, and Stone and Webster also filed for Chapter 11 as a result of asbestos-related litigation liabilities. While in reorganization, Federal Mogul, for instance, acquired companies such as Fel-Pro Inc., Hanauer Machine Works, Inc., Mather Co, Robert G. Evans Co., and Metaltec, Inc. The company emerged from Chapter 11 reorganization in January 2008. In April 2008, it issued Class A common stock on NASDAQ and continued to grow through mergers and acquisitions and to expand internationally. As another example, bankrupt Stone and Webster was bought at auction by the Shaw Group and emerged from bankruptcy in late 2003. Under the Shaw Group, Stone & Webster became part of a global leader with revenue of over $3.3 billion.

[45] When in 2002 Kmart filed for Chapter 11 bankruptcy protection, Eddie Lampert, ESL Investments hedge fund manager, used investment opportunities to acquire the retailer. He purchased Kmart's debt and then used his control as a creditor to become a controlling equity holder in the firm.

loss.[46] The equity of bankrupt firms possesses the main characteristics of lottery-type-stock (Kumar (2009)). The prices of these securities are usually low (Clark and Weinstein (1983), Hubbard and Stephenson (1997), Dawkins et al (2007)) with a high probability of delisting and complete devaluation (Hubbard and Stephenson (1997)). However, the investors may be richly rewarded for taking the risk if firms successfully reorganize and emerge from Chapter 11 and if the old equity holders are not wiped out. Hubbard and Stephenson (1997) find that pre-existing shareholders are rarely left with nothing when the firm emerges from bankruptcy. Morse and Shaw (1985) also demonstrate that the stock price generally trend upward as companies in Chapter 11 announce the progression of their reorganization process. They also note that, in the case of corporate bankruptcy, secured debt holders are generally the only party in favor of firm liquidation over restructuring due to their high standing on the payout seniority ladder. Unsecured creditors, management, and shareholders, by contrast, generally favor corporate restructuring over liquidation because it maintains the chance that they will receive some kind of payout upon bankruptcy emergence.

In a more recent study Jory and Madura (2010) observe similar stock market performance of equity of firms emerged from Chapter 11 relative to size matched control firms and to respective NYSE/AMEX beta decile-portfolios. They find, among other things, that the proportion of equity retained by the pre-Chapter 11 shareholders positively relates to the post-emergence stock price performance. Wold (2007) finds that the returns of common stocks issued by firms in Chapter 11 outperform their market competitors and closely match the performance of their newly public competitors. In addition, Eberhart et al (1999) observe that the firm starts yielding large positive excess stock returns in the 200-day post-emergence period.

ii. Investors' reaction to deteriorating performance of distressed firms

[46] However, in aggregate the loss could be substantial for institutions purchasing and holding thousands of distressed/bankrupt shares.

Different groups of investors react to the deteriorating performance of struggling firms differently. Corporate insiders sell (postpone purchase) before significant stock-price decreases and buy (postpone sales) before significant price increases (Seyhun and Bradley (1997)). Retail investors' reaction is somewhat delayed when it comes to ridding their portfolios of shares of failing firms (Coelho et al. (2010)). They seem to hold on to the shares of distressed firms for too long, continuing to incur significant capital losses as a result of a rapid decline of security prices that persists over several years prior to a formal bankruptcy filing (Li and Zhong (2009), Coelho et al. (2010)). Individual investors tend to acquire stocks with speculative features thereby exhibiting a strong propensity to gamble and they have utility functions which accentuate risk-seeking behavior (Kumar (2009), Han and Kumar (2009)).

iii. The trading behavior of institutional investors

An informed investor is compensated for the costly investigation into an asset's value by his or her ability to identify and acquire assets that yield greater potential returns on the investments (Rock (1986)).[47] Some academics argue that institutional investors are prone to behave rationally and to appear as "intelligent" investors who stabilize security prices by offsetting irrational trades by individual investors (Lakonishok et al. (1994)). Because of the size of the investments and their time horizons,[48] institutional investors have strong incentives to gather costly information[49] about firms whose shares they acquire for their portfolios and to decide whether contemporaneous weak performance is an indication of poor firm quality or a

[47] Or identify and divest assets that have low or negative potential returns.

[48] According to Hotchkiss and Strickland (2003) who investigate investor composition of underperforming firms with earnings below analysts' expectations, low turnover institutional investors (those with average holding period of 3 years or longer) own the greatest percentage of shares outstanding (mean of 27.4% and median of 27.5%; high turnover managers, with holding period of less than 1.5 years, hold on average 10.8% of shares outstanding (with median of 8.7%).

[49] Maug (1998) finds that information cost and the cost of monitoring inversely relate to market liquidity and that frequently traded shares reduce institutional investors' incentives to gather information through monitoring because they allow institutions to sell their holdings more easily. We believe, consistent with traditional economic theory, that the marginal benefits institutional investors gain from information gathering and analysis must exceed their marginal costs for the investors to consider these expenditures.

result of desirable long-term firm investment (Admati et al. (1994), Maug (1998), Edmans (2009)). If institutional investors do their homework and acquire undervalued shares of Chapter 11 firms that have potential for recovering and returning to profitability, these investments would result in positive future returns as the firms reorganize and emerge from bankruptcy.

Some institutional shareholders actively monitor firms in which they invest.[50] Monitoring is costly and more difficult for smaller investors (Black (1992), Wahal (1996), DelGuercio and Hawkins (1998), Gillan and Starks (2000), Noe (2002), Woidtke (2002), Cremers and Nair (2005), and Almazan et al. (2005)). Consistent with the research findings that support managers' superior information and investment abilities, Gompers and Metrick (1999) present evidence that the level of institutional ownership forecasts returns, with forecasting power the strongest when institutional inflows (both in terms of rising number of institutional investors and concentration of holdings among few institutions) are the highest.

Arbel et al. (1983) find that institutions typically avoid investing in thinly traded securities and in firms with small capitalizations. Institutional investors avoid taking greater risks associated with investment in small firms such as greater return volatility and lower liquidity. These constraints that affect investment decisions of institutions may lead to market segmentation, herding behavior, and continuous neglect of certain securities (Arbel et al. (1983), Nofsinger and Sias (1999)). Similarly, Falkenstein (1996) believes that managers acquire stocks with certain desirable characteristics and price levels. He observes that

[50] Some institutional investors are "passive" index investors. These institutions may not actively monitor the firms in which they invest, but rather transact as the index changes (with some institutions having trading criteria that allow certain exceptions to the index). Our sample would have very few of these institutional managers and many of those who invest in the shares of firms that are highly likely to be headed for Chapter 11 filing or are already in reorganization.

managers have a preference for stocks with high visibility and low transaction costs and avoid investments with low idiosyncratic volatility.[51]

Anecdotal evidence suggests that some institutions purchase shares of bankrupt or nearly bankrupt firms: On April 13, 1989, the *Los Angeles Times* reported that institutional investors have a great appetite for shares of bankrupt firms and pour hundreds of millions of dollars into the companies. The article says that managers frequently acquire shares of bankrupt firms when they believe their asset value exceeds that of the securities and debt they hold.[52] On October 17, 2005, *The Wall Street Journal's* Market Watch reported other evidence of institutions' investing in bankrupt firms: the Wintergreen Fund, an open-end mutual fund created by a highly respected former fund manager, invested in distressed or bankrupt securities which traded at a discount to the firm's current asset value. Creation of Vega-Chi platform, specifically designed for institutional investors to trade high yield and distressed securities,[53] is the most recent evidence that institutions are interested in investing in the equities of bankrupt firms.

The remainder of our paper is structured as follows. In Section II, we describe the data and in Section III we present the hypotheses. We develop test methodology and report regression results in Section IV. Section V concludes our paper.

II. Data and Descriptive Statistics

i. Sample description

We utilize two sources of data to obtain a sample of U.S. non-utility/non-financial firms[54] that filed for Chapter 11 reorganization and emerged from bankruptcy during the

[51] Falkenstein (1996) explains that fund managers take advantage of the option-like payoff to their relative performance by avoiding the lowest volatility stocks rather than investing in the most highly volatile stocks.
[52] "Some Funds Pursue Bankrupt Firms", *Los Angeles Times*, April 13, 1989.
[53] *The Wall Street Journal's* professional edition with Factiva, November 1, 2012
[54] Financial and utility firms operate in a highly regulated environment with often very different reporting standards. Including these firms would impair our ability to accurately compare sample firms' characteristics and performance.

period of January 1980 through August 2013: *Thompson Financial Services SDC Platinum* database and *The UCLA-LoPucki Bankruptcy Research Database* (BRD).[55] The two data sources combined consist of 4,086 firms filing for reorganization during this period. We combine firms from the two databases and remove duplicates. We search for firms' identifiers such as CUSIP, TICKER, and PERMNO on the *Center for Research in Security Prices* (CRSP) and eliminate those firms whose identifiers are either missing or inaccurate. This reduces our sample to 1,645 observations.[56] We further revise the sample by removing firms that delisted either prior to filing or while in bankruptcy.[57] Our sample consists of 499 non-delisted firms. In the sample, on the day of Chapter 11 filing, 159 firms are actively trading on an exchange (with trading status "A" for active), 28 firms have trading status "X" for unknown, and 1 firm's trading is suspended (with trading status "S" for suspended). Three hundred eleven firms (or 62% of our sample) do not have trading status information on the day of the filing. We retain these firms in the sample because they are not officially delisted according to CRSP and may have trading (and other performance related) data for time periods other than day of filing.[58]

Using 13f quarterly filings obtained from Thomson Reuters' Institutional (13f) Holdings – s34 we analyze institutional holdings for non-delisted firms filing and emerging from bankruptcy between 1980 and 2013 and for the firms that delisted in the process of reorganization.[59] Institutions are required to file 13f forms with the Securities and Exchange

[55] For more information refer to http://lopucki.law.ucla.edu/. In addition, the SDC database, which we used to collect sample firms, does not contain reasons for bankruptcy filings.
[56] It is possible that most of the excluded firms are either private or have never been on CRSP.
[57] Our goal is to analyze institutional behavior in firms through the bankruptcy process, including emerging from bankruptcy. We can only do this by using a sample of firms that were listed during the entire period.
[58] For the firms with missing or unknown trading status and no delisting data, it could mean that either (1) the firms delisted prior to filing, however delisting data is missing or (2) firms are actively trading, however the trading data is missing for the date searched.
[59] Thomson Reuters adjusts the reported holdings and net changes for stock splits (including reverse stock splits which are a more frequent occurrence in the case of bankrupt firms), and we use the split-adjusted values.

Commission (SEC) on a quarterly basis.[60] We determine quarter-end holdings of institutions for all firms in the sample by eliminating all observations from the 13f data file for which filing date does not match reporting date, thereby determining the last quarter of actual 13f filings.[61]

[Insert Table 1 here]

In Table 1 we describe the sample of 499 firms and a sample of 316 firms that delisted during Chapter 11 proceedings. As presented in Panel B of Table 1, at the end of one quarter prior to the quarter of bankruptcy filing, 270 (or 85 percent) of the 316 firms that delisted during Chapter 11 had institutional holders, while only 163 (or 33 percent) of the sample firms had institutional holders in the that quarter. These statistics are relatively unchanged in the quarter of filing for both groups of firms (86 percent for 316-firm group and 32 percent for 499-firm sample). Institutions, on average, hold the same percentage of total shares outstanding for the two groups of firms in the quarter preceding the quarter of filing (21percent for sample firms vs. 25 percent for delisted-while-in-bankruptcy firms).[62] While these holdings become materially smaller for both groups during the quarter of filing, they are

[60] The SEC's institutional investment manager filing mandate is as follows: "An institutional investment manager that uses the U.S. mail (or other means or instrumentality of interstate commerce) in the course of its business, and exercises investment discretion over $100 million or more in Section 13(f) securities (explained below) must report its holdings on Form 13F with the Securities and Exchange Commission (SEC). Form 13F is required to be filed within 45 days of the end of a calendar quarter. The Form 13F report requires disclosure of the name of the institutional investment manager that files the report, and, with respect to each section 13(f) security over which it exercises investment discretion, the name and class, the CUSIP number, the number of shares as of the end of the calendar quarter for which the report is filed, and the total market value." The SEC defines an institutional investor as "(1) an entity that invests in, or buys and sells, securities for its own account; or (2) a natural person or an entity that exercises investment discretion over the account of any other natural person or entity. Institutional investment managers can include investment advisers, banks, insurance companies, broker-dealers, pension funds, and corporations."

[61] Thomson Reuters continues reporting 13f data for several quarters after an institutional manager stops filing with the SEC. The data provider maintains original filing date (date on the holding report in the SEC's EDGAR, the regulator's electronic record database) and changes reporting date for the repeating holdings.

[62] Based on the facts that during pre-filing and filing quarters more delisted bankrupt firms are held by institutions (85 and 86 percent) than non-delisted bankrupt firms (33 and 32 percent), the mean value of institutional holdings of non-delisted firms is greater than that of delisted firms, and the percentages of shares held by institutions are identical for delisted (25 percent) and non-delisted (21 percent) groups of firms in the quarter preceding quarter of the filing, we conclude that institutions hold fewer shares of non-delisted firms that are greater in value than the shares of delisted bankrupt firms.

greater for sample firms in the quarter of filing than for 316 delisted firms in the same quarter (17% vs. 9%, respectively). Both the mean holding value and number of managers invested in the equity of bankrupt firms are significantly greater for sample firms than for the delisted 316 firms in either the quarter before or the quarter of filing.[63] Median holding values are identical for the two groups of firms in the quarter preceding quarter of filing ($2.17 million for sample firms and $2.08 million for delisted bankrupt firms) and bigger for non-delisted ($1.01 million) than for delisted ($0.21 million) bankrupt firms in the quarter of filing. The statistics in Table 1 demonstrate that although the proportion of firms with institutional investments is higher for the firms that end up delisting while in Chapter 11 than for the sample firms, the holdings are more substantial in terms of their magnitude and dollar value for the sample firms than for the 316 delisted firms. These values do not change appreciably from one quarter prior to filing to the quarter of filing for the sample firms while they decline for the group of 316 delisted firms.

ii. Institutional, insider, and retail shareholdings and their changes around filing and emergence

We next report bankrupt stock holdings of institutions, corporate insiders, and individual investors and present their ownerships as percentages of total shares outstanding during the eight quarters surrounding quarter of filing and the eight quarters surrounding quarter of emergence for 499 firms in our sample. We report the holdings during post-filing (in Panel A of Table 2) and pre-emergence (in Panel B of Table 2) periods for firms that are still in bankruptcy in a certain quarter.[64] We obtained quarterly holding data for corporate insiders from Thomson Reuters' Insiders Data. For the purposes of our analyses, retail

[63] To address the issue of extreme values, we winsorize the data at 1 and 99th percentile.

[64] For instance, if a firm emerged from bankruptcy in quarter q+2, we would not consider this firm's post-filing holdings for this and the following two quarters (Panel A). Hence, the holdings are not affected by event such as emergence from bankruptcy, which could cause increase in shareholdings. Similarly, if a firm still has not filed for bankruptcy in pre-emergence quarter q-3, we would not consider this firm's institutional holdings (Panel B).

investors' proportional holdings are determined as the difference between one hundred percent representing total shares outstanding and the sum of percentage shareholdings for institutions and corporate insiders.

[Insert Table 2 here]

As the firms approach bankruptcy, institutional investors gradually reduce their mean (median) holdings of distressed equity from 26.2% (17.2%) in the fourth quarter prior to filing to 16.8% (9.7%) in the quarter of filing, while mean (median) insider holdings also decline, although not continuously, from 7.7% (0.9%) to 5.7% (0.3%)[65] and individual investments increase from 66.1% (81.9%) to 77.5% (90.1%) in the respective quarters. In general, changes in the retail ownership during four quarters prior to filing and quarter of filing are consistent with common "street" belief, while institutional trading behavior during the same five-quarter period resembles that of a knowledgeable investor.

Next we turn to the four quarters after filing. Institutional managers' ownership remains practically unchanged in four quarters following bankruptcy filings. Managers' mean (median) holdings are 17.7% (8.7%) in the quarter q+1 and 16.2% (7.6%) in the fourth quarter from the filing. Individual investors slightly increase their shareholdings in quarter q+2, and

[65] In Seyhun and Bradley (1997), insiders own shares of 282 firms (90% of 314 firms in their sample) during the year preceding bankruptcy filings and 237 firms (75%) in the month of the filings. In our study corporate insiders own shares of 141 firms (28% of 499 firms in our sample) in the fourth quarter before bankruptcy filing and 102 firms (20%) in the quarter of filing. These lower numbers could be explained by the fact that we remove all delisted firms from our sample of 499 firms filing for bankruptcy over 33 year period, while Seyhun and Bradley (1997) analyze insider trading over shorter period of time (1975-1992) and keep these firms in the sample until they get delisted. In addition, Seyhun and Bradley (1997) analyze insider ownership during the pre-Reg FD (Regulation Fair Disclosure) period, when the publically traded companies were not mandated to disclose material information to all investors at the same time, including information on share trading by companies' executives. Part of their sample is also before the Insider Trading Sanctions Act of 1984 and the Insider Trading and Securities Fraud Enforcement Act of 1988 that placed penalties for illegal insider trading as high as three times profit gained or loss avoided from the trading. Our sample includes both pre- and post-Reg FD time periods (Reg FD was promulgated by the SEC in August 2000) and is after the Act of 1988. In addition, we evaluate insiders' holdings during a quarterly period of bankruptcy filing rather than a monthly period (as Seyhun and Bradley (1997) do) thereby considering longer post-filing time period within the quarter for those firms that filed for bankruptcy more than one month prior to the quarter-end, the time when ownership likely declines the most. Finally, Seyhun and Bradley (1997) use the original source from the SEC to collect the data and we use Thomson Reuters' Insiders Data, a derived source that does filtering, which results in fewer observations.

then divest shares of bankrupt firms during quarter q+3. Similar to their trading pattern in the pre-filing quarters, corporate insiders haphazardly change holdings of their firms' shares, decreasing their ownership in quarters q+1 and q+2 and then more than doubling it in q+3. The results presented in Table 2 are also presented in Figure 1.

[Insert Figures 1 (a) and (b)]

We perform similar analyses for the quarters surrounding quarter of emergence for all three groups of investors and consider only the firms that are actually in bankruptcy in a certain quarter.[66] For instance, if in quarter q-4 a firm has not filed for bankruptcy yet we would not report pre-emergence institutional holdings for this firm until the quarter of filing. This situation applies to firms who spent less than a year in bankruptcy proceedings. Based on the statistics in Panel B and Figure 1 (b), institutional managers do not change their holdings much during four quarters preceding quarter of emergence and significantly increase their holdings to approximately 41% during the following five quarters. Insiders' holdings increase sharply from quarter prior to emergence (mean (median) holdings of 6.8% (0.4%) in q-1) to quarter of emergence (mean (median) holdings of 18.4% (4.5%) in q=0). This increase in insiders' shareholdings is possibly due to the old shareholders being wiped out and the new ones, some of whom are possibly large creditors from pre-bankruptcy who converted in reorganization, emerging from reorganization. These investments then decline in the following two quarters to mean (median) of 8.2% (0.8%) in the second quarter following emergence and stabilize at around 12% (1.5%) during the last two post-emergence quarters, which could be caused by old creditors selling and then being replace by new investors, including corporate insiders. The fact that institutions greatly increase their ownership during the post-emergence quarters while insiders either reduce their holdings in quarter q+2 or hold

[66] The four quarters following filing and four quarters preceding emergence overlap for the majority of firms which spent less than two years in bankruptcy. For instance, if a firm emerged from bankruptcy seven quarters after the filing then its fourth quarter post-filing quarter holdings are the same as fourth quarter pre-emergence holdings.

it stable in quarters q+1, q+3, and q+4 is puzzling. Since both groups of investors are considered to be informed, we would expect to observe similar directional changes in their holdings. Retail investors continuously decrease their ownership during the post-emergence quarters starting with the quarter of emergence, q=0.

To summarize the results reported in Table 2 and Figures 1 (a) and (b), we observe that small retail investors seem to exhibit reactive investment behavior when it comes to trading shares of these distressed firms. They acquire the equity as it becomes more affordable (making it more like a lottery-stock as defined by Kumar (2009)). The irregular changes in insiders' ownership of bankrupt equity may be due to management turnover that occurs during this time period.[67] Executives' compensation and its structure also changes as the firms attempt to settle their debt obligations and to maintain going concern status (Seyhun and Bradley (1997)). Institutional ownership stays consistent in the post-filing quarters and rises in the quarter of emergence and thereafter for a year. Since institutions frequently hold debt and equity of the same firm in their portfolios (Jiang et al (2010)), this increase in the holdings could possibly be explained by changes made to firms' capital structure to reduce their leverage and to complete their restructuring. However, we are cautious to scrap the assumption that institutions may be purchasing the risky shares of bankrupt firms in hopes to reap a sizable return as the firms emerge. We further investigate institutional trading behavior around quarter of emergence in Table 3 and compare it to institutional investments for a subsample of control firms.

To obtain this subsample of control firms we first collect a sample consisting of all other firms not included in the initial sample of all firms filing for bankruptcy between 1980

[67] Hotchkiss (1995) reports "by the month of filing 81 firms (41 percent) have replaced the CEO who was in office 2 years prior to filing. At the time reorganization plan is proposed, 108 firms (55 percent) have replaced their CEO. Further changes in management, often related to implementation of the plan, occur when firms exit bankruptcy; following the effective date of the plan, 138 firms (70 percent) have replaced their CEO." These statistics are even higher in Betker (1993): 51 percent of CEOs are replaced prior to filing, 75 percent prior to emergence, and 91 percent following emergence.

and 2013. Frequently, in the empirical literature, a control sample consists of same-industry firms of comparable size. We eschew using this standard method of identifying control firms and utilize a modification of the Seyhun and Bradley's (1997) methodology. Seyhun and Bradley (1997) point out that non-filing firms in the same industry are likely to experience financial difficulty along with the filers. To construct their control sample for each insider portfolio (all insiders, executives, and officers), Seyhun and Bradley (1997) calculate the mean annual equity values of all firms not in their sample and reporting insider trading activity during 1975-1992. They rank these firms according to their total market equity and divide them into deciles. Then, they calculate insider trading activity over the entire period for each size decile. They obtain 6,480 data points of insider trading activity–one for each of the three portfolios, 10 size deciles, and 216 calendar months. They then compare the insider trading activity (for all insiders, executives and officers separately) of each firm for each month with the relevant decile in the relevant month.

Seyhun and Bradley (1997) build control portfolios based on mean annual equity values of all non-filing firms. In the spirit of their method we size match each firm in our sample with all other firms that are not in our sample and whose shares are held by institutional investors based on a 90 percent to 110 percent range of our sample firms' market value during the three quarters surrounding quarter of emergence.[68] The matching methodology we utilize is similar to that employed by Seyhun and Bradley (1997) and designed to allow us to compare the institutional trading of our sample firms with the institutional trading of similarly sized firms which did not file for bankruptcy during the period of this study.

First, we perform the match based on the sample firm's equity value—many firms in the sample are matched with multiple control firms. Then, we obtain data on institutional

[68] We include market values during quarter of emergence, one quarter preceding the emergence, and one quarter following it. Then, we find three-quarter average market value for each firm in the sample.

holdings during 1980-2013 for all control firms. We identify firms in both sample and control groups which either have institutional holdings in a given quarter or report a net holding change in the quarter. We analyze mean net changes in those holdings for firms in the control sample during the nine quarters surrounding the emergence of each corresponding sample firm. A summary of the net buying/selling activity for the sample firms and the control firms is presented in Table 3.

[Insert Table 3 here]

In Table 3 we report net trading behavior of institutional investors for sample and control firms four quarters prior to the quarter of emergence, in the quarter of emergence, and four quarters following the emergence.[69] In each column we report number of firms with positive net change in holdings as net buyers, zero change as non-traders, and negative change as net sellers. In each quarter institutional investors appear as net purchasers for sample and control firms; however the difference between number of firms with positive net changes in institutional holdings and number of firms with negative changes in the holdings for sample firms in quarters q-4 through q-2 is small. During these quarters the firms are most likely in the process of preparing their reorganization plans when holdings of pre-existing shareholders are less likely to be changed due to debt-to-equity conversion or may have not yet filed for bankruptcy. It is not surprising that we see a more significant difference between number of firms with net buyers and number of firms with net sellers in the following quarters as the firms have their plans approved and proceed to restructure. The number of sample firms with net buying institutional activities starts exceeding that number with net selling activities by close to 100% one quarter before quarter of emergence (78 vs. 40) and this difference becomes significantly greater in the following quarters, when conversion of debt to equity is most probable. This may indicate that institutional investors anticipate bankrupt firms'

[69] For those firms that spent less than four quarters in bankruptcy, in some early quarters these firms may have not yet filed for bankruptcy or these quarters may be the quarter of filing.

successful emergence from the proceedings and acquire the shares in hopes to earn positive return on investments.[70]

To test statistical significance of trading by the institutions reported earlier in the table, we calculate "abnormal" institutional trading for each firm in the sample and provide the results in the second and third last columns of Table 3. Our measure of "expected" institutional quarterly trading activity is net change of institutional holdings for firms in the control sample. Abnormal trading is calculated as the difference in the net institutional holding changes for the sample firms in a certain quarter before and after emergence and the net institutional holding changes for corresponding control firms in the same quarter. Sample institutional abnormal purchases are positive numbers and abnormal sales are negative numbers. As the results reported in Table 3 indicate, in the quarters preceding quarter of emergence the magnitude of sample firms' net buying is similar to that of control firms' (most of the pre-emergence abnormal net number of shares traded is not statistically significant) and it is significantly greater in the quarters following quarter of emergence (starting with the quarter of emergence the abnormal net changes are positive and statistically significant) Mean (median) abnormal net number of shares traded is 105,251 (5,297) in the quarter of emergence, and 128,259 (40,970) in the following quarter. In the second, third, and fourth quarters after emergence the sample firms' net buying activities on average exceed control firms' net buying activities by 42,712, 36,817, and 30,724 shares, respectively.

iii. Do the firms with institutional investments perform better than the firms without institutional investments?

a) Operating performance

In Table 4 we report operating performance as measured by relevant accounting variables and ratios one year before the year of filing (Panel A) and one year after year of emergence (Panel B), categorized by whether or not the firms had institutional holdings.

[70] Eberhart et al (1999) report large, positive excess stock returns in the 200-day post-emergence period.

Firms in Group A are those whose shares are held by institutions either one quarter prior to bankruptcy, in the quarters of filing and/or emergence.[71] Firms in Group B do not have investments from institutional managers in any of these quarters. We report market related variables for one year preceding the quarter of filing and one year following the quarter of emergence in Panels C and D, respectively. In each panel we also report differences between mean and median values of the variables and statistical significance of a two-tailed t-test (Wilcoxon-Mann-Whitney test) for difference in their means (medians).

We utilize Compustat to obtain accounting related variables such as sales, total assets, current assets, total debt, current liabilities, pretax income, interest expense, market value of equity, retained earnings, and net income.[72] We derive several performance measure ratios using Compustat data: net income divided by total assets (ROA); current assets divided by current liabilities (current ratio); total debt divided by total assets (debt ratio); and operating income before depreciation and amortization normalized either by total assets (cash flow/total assets) or by sales (cash flow/sales). We calculate Altman's z-score, a bankruptcy-risk proxy (Altman (1968)), which is defined as 3.3x((pretax income + interest expense)/total assets) + 0.999x(sales/total assets) + 0.6x(market capitalization/total liabilities) + 1.2x(working capital/total assets) + 1.4(retained earnings/total assets).

We use CRSP to find market-to-book and price-to-earnings ratios. In the panels with market related performance data we also list firms' market capitalization, share price, number of shares outstanding, share turnover calculated as trading volume divided by total shares outstanding, and market adjusted returns defined as security returns adjusted for the NYSE/Amex/NASDAQ equally-weighted returns including dividends. We use equally-weighted returns instead of value-weighted returns in calculations of market adjusted returns

[71] Although we cannot distinguish between purchases made prior to emergence from those made immediately after, by considering institutional holdings in the quarter of emergence we also capture those share purchases that occurred right after firms emerged from Chapter 11.

[72] We utilize Compustat to obtain quarterly and annual financial reporting figures. We elect to use annual financials because quarterly values are missing for a significant number of firms in the sample.

because equal weighting captures the extent of underperformance better than value weighting does and this is important given particular nature of bankrupt equity (Gilson (1995), Brav et al (2000), Kadiyala and Rau (2004)). In addition, Brav et al (2000) argue that because small stocks are likely to be mispriced more than large stocks, then the power consideration alone implies the use of equal weighting.

[Insert Table 4 here]

One year prior to the year of Chapter 11 filing, firms with investments from institutions either right before filing, while in bankruptcy, or shortly after emergence are smaller than firms without the investments as measured by total assets and sales: median total assets is $341 million for firms with institutional ownership and $660 million for firms without institutional ownership; median sales for firms with institutional holdings is $264 million while for firms without investments from institutions it is $589 million. These differences are statistically different from each other. In Panel C we report market capitalization, another size related variable, one year preceding quarter of filing. Although firms with institutional holdings appear to be larger than those without the holdings with mean (median) market values of $285 million ($38 million) and $122 million ($35 million), respectively, the differences in these values are not statistically different from zero. These results contradict earlier findings reported in the literature that institutions avoid investing in small firms.

Not surprisingly, as reported in Panel A of Table 4, firms' return on assets is negative for both sub-groups, with differences in means and medians significant at a five percent level. However, firms with institutional investors perform less poorly in the year preceding year of filing (mean ROA of -16% and median ROA of -7 reported for those firms while the same measures for the firms without investments from institutions are -28% and -16%, respectively). Also not surprisingly, both groups of firms have low Altman z-scores, suggestive of a forthcoming failure, with firms lacking institutional investments having

significantly lower mean and median z-scores. We find that current ratio is greater (mean is 1.5 and median is 1.23) and debt ratio is lower (mean is 0.94 and median is 0.78) for the firms with institutional investments than for the firms without the investments (current ratio mean is 1.29 and median is 0.8; debt ratio mean is 1.17 and median is 0.98), with most of the differences significant at conventional levels. Based on these performance characteristics, although both groups of firms perform poorly in the year prior to filing for Chapter 11 protection, firms with institutional ownership perform less badly than do the firms without investments from institutions.

We show in Panel B of Table 4 that differences between the two groups of firms largely disappear in the year following year of emergence. Operating performance, as measured by average return on assets, remains negative for both groups of firms, with firms held by institutions having an insignificantly lower ROA than the firms without institutional investments. We also observe median current ratio of 1.79 and cash flow returns on assets of 0.11 for the firms without investments from managers exceeding median current ratio of 1.43 and cash flow returns on assets of 0.08 for the firms with institutional investments at the statistical significance levels of five and ten percent, respectively. In addition, mean and median values of debt ratio for the firms with institutional investments now exceed those values for the firms without the investments, with differences in both values significant at a ten percent level. Average z-score for the firms without institutional ownership rises to 2.18 (from -0.34 in the year prior to year of filing), although above the highest point of distress zone of 1.80, still within a "grey" zone of 1.81 to 2.99 score range, while mean z-score for the firms with investments from institutions remains quite low, at 1.29, versus 1.09 during the pre-filing year. To summarize these statistics, we find that firms with institutional investments emerge from Chapter 11 more levered, with smaller current assets to meet current obligations, and with lower z-score, indicating greater probability of re-entering bankruptcy, than do firms without institutional investments. Thus, operating post-emergence improvements are better

for non-institutionally held firms than for the firms with institutional ownership. In addition, we find that firms without institutional investments on average spend fewer days in bankruptcy than do firms with the investments. Mean (median) number of days in bankruptcy for the former is 423 (313) and for the latter is 492 (383), with differences in both mean and median values significant at a ten percent level.[73]

Contrary to the belief that managers are sophisticated investors capable of picking winners we find little evidence that they focus on the operationally "stronger" firms with greater potential to successfully reorganize and emerge from bankruptcy sooner. We conclude that intuitions focus on the "better" firms before bankruptcy, however the firms with far less potential on emergence.

In Panels C and D of Table 4 we report market related variables four quarters before quarter of bankruptcy and four quarters following emergence, respectively. We categorize the market related data based on institutional ownership as described earlier.

Mean and median values for the two groups of firms are similar for most variables in the four quarters preceding Chapter 11 filings. Not surprisingly, for both groups of firms we observe low market-to-book, negative price-to-earnings and negative market adjusted returns during this time period. During the four quarters following emergence from bankruptcy, we find that median market capitalization for the firms without institutional investments ($126 million) significantly exceeds median market capitalization for the firms with investments from institutions ($35 million). Although values of both market-to-book and price-to-earnings rise quite noticeably from the four-quarter period preceding quarter of filing, they do not differ from one another for the two groups of firms in the four quarters following emergence. During the post-emergence year, as reported in Panel D of Table 4, firms without investments

[73] This statistic is not reported in the tables. Also, these results are consistent with previous research showing that firms usually start emerging from bankruptcy 15 months after their Chapter 11 filings date (Denis and Rodgers (2007), Kalay et al (2007)). Some however find that firms typically spend on average longer, about 24 months, in bankruptcy (Eberhart et al (1999), Coelho et al (2010))

from institutions also have higher share price, possibly from how recapitalizations were done, and turnover than do firms with institutional investments. However, shares of firms with institutional investments perform better during the year following quarter of emergence—mean daily market adjusted returns for the firms with investments from institutions is 0.56% and it is 0.06% for the firms without the investments, with difference in means significant at a ten percent level.

b) Market performance

We now turn to evaluating market performance of the bankrupt securities during pre-filing and post-emergence periods. We utilize methodology developed by Barber and Lyon (1997) who in their study focus on the long run stock performance and compute buy-and-hold return (BHR) for firms in the sample. This methodology is also used by several other studies focusing on performance of highly distressed and bankrupt firms (Dichev and Piotroski (2001), Taffler et al (2004), Ogneva and Subramanyan (2007), and Kausar et al (2009)). We determine BHR as follows:

$$\text{BHR}_{i,T} = \prod_{T=t_1}^{t_2}\left(1 + r_{i,T}\right) - \prod_{T=t_1}^{t_2}[1 + E\left(r_{i,T}\right)]$$

where $\text{BHR}_{i,T}$ is a buy-and-hold abnormal return for firm *i* for a time period *T*, $r_{i,T}$ is the daily stock return for firm *i* on day *t*, and $E\left(r_{i,T}\right)$ is expected return for firm *i* on day *t*. We use equally weighted market return, including dividends, for expected return.

We report the short term abnormal returns around bankruptcy filing. In Table 5 we analyze market-adjusted and buy-and-hold returns during the twenty-one-day window surrounding day of Chapter 11 filing. In Panel A we present daily market adjusted returns (MARs) for ten days prior to the filing, the day of the filing, and ten days following the filing. To capture the effect of those bankruptcies that were filed after market close, we also determine two-day market adjusted returns for days t=0 and t+1 and report them in the panel. In Panel A we also report BHRs for several time windows, from day t-10 before bankruptcy

filing to time period (-10, +10) around the day of filing. To avoid considering multiple day returns for the firms with missing return data we remove those firms from the calculation of the daily market adjusted returns and BHRs on the day their shares are not traded for the first time during the twenty-one-day period. As a result, we lose 33 firms (or 26% of the firms with market data) with institutional holdings and 6 firms (or 14%) without investments from institutions. As a robustness check, we also calculate daily abnormal returns and BHRs for the firms with missing return data as an average of the succeeding period return over the missing period and the succeeding period and report their means in Panels B of Table 5.[74] Several firms (14 firms with institutional holdings and 2 firms without the holdings) stop trading for the rest of the twenty-one-day period analyzed, however 19 firms with institutional holdings and 4 firms without the holdings return to trading. In addition, 4 firms with investments from institutions had several days of missing returns at the beginning of the twenty-one-day window.[75] As a robustness check, we also determine cumulative market adjusted returns (CMARs) using equally weighted, including dividends, market returns.[76] The results are qualitatively similar to those reported in Tables 5. The results from Table 5, Panel A are also provided for the twenty-one-day window surrounding bankruptcy filing in Figure 2 (a).

[Insert Table 5 here]

There are meaningful differences between abnormal returns around bankruptcy filing date for firms with institutional holdings (about three-fourths of the sample) and for those firms without institutional holdings. From Panel A, where we report mean MARs, we observe that the abnormal returns for the firms with institutional investments are not significant on all

[74] Peterson (1989) describes both methodologies (removing security from sample and averaging the returns over the missing period and the succeeding period) as the ways to address missing return issue. The first alternative introduces the potential for a selection bias because the firms removed from the calculation of mean returns are likely to have more negative returns around bankruptcy announcement dates than the firms, whose shares are trading without interruption, thereby biasing our mean abnormal returns upwards. We partially address this issue by utilizing another method, also described by Peterson (1989), where we calculate average raw returns for the non-trading periods.

[75] This is the reason why we start with 125 firms in Panels A and with 129 firms in Panels B.

[76] These results are not included in the tables.

but one (t-4) pre-filing day; the mean MAR is -2.63% on that day. MARs for firms without institutional investors are not significant on all but two pre-filing days: on day t-3 MAR is -5.27% (statistically significant at a one percent level) and on day t-1 it is -3.17% (statistically significant at a five percent level). On these two days MARs for firms without institutional investments are lower than those for firms with investments from institutions. In Panel A, mean BHRs for firms with institutional investments decline from -1.36% in (-10, -9) to -9.74% in (-10, -1). The decline in the pre-filing BHRs is more dramatic for firms without than with the investments—it changes from -1.63 down to -14.65% over the same time horizon.

We find that the two-day abnormal returns for the two groups of firms are quite negative, though clearly more so for the firms with investments from institutions (their two-day mean abnormal return is -15. 56%; the two-day mean market adjusted return is -11.01% for the firms without institutional investments), perhaps indicating that institutional share selling puts additional downward pressure on firms' stock prices at the time of bankruptcy filings. In Panel B, these returns are similar for the firms with institutional holdings (-15.10%) and are more negative for the firms without the holdings (-13.27%). In Panel A, on day t+2 the mean daily abnormal return is approximately 4% for firms with investments from institutions, which is statistically significant at a five percent level. The daily abnormal returns for the firms without institutional holdings are negative (-0.75%), however not statistically significant, on day t+2, and positive (4.81%) and significant at a ten percent level on day t+3. In contrast, in Panel B, these returns are not statistically significant for either group of firms on days t+2 and t+3; post-filing mean daily abnormal returns are 2.81% and 4.68% for the firms with institutional ownership on day t+5 and for the firms without the ownership on day t+4, respectively (both statistically significant at a ten percent level). In Panel A, during the post-filing time window (+2, +10), mean BHRs are 2.23% for the firms with institutional holdings and 0.27% for the firms without investments from institutions, however both are not statistically significant, thus price adjustment seems complete at t+1.

The mean BHRs for twenty-one-day window are economically and statistically material -27.64% for firms with institutional investments and -32.32% for firms without investments from institutions. In Panel B, the results for mean BHRs are qualitatively similar to those in Panel A. These negative market returns are the result of anticipation of and reaction to bankruptcy filings.

It is well-known that returns of firms filing for Chapter 11 protection are quite poor during the period immediately surrounding the filing. We find that pre-filing period (-10, -1) BHRs reported in Table 5 are consistent with the earlier findings that firms without institutional holdings fare worse operationally than those with institutional holdings, suggesting that there may be a relationship between firms' performance and investments from institutions. These returns are however more negative for the firms with than without investments from institutions during the two-day filing window. We speculate that institutions as possibly more knowledgeable investors hold shares of better performing firms. The post-filing BHRs are not different from zero for either firms with or without the holdings indicating market's proactive rather than reactive response to bankruptcy filings.

Regrettably, institutional trading data limitations do not allow us to drill down to daily changes in institutional holdings so we can compare them to daily share trading performance during these few days around filing to better determine managers' ability to recognize undervalued investments and to observe the relationship between institutional trading and share prices. However, we can and do assess how quarterly changes in institutional holdings are reflected in mean quarterly abnormal returns and whether or not managers sell prior to share price declines and purchase prior to share price increases (as Seyhun and Bradley (1997) show insiders do). From Table 4 we know that firms with institutional investments are operationally stronger (based on median ROA) than firms without the investments one year prior to bankruptcy filings and they are weaker (based on median operating cash flow returns

on assets) one year following emergence from Chapter 11. We expect to observe changes in institutional ownership consistent with the changes in the firms' operating performance.

We now turn to evaluating market adjusted daily returns and buy-and-hold returns during eleven days surrounding day of emergence. We employ the same methodology for calculating market adjusted returns and BHRs as in Table 5. However, we do not make the same adjustments to the daily abnormal returns and BHRs in Table 6 as we do in Table 5, Panels B, because we don't lose as many firms to a non-trading in this table as we do in Table 5 and the firms with missing trading data do not return to trading during the time period analyzed.[77]

[Insert Table 6 here]

In Table 6 we present returns during the twenty-one days around the day of emergence from Chapter 11. Similar to Table 5, Panel A, in Table 6 we report returns as compared to equally weighted, including dividends, market returns. To capture the effect of those reorganizations where firms emerged after market close, we also determine two-day market adjusted returns for days t=0 and t+1 and report them in the panel. In Table 6 we also include BHRs for various short-term periods around day of emergence.

Mean abnormal returns for firms with investments from institutions are 2.22% and 2.28% on pre-emergence days t-5 and t-3 (these returns are not statistically significant on all other pre-emergence days). Mean abnormal returns for firms without investments from institutional investors are not significant during the pre-emergence period with exception on day t-9 when it is -1.68% and statistically significant at a ten percent level. During ten days prior to emergence from bankruptcy firms with institutional holdings have a statistically insignificant mean BHR of 5%. In contrast, the subsample without institutional holdings has a

[77] We lose 5 firms in the subsample of firms with institutional holdings, which is about 5% of the subsample. These firms do not return to trading during twenty-one-day window around emergence. Therefore, the robustness check performed in Table 5 would not yield any changes to the number of observations in Table 6. All firms without investments from institutions remain in the subsample.

ten-day pre-emergence mean BHR of -3.88%, which is also not statistically significant, further confirming possible existence of positive relationship between firms' market performance and investments from institutions. The difference between the two mean BHRs is -8.88%, which is significant at a ten percent level.

Mean market adjusted return during (0, +1) for firms with institutional investments is 6.85% and statistically significant at a one percent level. This market adjusted return for firms without investments from institutions is 6.33% and is not statistically significant, however economically material. Post-emergence mean abnormal returns on days t+2, t+3, and t+4 for firms with institutional investments are negative, however not significant. MARs for these firms are -1.83% and -1.53% (both statistically significant at a five percent level) on days t+7 and t+10. Daily mean abnormal return for firms without institutional ownership is -3.49% and statistically significant at a ten percent level on day t+5. Mean BHRs for the post-emergence period (+2, +10) are negative but not statistically significant for both groups of firms. Mean twenty-one-day BHRs for firms in the two subsamples of held and non-held firms are 8.80% (which is significant at a five percent level) and -8.30% (which is statistically significant at a ten percent level), respectively, suggesting once again that market performance of firms with investments from institutions exceeds that of firms without the investments.

We pictorially present results reported in Tables 5 (Panel A) and 6 on Figures 2(a) and (b), respectively. We plot twenty-one-day BHRs for easier interpretation of the results included in the two tables.

[Insert Figure 2 (a) - (d) here]

Figures 2 (c) and (d) pictorially present share turnover determined as number of shares traded divided by number of shares outstanding during the twenty-one-day period around day of bankruptcy filing (c) and day of emergence from Chapter 11 (d). Before bankruptcy filing, from t-10 until t-2, there is no discernible difference between trading volumes for firms with and without investments from institutions. Starting on day t-1 until day t+3 we observe an

elevated level of trading volume for firms without investments from institutions. For firms with the investments trading volume becomes elevated between days t=0 and t+2. During the two-day filing period, on days t=0 and t+1, trading volumes are elevated for both groups of firms. Trading volume settles to the pre-filing levels after day t+3 for firms without institutional ownership and after day t+2 for firms with investments from institutions. .

As presented on Figure 2 (d), trading volumes do not change as a result of firms' emergence from bankruptcy for the group of firms with institutional investors. On most days prior to emergence from Chapter 11 and on the day of emergence, t=0, there is no discernible difference between trading volumes for firms with and without investments from institutions. We observe slight elevations in the trading volume of firms without investments from institutions on days t-4, t+1 through t+3, t+5, t+6, and t+8 through t+10. Trading volume for firms with institutional investments remains unchanged during the twenty-one day period.

We turn now to the medium term abnormal returns around bankruptcy filings and emergence from Chapter 11 and report results for several time horizons, from one quarter long to one year long, prior to the quarter of bankruptcy filing and following the quarter of emergence.[78] In this analysis we relate quarterly returns to institutional ownership and determine whether institutions hold shares of bankrupt firms that perform better in the stock market and whether market performances of firms with and without institutional investments are different.

[Insert Table 7 here]

In Panel A of Table 7 we provide pre-bankruptcy buy-and-hold abnormal returns for one-, two-, three-, and four-quarter periods. These negative values are statistically significant and economically material. While mean pre-filing buy-and-hold returns are lower for firms with institutional investors than for firms without the investments for each time horizon

[78] For instance, if a firm files for or emerges from Chapter 11 on February 1 (first quarter), then pre-bankruptcy quarter -1 (in Panel A) starts on October 1 (4th quarter of prior year) and post-emergence quarter +1 (in Panel B) starts on April 1 (2nd quarter of the same year).

reported, none of the differences in mean returns are statistically significant. Also, returning to operating performance indicators reported in Table 4, Panel A—we found that firms with institutional ownership modestly "outperform" firms without investments from institutions. In summary, irrespective of better pre-bankruptcy operating performance, market performance is similar for the two groups of firms indicating no real investment advantage from choosing the operationally less weak firms.

In Panel B of Table 7, we present buy-and-hold returns over one- to four-quarter periods for the two sub-groups after their emergence from bankruptcy. The abnormal returns for each post-emergence period for both groups are negative. While firms without institutional ownership consistently have better (though negative) mean buy-and-hold returns than do those with institutional ownership starting in the quarter period (+1, +2) (mean of -4.59% vs. -9.45%) through quarter period (+1, +4) (mean of -8.83% vs. -20.46%), there is a lack of consistent statistical significance to the large differences in returns between the two groups. These findings are inconsistent with our initial conjecture about either institutional managers' superior ability to pick *stronger* and *better performing* losers or their investments positively effecting share performance of the firms. Stock performance of firms without investments from institutions, although negative, is better than performance of firms with the investments during the post-emergence quarters. Our findings are also in contrast to Eberhart et al (1999) who observe that the firm starts yielding large positive excess stock returns in the 200-day post-emergence period.

III. Development of Hypotheses

For firms that have institutional ownership during bankruptcy proceedings we find that institutional managers are consistent net buyers during the quarter of emergence and several quarters following and that the gap between number of net buyers and net sellers starts to widen in the quarter before emergence (q-1). Given the net purchase/selling results to this point, it is important to determine how profitable this net trading behavior is during

restructuring and shortly after emergence. Thus, we offer a hypothesis that examines the relation between the timing of institutional investors' trading and security returns. Although we find that, in aggregate, institutions are not in a rush to sell shares of distressed firms, perhaps considering these investments undervalued in the market and/or operationally underperforming with a good potential for operating and market performance improvements, we further analyze institutions' investment behavior and determine whether they buy (sell) the investments before the stock prices rise (decline). If the purchasing (selling) occurs after the prices increase (decline), then the institutional managers would incur losses just as other shareholders would with investments in the bankrupt securities of the same firms. Hence:

H1: Institutional investors purchase (sell) shares of distressed firms to achieve (avoid) capital gains (losses). This behavior is similar to that of insiders, when they sell (postpone purchases) before significant stock-price decreases and buy (postpone sales) before significant price increases.

From the summaries of performance related data presented in Tables IV-VII we observe that although one year prior to year of filing firms whose shares are held by institutional investors are operationally less weak than firms whose shares are not part of institutional portfolios, these results reverse as the firms emerge from bankruptcy and operate for a year following emergence. Firms without institutional ownership improve their post-emergence performance more than do firms with investments from institutions. In addition, market capitalization and share turnover are significantly greater for the firms without investments from institutions than for the firms with the investments one year following quarter of emergence. Post-emergence BHRs (as reported in Table 7) are less negative for the firms without institutional investments than for the firms with institutional investments. However, when analyzing short-term BHRs, we find that market performance of firms with institutional investments exceeds performance of firms without the investments during the pre-filing time period. These returns are however more negative for the firms with than without

investments from institutions during the two-day filing window. We investigate whether the firms with institutional holdings perform better and return to profitability sooner than do the firms without the investments. To make this determination we develop and test our second hypothesis:

H2: Operating and market performances of bankrupt firms improve as their shares become part of institutional investors' portfolios. The firms with institutional holdings reorganize and return to profitability sooner than their counterparts without investments from institutions.

IV. Test Methodology and Presentation of Regression Results

At this point we attempt to determine whether or not institutional managers possess the ability to timely recognize undervalued investments held in their portfolios or acquired close to the day of filing, during reorganization, or shortly after emergence. Subsequently, we also measure the relationship between institutional trading on firms' post-bankruptcy recovery.

i. Institutional trading around periods of quarterly abnormal holding period returns

We now examine the relation between the timing of institutional trading and security returns to test our first hypothesis. Seyhun and Bradley (1997) find that stockholders of bankrupt firms suffer significant capital losses in the years before filing and find that corporate insiders of firms filing bankruptcy petitions sell stock before prices fall and buy stock after prices have fallen. The summary of data presented in Table 3 indicates that institutional managers are purchasers of the shares of previously failed firms during the quarters following emergence. In addition, as is reported in Table 7, Panel B, abnormal returns, in aggregate but with a great variation, continue to be negative post-emergence. We now attempt to find out whether institutional buying (selling) of bankrupt firms occurs before (after) the stock prices rise. If the institutions in our sample do not act strategically and, instead, buy (sell) share after

the prices have risen (fallen), then they would not earn capital gains expected from savvy and informed investors.

To test our first hypothesis we utilize the methodology developed by Seyhun and Bradley (1997). First, to measure the timing of institutional trading, we partition abnormal holding period returns before and after institutional trading using a dummy variable technique. We begin with calculating quarterly abnormal holding period returns between 1980 and 2013 by subtracting quarterly market returns from each firm's returns in the same quarter. Then, for each quarter holding period, we determine the net abnormal trading by institutional managers in the quarter preceding the holding period and the net abnormal trading by the managers in the quarter immediately following the holding quarter period.

Next we run the following regression for each quarter-manager combination.

$$BHR_{i,t} = \beta_0 + \beta_1 DB_{i,t-1} + \beta_2 DA_{i,t+1} + \varepsilon_t, \text{ for } t = -3 \text{ to } +3$$

where $BHR_{i,t}$ is buy-and-hold abnormal holding period return for firm *i* in quarter *t* (t=0 for quarter of emergence); $DB_{i,t-1}$ is dummy variable that takes on a value of 1 if institutional managers are net buyers, 0 if they are non-traders, and -1 if they are net sellers for firms *i* during the quarter before the holding period, *t-1*; and $DA_{i,t+1}$ is dummy variable that takes on a value of 1 if managers buy, 0 if they do not trade, and -1 if they sell equity of firm *i* during the quarter after the holding period, *t+1*.[79]

As Seyhun and Bradly (1997) indicate, if the institutional investors believe that the market price has fallen and that the investment is now undervalued, they would be enticed to buy shares of this security; this would result in a negative, statistically significant estimate for β_2. If, however, the institutional investors sell shares of stocks before their prices fall, then β_1 should be positive and significant; if institutions sell after the prices fall, then β_2 should be positive and significant.

[79] We do not size-partition our sample to run the same regression for small, medium, and large size net change in institutional holdings, as Seyhun and Bradley (1997) did for insider trading, due to small size of our sample.

[Insert Table 8 here]

In Table 8 we report time-series estimates of the coefficients of the estimating equation for all institutions in the sample by quarter prior to and following completion of reorganization. The signs of the coefficients for before-holding period trading (DB) are mixed during the seven-quarter period we analyze. During quarter q-2, institutions appear to exercise an inferior judgment when trading bankrupt equity—they sell shares of bankrupt firms after their prices fall (parameter on DA variable for this quarter is statistically significant 0.003). We find that during the quarter of emergence coefficient for DB is positive and statistically significant at a ten percent level; during second quarter following emergence, it is negative and statistically significant at a five percent level. Although we do not know exactly when in the quarter of emergence institutions sell the bankrupt (or reorganized) equity, before or after prices fall,[80] we speculate, based on the net quarterly trading activities around quarter of emergence, that institutions may trade the shares strategically. In the second quarter following emergence, however, institutions purchase shares of reorganized firms after their prices increase (DB's coefficient is negative and statistically significant) and sell the shares after their prices fall (DA's coefficient is positive and statistically significant at a five percent level) indicating that institutional managers are incapable of identifying undervalued securities when adding shares of formerly bankrupt firms to their portfolios. Based on these results we conclude that the only time when institutions transact strategically is right around firms' quarter of emergence from Chapter 11.

ii. How does operating and market performance of firms with institutional holdings differ from that of firms without investments from institutions?

Now we consider our second hypothesis related to the impact institutional trading has on performance of distressed firms. We utilize logistic regression model to compare changes in firms' operating and market performances from one year preceding the filing to one year

[80] We utilize quarterly 13f trading data for this analysis.

following the emergence and whose shares are held by institutions to changes in performance of those firms during the same time periods and who do not have investments from institutions. To do so we design the following dependent variable:

$$y_{it} = (y_{ipost} - y_{ipre})$$

where *i* indexes firms, *t* indexes time, y_{it} is the dependent variable of interest (cash flow, which is defined as the firms' operating income before depreciation and amortization normalized either by sales (CFS) or by total assets (CFA), or market adjusted buy-and-hold abnormal return),[81] y_{ipost} and y_{ipre} are firms' cash flows or market returns in the years following year of emergence and preceding year of filing, respectively. We then derive the binary dependent variable as follows: if changes in cash flow or abnormal market returns are positive, indicating firm's operating or market performance improvement from the pre-filing period to the post-emergence period, then we assign 1 to the variable, if it is negative, the dependent variable equals 0.[82] To test whether or not institutional holdings relate to changes in firms' performance we use two dummy variables. One of the variables is IHD_BK that equals 1 if bankrupt securities are held by institutional investors either shortly before bankruptcy filings (one quarter before quarter of bankruptcy filings) or during quarter of the filings , and 0 otherwise. The other variable is IHD_REO that equals 1 if bankrupt securities are held by institutional investors either in the quarter of emergence or one quarter following and 0 otherwise. In the model we control for firm size measured as natural logarithm of total assets, profit margin, and Altman's z-score. All dependent variables are as of one year prior to bankruptcy filing.

[81] Kaplan (1989), Smith (1990), Muscarella and Vetsuypens (1990), and Healy et al (1992) use accounting measures of profitability in their studies to determine improvement in performance following events such as buyouts and mergers.

[82] We also ran OLS regressions with the changes in cash flow and abnormal market returns as dependent variables and were unable to obtain robust enough results.

The calculation of cash flow does not consider interest expense, dividends, or taxes, and does not reflect differences in capital structure. In addition, the measure of operating income before depreciation and amortization normalized by sales (CFS) is less affected by asset write downs and divestitures, common changes reported for bankrupt firms in the extant literature, than CFA (Hotchkiss (1995)). We first use CFA to define our dependent variable and then, as robustness checks, we run the same regression with a binary dependent variable determined based on changes in CFS and abnormal returns.

[Insert Table 9 here]

Based on the results reported in Table 9 we observe that that institutional holdings are related to reorganized firms' performance (dummy variable IHD_BK is statistically significant and economically material in two out of three regressions, while dummy variable IHD_REO is not significant in the regressions). We find that institutional investments negatively relate to firms' likelihood to improve their post-emergence operating performance. This finding is not consistent with the earlier, unrelated to bankruptcy, evidence in the literature that higher institutional ownership has a positive effect on stock prices and returns (Brown and Brooke (1993), Gompers and Metrick (1999)). Investments from institutions positively relate to changes in market buy-and-hold abnormal returns, indicating that the likelihood of firms improving its market performance rises with the presence of investments from institutions as the firms approach and file for bankruptcy. Large firms are more likely to recover from bankruptcy and to improve their operating performance (measured by CFA and CFS dummy variables) as shown by the positive coefficient on variable LNAT, significant at a five percent level. However, small firms are more likely to improve their market performance (measured by buy-and-hold return dummy variable) as shown by the negative coefficient on the size related variable. Finally, the changes in reorganized firms' operating and market performances do not depend either on the firms' pre-bankruptcy operating performance

measured by profit margin or the probability of the firms falling into distress and bankruptcy measured by z-score.

V. Conclusion

In this paper we analyze the relationship between institutional holdings and performance of distressed firms and evaluate whether or not institutional investors strategically trade shares of bankrupt firms, identifying undervalued investments and timing their trading, which would lead to future positive returns. We find that retail investors and not institutional investors are majority holders of distressed and bankrupt equity. However institutional ownership grows as the firms progress through restructuring and emerge from bankruptcy. When analyzing institutional trading behavior for eight quarters surrounding quarter of emergence we find that institutional investors are net buyers of these firms' shares and increase their acquisitions significantly during the quarter of emergence and four quarters following.

Given institutional managers' interest in the bankrupt firms we attempt to discern whether the institutions have superior timing ability when trading shares of bankrupt firms. We evaluate the timing of institutional managers' trading and determine whether they acquire securities of bankrupt firms after the share prices have fallen and sell them before the prices fall. We find that institutions transact strategically by selling shares of bankrupt firms before the prices fall right around firms' emergence from Chapter 11. We fail, however, to find any evidence of managers' superior trading strategy during any other time period reviewed.

We find that firms with institutional holdings are smaller and less levered than firms without the investments in the year preceding filing for Chapter 11 protection. These firms' pre-bankruptcy operating performance is also stronger than that of bankrupt firms without institutional ownership. Firms with institutional ownership also have higher pre-filing current ratio and Altman's z-score. However, one year following the emergence, firms without

institutional investments are less levered and have higher z-score and current ratio than do firms with investments from institutions.

As to the market performance measures, they do not vary significantly between the two groups of firms until after they emerge from Chapter 11. In the year following quarter of emergence share price and trading volume for firms without institutional investments exceed those for firms with the investments. However, mean market adjusted return during this year is lower for the former than for the latter. Although negative for both groups of firms, short-term buy-and-hold abnormal returns around day of bankruptcy filing are greater for the firms with institutional investments than for the firms without investments from institutions, indicating that institutions hold the firms with better market performance. We further investigate the relationship between institutional trading and bankrupt firms' performance and find that institutional holdings at the time when the firms file for bankruptcy negatively relate to their operating recovery and positively relate to the firms' changes in the market performance as they emerge from Chapter 11. Large firms tend to recover operationally better than small firms, while the small firms are more capable than the large firms of improving their pre-filing market performance levels as they emerge from Chapter 11.

In our analysis of institutional investment behavior we do not find convincing and consistent evidence that would persuade us to believe in sophistication, ingenuity, and astuteness of institutions' investment strategies–at least as it might pertain to the firms during the time shortly before filing for Chapter 11 protection, during reorganization, and shortly after emergence. However, there is a time when institutions trade strategically by selling equity of bankrupt firms around quarter of emergence before the stock prices fall. Institutional ownership negatively relates to firms' achievements of pre-bankruptcy performance results after they emerge from Chapter 11.

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Table 1
Sample formation and institutional holdings for the firms filing for Chapter 11 between 1/1/1980 and 08/31/2013

Panel A: Sample description

	Number
Chapter 7 and Chapter 11 filings from SDC; excludes utilities and financial firms	3,243
Chapter 7 and Chapter 11 filings from Lopucki's Database; excludes utilities and financial firms	843
Non-duplicating Chapter 11 filings from both data sets with accurate identifiers (Permno, CUSIP, Ticker) and emergence dates; excludes utilities and financial firms	1,645
Firms delisted before or on the day of bankruptcy filing	830
Firms delisted during reorganization proceedings	316
Total firms in the sample*	499
with active ("A") trading status on the day of bankruptcy filing	159
with unknown ("X") trading status on the day of filing	28
with suspended ("S") trading status on the day of filing	1
with missing trading data on the day of filing	311

(Table 1 continues)

Panel B: Institutional holdings (IH) description for firms that did not delist prior to filing

	For 316 firms that delisted during Ch. 11	For 499 firms that did not delist in Ch. 11
Percentage of firms with institutional holdings one quarter prior to filing in relation to total firms in each sub-sample	85%	33%
Percentage of firms with institutional holdings in the quarter of filing in relation to total firms in each sub-sample	86%	32%
Percentage of shares held by managers one quarter prior to filing in relation to total shares outstanding	25%	21%
Percentage of shares held by managers in the quarter of filing in relation to total shares outstanding	9%	17%
Mean IH value one quarter prior to filing (in $mill)	15.32	213.85
Median IH value one quarter prior to filing (in $mill)	2.08	2.17
Mean IH value in the quarter of filing (in $mill)	2.07	193.59
Median IH value in the quarter of filing (in $mill)	0.21	1.01
Mean number of managers holding shares of the same distressed firm one quarter prior to filing	24	32
Mean number of managers holding shares of the same distressed firm in the quarter of filing	12	27

The table presents number of firms filing Chapter 11 between 1980 and 2013. The data reported here comes from *Thompson Financial Services SDC Platinum* and Lopucki's Bankruptcy database. The sample consists of all U. S. non-utility and -financial firms that filed for Chapter 11 and completed reorganization during the period. For the firms with missing or unknown ("X") trading status and no delisting data, it could mean that either (1) firms delisted prior to filing, however delisting data is missing, or (2) firms are actively traded, however trading data is missing for that date. Institutional holding (IH) value is number of shares held by institutions multiplied by share price.

Table 2
Shareholdings of corporate insiders, institutional managers, and retail investors during the year prior to and subsequent to bankruptcy filing and the year prior to and subsequent to emergence

Panel A: Holdings around quarter of bankruptcy filings

Quarter horizons	Institutions			Corporate insiders			Retail investors		
	No. of firms with holdings	Mean ownership %-age	Median ownership %-age	No. of firms with holdings	Mean ownership %-age	Median ownership %-age	No. of firms with holdings	Mean ownership %-age	Median ownership %-age
-4	160	26.2%	17.2%	141	7.7%	0.9%	160	66.1%	81.9%
-3	162	24.5%	16.9%	147	8.8%	1.0%	162	66.7%	82.1%
-2	160	22.8%	13.0%	131	5.4%	0.5%	160	71.8%	86.5%
-1	163	20.8%	13.4%	122	4.9%	0.3%	163	74.3%	86.3%
0	146	16.8%	9.7%	102	5.7%	0.3%	146	77.5%	90.1%
1	119	17.7%	8.7%	76	4.8%	0.4%	119	77.4%	90.9%
2	101	16.4%	8.6%	56	3.8%	0.2%	101	79.7%	91.2%
3	85	16.8%	7.8%	50	9.3%	0.1%	85	73.8%	92.1%
4	67	16.2%	7.6%	49	7.0%	0.5%	67	76.8%	91.9%

(Table 2 continues)

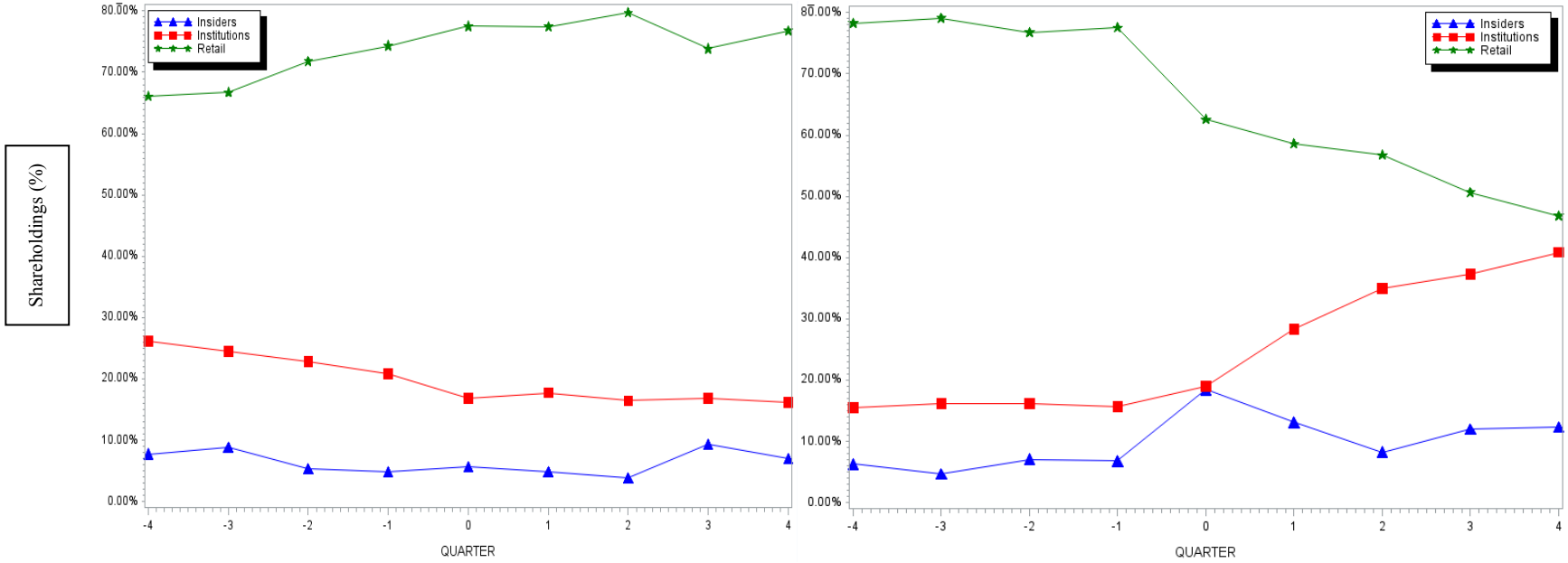
Panel B: Holdings around quarter of emergence from Chapter 11

Quarter horizons	Institutions			Corporate insiders			Retail investors		
	No. of firms with holdings	Mean ownership %-age	Median ownership %-age	No. of firms with holdings	Mean ownership %-age	Median ownership %-age	No. of firms with holdings	Mean ownership %-age	Median ownership %-age
-4	86	15.4%	7.5%	47	6.3%	0.2%	86	78.3%	92.3%
-3	98	16.2%	8.2%	57	4.7%	0.5%	98	79.1%	91.3%
-2	111	16.2%	7.4%	67	7.1%	0.2%	111	76.8%	92.4%
-1	135	15.7%	7.3%	83	6.8%	0.4%	135	77.5%	92.3%
0	193	19.0%	8.1%	159	18.4%	4.5%	193	62.6%	87.5%
1	203	28.3%	19.2%	156	13.1%	2.3%	203	58.6%	78.5%
2	208	35.0%	28.8%	148	8.2%	0.8%	208	56.8%	70.3%
3	214	37.3%	31.3%	151	12.0%	1.6%	214	50.6%	67.1%
4	210	40.9%	37.1%	156	12.3%	1.4%	210	46.8%	61.5%

The table presents mean and median percentages of institutional, corporate insider, and retail investor ownerships four quarters before, quarter of, and four quarters following bankruptcy filing (Panel A) and Chapter 11 emergence (Panel B). Quarters 0 are quarters of filing and emergence in Panel A and Panel B, respectively. We provide number of firms with institutional, insider, and retail holdings. We obtained quarterly holding data for corporate insiders and institutions from Thomson Reuters' Database. Retail investors' proportional holdings are determined as a difference between one hundred percent representing total shares outstanding and the sum of percentage shareholdings for institutions and corporate insiders.

Figure 1 (a) and (b)
Corporate insider, institutional and retail share holdings:

(a) Around quarter of bankruptcy **(b) Around quarter of emergence**



On Figure 1 we plot share holdings as percentages of total shares outstanding for three groups of investors: corporate insiders, institutions, and retail investors.

Table 3
Number of firms where institutional holders are net buyers, non-traders, or net sellers during eight quarters surrounding quarter of emergence, 1980-2013

Quarter horizons	No. of firms with holdings	All sample firms			All control firms			Mean abn. net # of shares traded	Median abn. net # of shares traded	P-value
		Net buyers	Non-traders	Net sellers	Net buyers	Non-traders	Net sellers			
-4	151	76	20	55	89	6	56	-9,720	-2,679	0.0656
-3	147	66	24	57	81	7	59	1,749	-1,553	0.8132
-2	145	60	29	56	87	9	49	1,382	-1,190	0.6928
-1	146	78	28	40	90	8	48	-931	-1,152	0.9161
0	193	130	29	34	134	9	50	105,251	5,297	<.0001
+1	203	161	16	26	142	4	57	128,259	40,970	<.0001
+2	208	164	15	29	145	6	57	42,712	9,545	<.0001
+3	214	156	19	39	145	2	67	36,817	7,806	0.0002
+4	210	163	14	33	144	3	63	30,724	4,260	0.0095

Table 3 reports net trading behavior of institutional investors for sample and control firms four quarters prior to quarter of emergence, in the quarter of emergence, and four quarters following the emergence. In each column we report number of firms with positive net change in holdings as net buyers, zero change as non-traders, and negative change as net sellers. The last three columns are associated with mean and median abnormal net number of shares traded determined as difference between net changes in institutional holdings of bankrupt firms and those of control firms. Quarter horizon 0 corresponds to quarter of emergence from Chapter 11.

Table 4
Descriptive statistics, categorized by firms with and without institutional holdings

Panel A: Accounting variables one year prior to the year of bankruptcy

Variable	Firms with IH (A)			Firms without IH (B)			Difference (B-A)			
	No. of firms	Mean	Median	No. of firms	Mean	Median	Mean	P-value	Median	P-value
Sales ($mill)	77	1,016.50	264.13	126	1,859.92	588.59	843.40	0.0148	324.47	0.0048
Total assets ($mill)	77	1,266.78	341.09	126	2,345.02	659.53	1,078.20	0.0359	318.44	0.0028
ROA	77	-16%	-7%	126	-28%	-16%	-12%	0.0304	-9%	0.0354
Z-score	60	1.088	1.021	93	-0.337	0.179	-1.425	0.0036	-0.842	0.0028
Current ratio	68	1.501	1.230	117	1.289	0.797	-0.212	0.3651	-0.433	0.0040
Debt ratio	77	0.942	0.782	125	1.170	0.983	0.228	0.0538	0.201	<.0001
Cash flow/total assets	76	0.004	0.052	125	0.003	0.043	-0.001	0.9803	-0.009	0.7085
Cash flow/sales	76	-0.069	0.040	124	-0.021	0.049	0.048	0.5265	0.010	0.9138

Panel B: Accounting variables one year after emergence from bankruptcy

Variable	Firms with IH (A)			Firms without IH (B)			Difference (B-A)			
	No. of firms	Mean	Median	No. of firms	Mean	Median	Mean	P-value	Median	P-value
Sales ($mill)	51	1,481.94	383.50	129	1,637.43	462.87	155.50	0.7799	79.37	0.3112
Total assets ($mill)	51	1,314.67	268.13	130	1,965.40	449.52	650.70	0.4558	181.38	0.1152
ROA	51	-5%	1%	129	-1%	2%	5%	0.3359	1%	0.2847
Z-score	40	1.285	1.482	110	2.181	2.019	0.896	0.0858	0.537	0.1705
Current ratio	46	1.766	1.432	121	2.165	1.795	0.400	0.1932	0.363	0.0309
Debt ratio	51	0.791	0.779	129	0.689	0.669	-0.102	0.0797	-0.110	0.0969
Cash flow/total assets	51	0.038	0.082	126	0.070	0.109	0.032	0.3418	0.028	0.0628
Cash flow/sales	49	0.025	0.071	126	0.048	0.092	0.023	0.7811	0.021	0.2368

(Table 4 continues)

Panel C: Market related variables one year prior to quarter of bankruptcy

Variable	Firms with IH (A)			Firms without IH (B)			Difference (B-A)			
	No. of firms	Mean	Median	No. of firms	Mean	Median	Mean	P-value	Median	P-value
Market value ($mill)	141	284.73	37.68	47	121.98	34.54	-162.75	0.1329	-3.14	0.8454
Market-to-book	62	0.7158	0.7081	24	1.0722	0.4522	0.3564	0.6769	-0.2559	0.4614
Price-to-earnings	62	-1.7504	-1.1699	21	-1.4130	-0.3969	0.3374	0.8328	0.7731	0.2386
Price	141	7.39	3.61	47	4.79	3.59	-2.60	0.0118	-0.02	0.1968
Volume	141	0.50%	0.30%	47	0.58%	0.34%	0.08%	0.5675	0.04%	0.3727
Shares outstanding (in 1,000)	144	33,655	10,815	51	35,645	17,104	1,990	0.8567	6,289	0.3227
Market adj. return	141	-0.17%	-0.22%	47	-0.13%	-0.19%	0.04%	0.5960	0.02%	0.4842

Panel D: Market related variables one year after quarter of emergence

Variable	Firms with IH (A)			Firms without IH (B)			Difference (B-A)			
	No. of firms	Mean	Median	No. of firms	Mean	Median	Mean	P-value	Median	P-value
Market value ($mill)	119	492.76	35.24	155	557.77	126.11	65.02	0.5987	90.87	0.0001
Market-to-book	40	1.1458	1.3078	91	1.6751	1.1350	0.5293	0.3837	-0.1729	0.7892
Price-to-earnings	40	2.6025	-0.2874	93	7.2936	6.4419	4.6911	0.2246	6.7293	0.4455
Price	119	9.62	3.27	155	12.37	8.52	2.75	0.0923	5.24	<.0001
Volume	117	0.44%	0.27%	155	0.70%	0.46%	0.26%	0.0130	0.19%	<.0001
Shares outstanding (in 1,000)	137	39,098	14,755	159	49,291	18,122	10,193	0.3872	3,367	0.2978
Market adj. return	119	0.56%	0.03%	155	0.06%	-0.004%	-0.49%	0.0775	-0.04%	0.2308

Mean and median annual operating and market related performance statistics are included in this table. Accounting related data are obtained from COMPUSTAT and reported in Panels A and B for one year prior to year of filing and one year following year of emergence, respectively. Market related data are from CRSP and reported in Panels C and D for one year prior to quarter of filing and one year after quarter of emergence. We obtain sales, total assets, current assets, total debt, current liability, pretax income, interest expense, market value of equity, retained earnings, and net income from COMPUSTAT. We derive several performance measure ratios using accounting data: net income divided by total assets (ROA); current assets divided by current liabilities (current ratio); total debt divided by total assets (debt ratio); and operating income before depreciation

and amortization normalized either by total assets (cash flow/total assets) or by sales (cash flow/sales). Altman's z-score, bankruptcy-risk proxy (Altman (1968)), is defined as 3.3x((pretax income + interest expense)/total assets) + 0.999x(sales/total assets) + 0.6x(market capitalization/total liabilities) + 1.2x(working capital/total assets) + 1.4(retained earnings/total assets). Panels C and D include market related data: firms' market capitalization, market-to-book and price-to-earnings ratios, share price, number of shares outstanding, share turnover calculated as trading volume divided by total shares outstanding, and market adjusted returns defined as security returns adjusted for the NYSE/Amex/Nasdaq equally-weighted returns including dividends. Extreme values are censored. In each panel we also report differences between mean and median values of the variables and statistical significance of a two-tailed t-test (Wilcoxon-Mann-Whitney test) for difference in their means (medians).

Table 5
Changes in market performance around day of bankruptcy filing

Panel A: Market Adjusted Returns (MAR) for firms with continuous trading

Day	Firms with IH			Firms without IH		
	Number	Mean	p-stat.	Number	Mean	p-stat.
-10	125	-0.51%	0.6763	43	0.14%	0.9107
-9	125	-0.28%	0.7595	43	-1.52%	0.2543
-8	125	-0.19%	0.8173	43	-1.66%	0.2529
-7	125	-0.16%	0.8830	43	1.66%	0.2435
-6	125	-1.54%	0.1504	43	-0.60%	0.6625
-5	124	0.38%	0.6779	43	-0.50%	0.6532
-4	123	-2.63%	0.0092	43	-1.98%	0.1110
-3	121	0.03%	0.9806	43	-5.27%	0.0004
-2	121	-1.36%	0.3190	43	-1.88%	0.2794
-1	121	-0.60%	0.6354	42	-3.17%	0.0442
0	109	-10.06%	<.0001	40	-7.48%	0.0303
1	97	-4.74%	0.0577	38	-3.02%	0.5255
(0, +1)	97	-15.56%	<.0001	38	-11.01%	0.0210
2	96	4.19%	0.0239	38	-0.75%	0.8034
3	96	0.09%	0.9486	38	4.81%	0.0875
4	96	-1.09%	0.4616	37	3.89%	0.1768
5	96	2.05%	0.2445	37	-0.25%	0.8738
6	95	1.60%	0.2383	37	0.35%	0.8379
7	94	-1.38%	0.3092	37	-2.38%	0.0839
8	94	1.43%	0.1841	37	-1.63%	0.2815
9	94	-0.27%	0.8365	37	2.18%	0.2943
10	92	-1.93%	0.0898	37	-2.24%	0.2112

Panel A: Buy-and-Hold Returns (BHR) for firms with continuous trading

Time horizons	Firms with IH (A)			Firms without IH (B)		
	Number	Mean	p-stat.	Number	Mean	p-stat.
Day -10	125	-0.51%	0.6763	43	0.14%	0.9107
(-10,-9)	125	-1.36%	0.2330	43	-1.63%	0.2463
(-10,-8)	125	-1.53%	0.2774	43	-3.30%	0.0711
(-10,-7)	125	-1.32%	0.4851	43	-2.01%	0.3187
(-10,-6)	125	-3.50%	0.0594	43	-2.40%	0.3764
(-10,-5)	124	-3.54%	0.0654	43	-2.99%	0.3021
(-10,-4)	123	-6.28%	0.0012	43	-4.34%	0.2469
(-10,-3)	121	-6.47%	0.0013	43	-9.37%	0.0114
(-10,-2)	121	-7.70%	0.0010	43	-12.10%	0.0004
(-10,-1)	121	-9.74%	<.0001	42	-14.65%	<.0001
(-10, 0)	109	-19.86%	<.0001	40	-22.42%	<.0001
(-10,+1)	97	-25.19%	<.0001	38	-28.01%	<.0001
(-10,+2)	96	-24.75%	<.0001	38	-31.11%	<.0001
(-10,+3)	96	-25.15%	<.0001	38	-28.70%	<.0001
(-10,+4)	96	-26.48%	<.0001	37	-26.92%	<.0001
(-10,+5)	96	-25.41%	<.0001	37	-27.89%	<.0001
(-10,+6)	95	-24.49%	<.0001	37	-27.36%	<.0001
(-10,+7)	94	-25.58%	<.0001	37	-29.75%	<.0001
(-10,+8)	94	-24.98%	<.0001	37	-31.53%	<.0001
(-10,+9)	94	-25.60%	<.0001	37	-29.83%	<.0001
(-10,+10)	92	-27.64%	<.0001	37	-32.32%	<.0001
(+2,+10)	92	2.23%	0.5243	37	0.27%	0.9526

(Table 5 continues)

Panel B: Market Adjusted Returns (MAR) for all firms

Day	Firms with IH			Firms without IH		
	Number	Mean	p-stat.	Number	Mean	p-stat.
-10	129	-0.46%	0.6985	43	0.14%	0.9107
-9	129	-0.21%	0.8068	43	-1.52%	0.2543
-8	129	-0.33%	0.6780	43	-1.66%	0.2529
-7	129	-0.31%	0.7613	43	1.66%	0.2435
-6	129	-1.55%	0.1367	43	-0.60%	0.6625
-5	128	0.32%	0.7144	43	-0.50%	0.6532
-4	128	-2.56%	0.0082	43	-1.98%	0.1110
-3	127	-0.06%	0.9512	43	-5.27%	0.0004
-2	127	-1.37%	0.2891	43	-1.88%	0.2794
-1	127	-0.69%	0.5673	43	-3.38%	0.0303
0	123	-9.54%	<.0001	43	-8.38%	0.0109
1	117	-5.41%	0.0113	42	-4.69%	0.2854
(0, +1)	117	-15.09%	<.0001	42	-13.27%	0.0039
2	116	2.22%	0.1753	42	-0.83%	0.7655
3	116	-0.69%	0.5774	42	3.67%	0.1609
4	116	-0.79%	0.5270	42	4.68%	0.0705
5	116	2.81%	0.0906	42	-0.22%	0.8951
6	114	1.14%	0.3447	42	-0.65%	0.6813
7	113	-0.20%	0.8704	42	-0.90%	0.5599
8	113	2.38%	0.0345	42	-0.69%	0.6398
9	113	-1.07%	0.3572	42	2.46%	0.2107
10	111	-1.35%	0.1822	41	-2.18%	0.1813

Panel B: Buy-and-Hold Returns (BHR) for all firms

Time horizons	Firms with IH (A)			Firms without IH (B)		
	Number	Mean	p-stat.	Number	Mean	p-stat.
Day -10	129	-0.46%	0.6985	43	0.14%	0.9107
(-10,-9)	129	-1.23%	0.2721	43	-1.63%	0.2463
(-10,-8)	129	-1.56%	0.2549	43	-3.30%	0.0711
(-10,-7)	129	-1.51%	0.4101	43	-2.01%	0.3187
(-10,-6)	129	-3.67%	0.0417	43	-2.40%	0.3764
(-10,-5)	128	-3.76%	0.0444	43	-2.99%	0.3021
(-10,-4)	128	-6.49%	0.0005	43	-4.34%	0.2469
(-10,-3)	127	-6.59%	0.0006	43	-9.37%	0.0114
(-10,-2)	127	-7.85%	0.0004	43	-12.10%	0.0004
(-10,-1)	127	-9.90%	<.0001	43	-15.44%	<.0001
(-10, 0)	123	-19.49%	<.0001	43	-23.60%	<.0001
(-10,+1)	117	-24.79%	<.0001	42	-29.64%	<.0001
(-10,+2)	116	-25.38%	<.0001	42	-32.68%	<.0001
(-10,+3)	116	-26.20%	<.0001	42	-30.90%	<.0001
(-10,+4)	116	-27.31%	<.0001	42	-28.75%	<.0001
(-10,+5)	116	-25.83%	<.0001	42	-29.58%	<.0001
(-10,+6)	114	-25.31%	<.0001	42	-29.68%	<.0001
(-10,+7)	113	-25.63%	<.0001	42	-31.11%	<.0001
(-10,+8)	113	-24.41%	<.0001	42	-32.37%	<.0001
(-10,+9)	113	-25.41%	<.0001	42	-30.45%	<.0001
(-10,+10)	111	-27.10%	<.0001	41	-32.62%	<.0001
(+2,+10)	111	1.39%	0.6513	41	1.35%	0.7492

Reported are short-term market adjusted (MAR) and buy-and-hold abnormal returns (BHR), categorized by firms with and without institutional ownership. We utilize equally weighted, including dividends, CRSP market returns for computations of the returns. We evaluate returns during twenty-one-day window surrounding day of Chapter 11 filing. In Panel A, we present MAR and BHR for firms with continuous trading during ten days prior to bankruptcy filing, on the day of filing (Day 0), and ten days following bankruptcy filing. In Panel B we report MAR and BHR for all firms during various short-term horizons. P-values are reported for each category of firms.

Table 6
Changes in market performance around day of emergence from bankruptcy proceedings

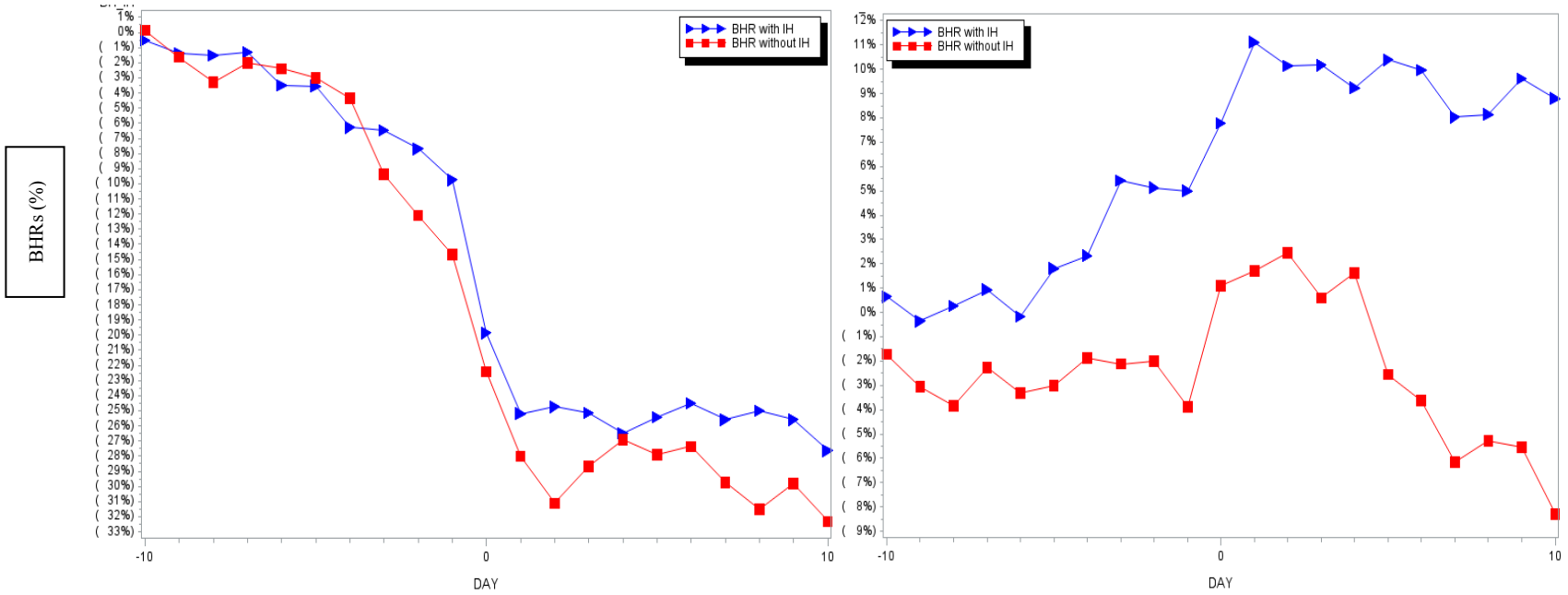
Market Adjusted Returns (MAR)							*Buy-and-Hold Returns (BHR)*						
Day	Firms with IH			Firms without IH			Time horizons	Firms with IH			Firms without IH		
	Number	Mean	p-stat.	Number	Mean	p-stat.		Number	Mean	p-stat.	Number	Mean	p-stat.
-10	104	0.65%	0.5132	43	-1.72%	0.1860	Day -10	104	0.65%	0.5132	43	-1.72%	0.1860
-9	104	-0.94%	0.3072	43	-1.68%	0.0766	(-10,-9)	104	-0.36%	0.7823	43	-3.04%	0.0095
-8	104	0.54%	0.5519	43	-0.83%	0.3815	(-10,-8)	104	0.26%	0.8815	43	-3.82%	0.0132
-7	104	0.79%	0.5132	43	1.90%	0.2392	(-10,-7)	104	0.94%	0.6754	43	-2.27%	0.2288
-6	104	-0.31%	0.8049	43	-1.13%	0.3012	(-10,-6)	104	-0.17%	0.9405	43	-3.31%	0.1340
-5	104	2.22%	0.0728	42	0.98%	0.4646	(-10,-5)	104	1.81%	0.4771	42	-3.00%	0.3322
-4	104	0.88%	0.4422	42	0.55%	0.7058	(-10,-4)	104	2.34%	0.3805	42	-1.88%	0.6630
-3	103	2.28%	0.0660	42	-0.89%	0.5006	(-10,-3)	103	5.42%	0.1537	42	-2.12%	0.7020
-2	103	0.51%	0.6978	42	0.77%	0.6278	(-10,-2)	103	5.13%	0.1421	42	-2.00%	0.7171
-1	103	0.85%	0.4490	42	-0.47%	0.7922	(-10,-1)	103	5.00%	0.1094	42	-3.88%	0.3716
0	103	3.53%	0.0032	42	4.78%	0.0466	(-10, 0)	103	7.79%	0.0093	42	1.11%	0.8452
1	102	2.93%	0.0688	42	1.54%	0.6326	(-10,+1)	102	11.11%	0.0016	42	1.72%	0.7742
(0, +1)	102	6.85%	0.0006	42	6.33%	0.1020	(-10,+2)	101	10.15%	0.0038	42	2.47%	0.6270
2	101	-0.98%	0.3888	42	1.92%	0.3975	(-10,+3)	99	10.16%	0.0052	42	0.60%	0.9094
3	99	-1.05%	0.1920	42	-2.28%	0.1264	(-10,+4)	99	9.24%	0.0096	42	1.61%	0.7558
4	99	-0.75%	0.4648	42	1.96%	0.2639	(-10,+5)	99	10.38%	0.0045	42	-2.55%	0.5874
5	99	1.81%	0.1982	42	-3.49%	0.0697	(-10,+6)	99	9.97%	0.0056	42	-3.63%	0.4336
6	99	0.16%	0.8323	42	-0.74%	0.5299	(-10,+7)	99	8.02%	0.0274	42	-6.17%	0.2050
7	99	-1.83%	0.0378	42	-2.39%	0.2837	(-10,+8)	99	8.14%	0.0173	42	-5.28%	0.2585
8	99	0.06%	0.9536	42	2.88%	0.1787	(-10,+9)	99	9.61%	0.0113	42	-5.56%	0.2351
9	99	0.61%	0.5294	42	-1.06%	0.4910	(-10,+10)	99	8.80%	0.0159	42	-8.30%	0.0863
10	99	-1.53%	0.0349	42	-2.27%	0.2616	(+2,+10)	99	-2.80%	0.1994	42	-6.51%	0.1404

Reported are short-term market adjusted (MAR) and buy-and-hold abnormal returns (BHR) for firms with continuous trading, categorized by firms with and without institutional ownership. We utilize equally weighted, including dividends, CRSP market returns for computations of the returns. We evaluate returns during twenty-one-day window surrounding day of emergence from Chapter 11. In the Table we present MAR and BHR for ten days prior to emergence from bankruptcy, on the day of emergence (Day 0), and ten days following emergence from bankruptcy. P-values are reported for each category of firms.

Figure 2 (a) - (d)
Buy-and-hold market adjusted abnormal returns and share trading volumes for firms with and without institutional holdings for 21-day periods:

(a) Around day of bankruptcy filing

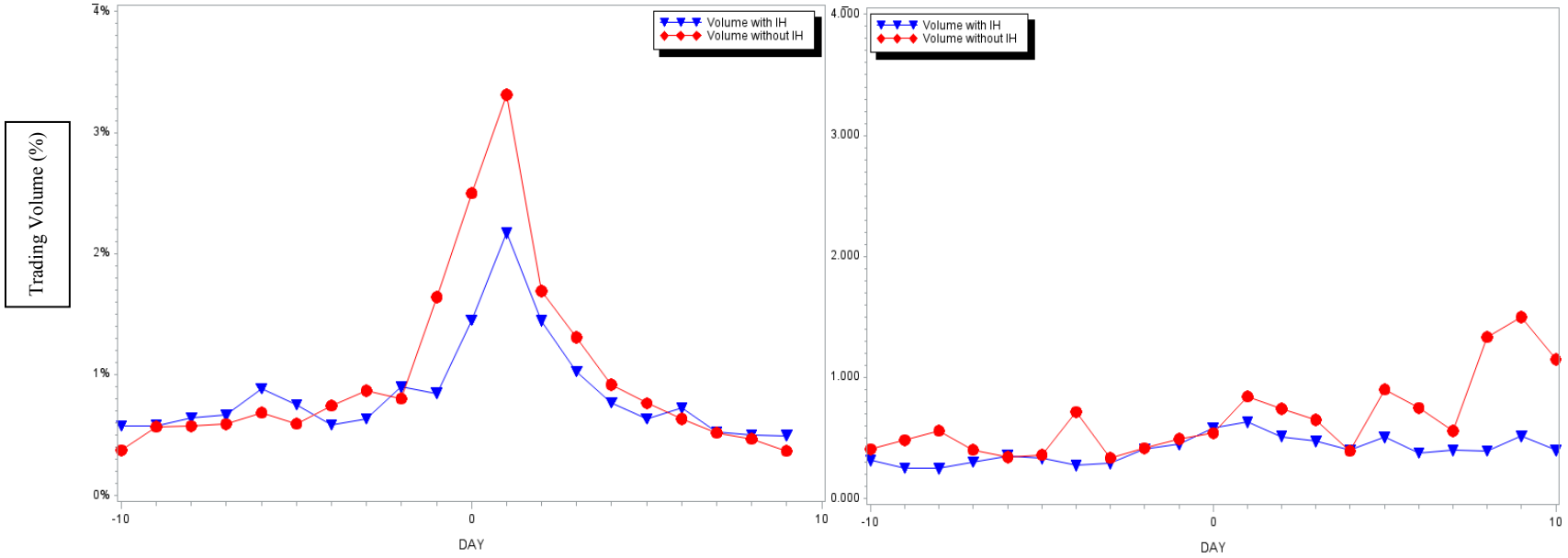
(b) Around day of emergence from bankruptcy



(Figure 2 (a) - (d) continues)

(c) Around day of bankruptcy filing

(d) Around day of emergence from bankruptcy



On Figure 2 in addition to plotting BHRs for the (-10,+10) day period surrounding days of bankruptcy filing (a) and emergence (b), we plot trading volumes, determined as share turnover divided by total shares outstanding ((c) and (d)). Figure 2 (a) plots BHRs ten days prior to bankruptcy filing, on the day of filing (day t=0), and ten days following bankruptcy filing. Figure 2 (b) plots BHRs ten days prior to emergence from bankruptcy, on the day of emergence (day t=0), and ten days following emergence from bankruptcy. Figure 2 (c) plots share turnover ten days prior to bankruptcy filing, on the day of filing (day t=0), and ten days following bankruptcy filing. Figure 2 (d) plots share turnover ten days prior to emergence from bankruptcy, on the day of emergence (day t=0), and ten days following emergence from bankruptcy.

Table 7
Buy-and-hold abnormal returns, categorized by firms with and without institutional ownership

Panel A: Buy-and-hold abnormal return prior to quarter of bankruptcy filing

Quarter period	Firms with IH (A)			Firms without IH (B)			Difference (B-A)			
	No. of firms	Mean	Median	No. of firms	Mean	Median	Mean	P-value	Median	P-value
Quarter-1	130	-28.31%***	-27.61%***	43	-19.54%***	-30.65%***	8.78%	0.1735	-3.04%	0.4791
(-2,-1)	138	-43.15%***	-50.17%***	45	-32.43%***	-44.34%***	10.72%	0.1822	5.83%	0.3237
(-3,-1)	139	-58.69%***	-67.95%***	47	-51.12%***	-63.13%***	7.56%	0.3208	4.82%	0.2475
(-4,-1)	139	-71.77%***	-75.41%***	47	-64.36%***	-76.47%***	7.40%	0.3790	-1.06%	0.4426

Panel B: Buy-and-hold abnormal return following quarter of emergence from bankruptcy

Quarter period	Firms with IH (A)			Firms without IH (B)			Difference (B-A)			
	No. of firms	Mean	Median	No. of firms	Mean	Median	Mean	P-value	Median	P-value
Quarter+1	82	-5.70%	-7.26%	65	-7.37%*	-8.83%*	-1.66%	0.7850	-1.57%	0.8622
(+1,+2)	95	-9.45%**	-11.43%**	108	-4.59%	-9.94%	4.86%	0.4287	1.49%	0.3610
(+1,+3)	139	-13.20%***	-20.02%***	47	-1.82%	-10.48%	11.47%	0.1049	9.54%	0.0907
(+1,+4)	139	-20.46%***	-29.79%***	47	-8.83%	-18.30%	11.63%	0.1539	11.49%	0.1965

The table reports buy-and-hold abnormal returns for several time horizons, from one quarter to one year prior to quarter of bankruptcy filing (Panel A) and following quarter of emergence (Panel B). Quarter -1 is one-quarter period prior to quarter of bankruptcy, quarter horizon (-2, -1) is two-quarter period prior to quarter of bankruptcy, (-3, -1) is three-quarter period prior to quarter of bankruptcy, and (-4, -1) is four-quarter period prior to quarter of bankruptcy. Quarter +1 is one-quarter period following quarter of emergence, quarter horizon (+1, +2) is two-quarter period following quarter of emergence, (+1, +3) is three-quarter period following quarter of emergence, and (+1, +4) is four-quarter period following quarter of emergence. In each panel we also report differences between mean and median values of the variables and statistical significance of a two-tailed t-test (Wilcoxon-Mann-Whitney test) for difference in their means (medians). ***, **, and * denote that the value is significantly different from zero at 1, 5, and 10 percent levels, respectively.

Table 8
The timing of institutional trading in relationship to emergence from bankruptcy

Quarter horizons	Intercept	DB	DA	R^2	No. of observations
-3	0.0015	0.0009	-0.0016	0.021	99
	(0.2627)	(0.4820)	(0.2231)		
-2	0.0048	-0.0003	0.0028	0.029	101
	(0.0060)	(0.8473)	(0.0999)		
-1	0.0027	-0.0017	0.0008	0.031	86
	(0.0149)	(0.1262)	(0.4647)		
0	0.0018	0.0013	0.0005	0.059	68
	(0.0144)	(0.0767)	(0.4915)		
+1	0.0005	-0.0006	-0.0002	0.011	117
	(0.4199)	(0.3539)	(0.7480)		
+2	0.0007	-0.0014	0.0013	0.064	145
	(0.2236)	(0.0170)	(0.0157)		
+3	0.0006	-0.0006	0.0002	0.013	147
	(0.1639)	(0.1817)	(0.6228)		

The table reports estimated coefficients from regressions of quarterly market adjusted abnormal returns on the abnormal number of shares traded in the quarterly intervals before and after the holding period. Abnormal trades are coded as one of the three dummy variables: -1 if sales, 0 if no trading, and 1 if purchases. Quarter 0 is quarter of emergence. P-values are reported in parentheses.

Table 9
Propensity of institutional holdings to impact bankrupt firms' post-emergence performance

Variables	CFA		CFS		Buy-and-hold return	
	Estimates	Point estimates	Estimates	Point estimates	Estimates	Point estimates
Intercept	-3.929		-3.823		2.163	-
	(0.0540)		(0.0647)		(0.3828)	
IHD_BK	-0.497	0.608	-0.775	0.461	1.418	4.129
	(0.2637)		(0.0857)		(0.0208)	
IHD_REO	0.297	1.346	0.310	1.363	0.741	2.097
	(0.4999)		(0.4881)		(0.2419)	
LNAT	0.205	1.227	0.208	1.231	-0.211	0.810
	(0.0420)		(0.0424)		(0.0822)	
PRMGN	-0.214	0.808	-0.081	0.922	0.233	1.263
	(0.3298)		(0.6681)		(0.4855)	
ZSCORE	-0.033	0.968	-0.048	0.953	0.077	1.079
	(0.2531)		(0.2033)		(0.3032)	
Likelihood Ratio	14.819		19.474		17.920	
	(0.0112)		(0.0016)		(0.0030)	

Table contains results of logistic regression model that we use to compare operating and market performance changes from one year preceding the filing to one year following the emergence between the firms with and without institutional holdings. Dependent variable is changes in cash flows measured by the firms' operating income before depreciation and amortization normalized either by sales (CFS) or by total assets (CFA), or market adjusted buy-and-hold abnormal return: if cash flow or abnormal market return is positive, then we assign 1 to the variable, if it is negative, the dependent variable equals 0. As a control, we use two dummy variables: IHD_BK equals 1 if bankrupt securities are held by institutional investors in the quarters before or of bankruptcy filings, and 0 otherwise, and IHD_REO equals 1 if bankrupt securities are held by institutional investments in quarter of reorganization or in the following quarter, and zero otherwise. We also control for firm size measured as natural logarithm of total assets, profit margin, and Altman's z-score. All variables are measured as of one year preceding year of Chapter 11 filing. We first use CFA to define our dependent variable and then, as a robustness check, we run the same regression with a binary dependent variable determined based on changes in CFS and abnormal returns. LogLikelihoods are reported for each regression at the bottom of the table. P-values are reported in parentheses.

CHAPTER 3

Acquisitions of Bankrupt and Distressed Firms

by

Elena Precourt[83]; Henry R. Oppenheimer[84]

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[83] PhD Candidate, College of Business Administration, The University of Rhode Island, Kingston, RI 02881, Email: elena_precourt@my.uri.edu
[84] Associate Professor, College of Business Administration, The University of Rhode Island, Kingston, RI 02881, Email: hroppenheimer@mail.uri.edu

Abstract

In this paper we focus on acquisitions of bankrupt firms and firms that recently emerged from Chapter 11 and compare these firms with acquired distressed firms to determine whether or not transaction timing plays a role in the outcomes of the mergers. We analyze deal premiums (or lack thereof) and evaluate post-merger operating cash flows to determine whether or not timing of the transactions impacts their effectiveness and success. We also examine characteristics of acquirers and targets, evaluate their stock price reactions to the announcements of acquisitions, and analyze how institutional investors trade shares of bankrupt and distressed targets. We find that distressed targets sell their assets at a premium or at a discount smaller than bankrupt firms do, thereby benefiting from acquisitions more than bankrupt targets. We also find that abnormal post-merger cash flow and cumulative abnormal return changes are more pronounced for bankrupt than distressed firms, indicating that acquisitions in Chapter 11 add greater economic value for both target and its acquirer than do acquisitions outside of bankruptcy. Insurance companies and, to a lesser extent, independent investment advisors recognize the acquired bankrupt firms' post-merger operating and market performance improvements and increase their ownership in the firms starting two to three quarters prior to the acquisition announcements. However we find post-merger market performance improvements for bankrupt and not distressed firms. In summary, distressed firms get a merger announcement premium and bankrupt firms give it away to their acquirers whose shareholders benefit from acquisition premiums in a year after the mergers.

I. Introduction

Distressed firms often choose Chapter 11 bankruptcy as a mechanism to effectively redeploy their assets, to reduce debt burden, or to change their strategic focus. These firms emerge from Chapter 11 as independently reorganized companies, either private or publicly traded, convert to Chapter 7 and subsequently liquidate, or are acquired by other public or privately operating companies, creditors, or private investors. It has been shown that acquisitions of bankrupt firms create value, provide an efficient mechanism for asset redeployment, and result in a better performing enterprise than when bankrupt firms reorganize independently (Hotchkiss and Mooradian (1998), Maksimovic and Phillips (1998). Hotchkiss and Mooradian (1998) observe that the combined post-acquisition cash flows of the merged firms increase by more than is observed for transactions that do not occur under Chapter 11. In addition, Maksimovic and Phillips (1998) find that in high-growth industries the productivity of the assets sold by bankrupt manufacturing firms increases under new ownership, evidencing efficient redeployment of assets to more productive uses. As a result of Chapter 11, capital structure of filing firms changes—in addition to likely asset sales, firms reduce their leverage as a result of debt-to-equity conversions and debt forgiveness.

In general, several researchers analyzing returns resulting from M&A transactions reveal that they are material and significant, despite variations in time period, type of deal (merger, acquisition, tender offer, etc.), and observation period. In short, the M&A transactions deliver a premium return to target firms' shareholders (Bradley, Desai, and Kim (1988), Lang, Stulz, and Walkling (1989), Loughran and Vijh (1997), Kuipers, Miller, and Patel (2003)) and mixed market-based returns to buyer firms' shareholders (Roll (1986), DeLong (2001), Kuipers et al. (2003), Loderer and Martin (1990), Kohers and Kohers (2000), and Jarrell and Poulsen (1989)). Roll (1986), DeLong (2001) and Kuipers et al. (2003) report negative returns to buyer firms' shareholders, while Loderer and Martin (1990) and Kohers

and Kohers (2000) report zero or positive returns to acquirers and Jarrell and Poulsen (1989) find significant positive abnormal returns to acquiring firm shareholders. As part of the "hubris hypothesis" of corporate takeovers[85] Roll (1986) argues that the average increase in the target firm's market value as a result of the merger is more than offset by the average decrease in the value of the acquirer, wiping out all the gains available to the acquirer's shareholders. Roll (1986) concludes that the reason why a merger results in a loss to the bidding firm's shareholders is because on average acquirers pay too much for their targets.

According to the Wall Street Journal's article "Buyers' Fading Remorse" on March 10, 2014, industries such as broadcasting, telecommunications, paper container and packaging, and pharmaceutical are currently experiencing the greatest increase in M&A. "Investors are rewarding U.S. companies for making acquisitions… Typically shareholders have punished an acquirer for making an acquisition. Between 1995 and 2011, the stock price of acquirers averaged a loss every year… Yet at a time when companies are increasingly struggling to increase their earnings and sales, investors are applauding companies for making acquisitions."[86]

[Insert Figures 1a and 1b here]

In Figure 1a we present annual volumes of all M&A announcements (U.S. targets) and Chapter 11 filings for the period between 1993 and 2013 and determine whether or not the two events correlate. In Figure 1b, we plot annual numbers of acquisition announcements of bankrupt and distressed firms[87] during the same annual period. Data for both figures are

[85] To explain the corporate takeover phenomenon Roll (1986) in the "hubris hypothesis" describes bidders/managers as being convinced that valuation of the target is accurate and that the market does not reflect the full economic value of the merged firm: "If there are actually no aggregate gains in takeover, the phenomenon depends on the overbearing presumption of bidders that their valuations are correct." (p. 200)

[86] "Buyers' Fading Remorse" By Maureen Farrell, *The Wall Street Journal*, Money and Investing section of online subscription, March 10, 2014.

[87] Distressed firms are those with Altman z-score (Altman (1968)) of less than 1.8. The difference between distressed and bankrupt firms is that these firms, in spite of low z-score, have not filed for bankruptcy at any point during the period analyzed.

obtained from Thompson Financial Services SDC Platinum database. We also provide a correlation matrix for the four variables plotted on the two figures.

From Figure 1a we observe that annual volumes of M&A transactions are significantly greater than annual volumes of bankruptcy filings in each year reported. In the late 1990's we observe the greatest increase in M&A volume. This wave peaked in 1998 and then the M&A volume declined in 2001 and even more so in 2002. Number of bankruptcy filings started to rise in 1998 and following the dot-com bubble climaxed in 2001. In the late 2000's we observe the next M&A wave with the highest volume of announcements in 2007. In 2009, bankruptcy filing volume peaks as a result of the latest economic recession following the mortgage meltdown. Although it may seem as the two events are diametrically opposed, there are several years when volumes of M&A announcements and Chapter 11 filings increase or decrease simultaneously: in the periods from 1994 to 1995, from 1997 to 1998, and again from 2006 to 2007 volumes of M&A and Chapter 11 rise, and from 2001 to 2002 they both fall. In all other annual time horizons, when M&A volume rises, number of Chapter 11 filings declines, and vice versa. In addition, the correlation between the two events is -0.33, indicating weak inverse relationship between the two events.

From Figure 1b, it is evident that more distressed than bankrupt firms are acquired in almost every year reported. Although correlation between the two events is weak (0.25), it is positive. Correlation between number of M&A announcements and number of bankrupt firm acquisition announcements is negative and strong (-0.65), indicating that with the increase in the overall volume of M&A the number of bankrupt firm acquisitions declines. In addition, during good economic times, when M&A activities increase and number of bankruptcy filings drops, the market become less saturated with bankrupt targets and bidders can afford to spend more on acquisitions. Correlations between number of bankruptcy filings and numbers of bankrupt and distressed firm acquisition announcements are positive and strong (0.71 and 0.47, respectively), indicating bidders' interest in affordable (but risky) acquisitions.

In this paper we focus on acquisitions of bankrupt firms and firms that recently emerged from Chapter 11 and compare these firms with acquired distressed firms to consider whether or not acquisition transaction timing plays a role in the outcomes of the mergers. Although we do not know if the distressed firms would have filed for bankruptcy if they did not get acquired or if they would have recovered from their distress outside of bankruptcy, these firms are directly comparable (based on a low Altman z-score, size, and industry of operation) to the bankrupt firms in our sample. Distressed firms in general may subsequently file for Chapter 11, get acquired, extricate themselves from their distress outside of bankruptcy, or remain in a state of distress for quite some time. As part of our research one of the questions we answer is: Is acquisition a better alternative to bankruptcy? We analyze deal premiums (or lack thereof) and evaluate post-merger operating cash flows to determine whether or not timing of the transactions impacts their effectiveness and success. We also examine characteristics of acquirers and targets and evaluate their stock price reactions to the announcements of acquisitions.

In addition, we provide analysis of institutional trading of shares of distressed and bankrupt firms and determine how changes in managers' shareholdings relate to the likelihood of firms' acquisitions. We evaluate whether institutions behave consistently with a superior information hypothesis and acquire shares of distressed firms in advance of public announcements of the M&A deals. We also analyze executive officers and directors' shareholdings to determine whether their sizable ownership relates to acquisitions. This is the first research to analyze either the effects of timing of bankrupt firm acquisitions or institutions' trading of shares of these firms that are acquired either before they file for bankruptcy or while in reorganization.

i. Evidence of effectiveness of bankrupt firm acquisitions vs. reorganizations under Chapter 11

Although a key goal of Chapter 11 is to provide economically viable firms an opportunity to reorganize, while leading to liquidation of those that are not viable, Hotchkiss (1995) finds that about forty percent of firms emerging from bankruptcy continue to experience operating losses for several years following emergence and more than one third undergo a second restructuring. In addition, Maksimovic and Phillips (1998) examine measures of productivity of capital and operating cash flow for plants of bankrupt manufacturing firms and find that asset sales and plant closures, and not efficiency of retained assets, explain changes in bankrupt firms' performance.[88] Because the manufacturing firms retain their least profitable assets, their operating performance does not improve from pre-bankruptcy levels.

Not all firms petitioning for Chapter 11 however succeed in their attempts to reorganize. Based on the National Chapter 11 Filing and Confirmation Figures (Excluding North Carolina and Alabama) by Year since 1990 report issued by Executive Office for United States Trustees[89] at least 55 to 60 percent of cases are closed without confirmation.[90] Firms that are liquidated or dissolved also include firms that convert from Chapter 11 to Chapter 7. The firms that convert to Chapter 7 after failed efforts to reorganize are typically smaller firms (Hotchkiss (1995)).

The structure of Chapter 11 makes acquisitions of bankrupt firms more cumbersome, because they cannot occur without creditor approval (Hotchkiss and Mooradian (1998)) and management support (Baird (1993)).[91] Shleifer and Vishny (1992) find that industry

[88] Maksimovic and Phillips (1998) find that plants that are not sold by the manufacturing firms have lower productivity compared to those that are sold off.
[89] For information refer to http://www.justice.gov/ust/.
[90] Confirmation figures for time period from 1990 to 2003 include not only those for publicly traded companies, but also those for privately held firms. In addition, firms are liquidated under either Chapter 11 or 7 in the closed without confirmation cases.
[91] Virtually all mergers outside of bankruptcy also require management support and many require creditor approval or waiver of covenants of loan agreements or bond indentures. However, a potential acquirer of a bankrupt firm must negotiate with each creditor group not only the sale price but also the distribution of the proceeds from the sales. Baird (1993) also observes that managers often cannot be

conditions may also deter an acquisition and affect the type of bidders and the prices paid for distressed firms. Finally, Gertner and Picker (1992) argue that asymmetric information may also impede acquisitions of bankrupt firms.

Although fairly infrequent,[92] acquisitions are an effective mechanism for reducing debt burden and effectively redeploying assets of Chapter 11 firms: Hotchkiss and Mooradian (1998) observe that the combined post-acquisition operating cash flows of the merged firms increase by more than is observed for transactions that do not occur under Chapter 11. In addition, Maksimovic and Phillips (1998) find that in high-growth industries the productivity of the assets sold by bankrupt manufacturing firms increases under new ownership, evidencing efficient redeployment of assets to more productive uses. Shrieves and Stevens (1979) also provide evidence of resolution of financial crisis among failing firms through the merger process to have value-adding qualities. The researchers' findings are consistent with bankruptcy avoidance rationale for mergers hypothesis. Shrieves and Stevens (1979) conclude that mergers contribute to the efficiency with which resources are reallocated to more productive ends.

In summary, acquisitions of bankrupt firms create value, provide an efficient mechanism for asset redeployment, help reduce debt, and result in a better performing enterprise than when bankrupt firms reorganize independently (Hotchkiss and Mooradian (1998), Maksimovic and Phillips (1998). Managers of Chapter 11 firms do not have necessary incentives to allocate corporate resources to their highest-valued uses (Bradley and Rosenzweig (1992), Baird (1993)). Bradley and Rosenzweig (1992) demonstrate that under the Bankruptcy Code (Bankruptcy Reform Act of 1978) managers of financially troubled and not economically viable firms are more likely to choose reorganization than liquidation. Baird

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counted on to conduct a sale of the firms even if it is in the interest of shareholders and creditors to do so.

[92] Hotchkiss and Mooradian (1998) report that about 32 percent of bankrupt firms in their sample merge. We report 31 percent of bankrupt firms in our sample merging.

(1993) states that "those in control often lack the incentive to act in a way that is in everyone's interest and that, even if they did, they might not be able to persuade third parties that they wanted an early sale to save the costs of bankruptcy..." (p.3)

ii. Post-merger performance

Researchers evaluating post-merger performance measured by profit margins, growth rates, and returns of assets, capital, and equity report mixed results.[93] Meeks (1977), for example, explores gains from merger by looking at the change in return on assets (ROA) and comparing it to the change in ROA for the buyer's industry.[94] He finds that ROA declines for acquirers following the transaction and that for nearly two-thirds of acquirers, performance is below the standard of the industry. Mueller (1980) also finds that in several instances acquirers report worse returns in the years after acquisition than their non-acquiring counterparts. He analyzes changes in size, risk, leverage, and profitability of merged firms and concludes that "mergers would appear to result in a slight improvement here, a slight worsening of performance there. If a generalization is to be drawn, it would have to be that mergers have but modest effects, up or down, on the profitability of the merging firms in the three to five years following merger. Any economic efficiency gains from the mergers would appear to be small." (p. 306) Similarly, Ravenscraft and Scherer (1987) find that profitability is one to two percentage points less for acquirers than for control firms and that entry into new (diversifying) lines of business are associated with material and significant decreases in profitability.[95]

In contrast, Healy, Palepu, and Ruback (1992) find that asset productivity improves significantly for firms following acquisition, which contributes to higher operating cash flow returns relative to their non-acquiring peers. The authors observe that acquirers maintain their

[93] In this section I summarize studies that do not necessarily relate to acquisitions in bankruptcy.
[94] Meeks (1977) defines return on assets as pre-tax profits (after depreciation, but before taxes) divided by the average of beginning and ending assets for the year.
[95] Ravenscraft and Scherer (1987) use the ratio of operating income to assets as a measure of firms' profitability and control for industry effects, accounting method choices, and market shares.

rates of capital expenditure and R&D relative to their industries, suggesting that the improved performance is not at the expense of fundamental investment in the business. Healy et al (1992) further find that the announcement stock returns of the merging firms are significantly associated with the improvement in post-merger operating performance, suggesting that anticipated gains drive the share prices at announcement. Similarly, acquisitions in bankruptcy produce economic gains, facilitate an efficiency-enhancing redeployment of assets, and result in improved post-merger performance (Hotchkiss (1995), Hotchkiss and Mooradian (1998), Maksimovic and Phillips (1998)). Hotchkiss and Mooradian (1998) find that increase in profitability for bankrupt targets is associated with a decrease in operating expenses and decreases in employment.

iii. Institutional trading

An informed investor engages in the costly investigation into an asset's value to identify and acquire assets that yield greater potential returns on the investments than do uninformed trades (Rock (1986)).[96] Some academics argue that institutional investors are prone to behave rationally and to appear as "intelligent" investors who stabilize security prices by offsetting irrational trades by individual investors (Lakonishok et al. (1994)). Because of the size of the investments and their time horizons,[97] institutional investors have strong incentives to gather costly information[98] about firms whose shares they acquire for their portfolios. Irrespective of that, we can, to this point, find no empirical evidence relevant to

[96] Since research findings on the positive and significant target share abnormal returns are practically uniform, in this study we focus on institutional trading of shares of target firms.

[97] According to Hotchkiss and Strickland (2003) who investigate investor composition of underperforming firms with earnings below analysts' expectations, low turnover institutional investors (those with average holding period of 3 years or longer) own the greatest percentage of shares outstanding (mean of 27.4% and median of 27.5%; high turnover managers, with holding period of less than 1.5 years, hold on average 10.8% of shares outstanding (with median of 8.7%).

[98] Maug (1998) finds that information cost and the cost of monitoring inversely relate to market liquidity and that frequently traded shares reduce institutional investors' incentives to gather information through monitoring because they allow institutions to sell their holdings more easily. We believe, consistent with traditional economic theory, that the marginal benefits institutional investors gain from information gathering and analysis must exceed their marginal costs for the investors to consider these expenditures.

institutional trading of the shares of distressed and bankrupt companies that are about to be acquired.

In the existing empirical literature on institutional trading there is no concrete evidence as to how sophisticated the investment strategies are that institutions employ in their overall trading. While some researchers argue that institutional investors are capable of picking winners and exhibit fully rational herding behavior that promotes price discovery and predicts stock returns (Nofsinger and Sias (1999), Sias (2004)), others conclude that managers mechanically acquire stocks with certain desirable characteristics and price levels (Falkenstein (1996)) and irrationally engage in herding causing temporary price bubbles (Dreman and Lufkin (2000)) and future price correction (Gutierrez and Kelley (2009)).

Arbel et al. (1983) find that institutions typically avoid investing in thinly traded securities and in firms with small capitalizations. Institutional investors avoid taking greater risks associated with investment in small firms such as greater return volatility and lower liquidity. These constraints that affect investment decisions of institutions may lead to market segmentation, herding behavior, and continuous neglect of certain securities (Arbel et al. (1983), Nofsinger and Sias (1999)). Similarly, Falkenstein (1996) believes that managers acquire stocks with certain desirable characteristics and price levels. He observes that managers have a preference for stocks with high visibility and low transaction costs and avoid investments with low idiosyncratic volatility.[99]

The remainder of our paper is structured as follows: In Section II, we present the hypotheses and in Section III we describe the data and sample selection. We develop test methodology and report regression results in Section IV. Section V concludes our paper.

II. Development of Hypotheses

[99] Falkenstein (1996) explains that fund managers take advantage of the option-like payoff to their relative performance by avoiding the lowest volatility stocks rather than investing in the most highly volatile stocks.

Since acquisitions of bankrupt firms have been found to be an effective way to reorganize, an important question arises concerning timing of acquisitions. Is acquisition a better alternative to reorganization in Chapter 11? Consequently, could distressed firms negotiate better acquisition terms than could firms in bankruptcy? And do acquisitions of distressed firms create more value and result in a better performing firm than do acquisitions of bankrupt firms? In the extant literature, researchers do not evaluate the importance of acquisition timing,[100] if it influences acquisition terms, and if and how the timing impacts outcome of the transactions. Although we cannot state with absolute confidence that the distressed firms we use to compare to the bankrupt firms in our sample would have filed for bankruptcy if they were not acquired, we make this assumption based on their low z-score and weak market and operating performances. Distressed firms in general may subsequently file for Chapter 11, get acquired, extricate themselves from their distress outside of bankruptcy, or remain in a state of distress for quite some time.

When firms enter the state of operating and/or financial distress they become more vulnerable to a merger, an acquisition or a takeover as potential acquirers expect to pay lower price for the firms' assets than the average price paid for all other acquired firms in the same industry. According to the hubris hypothesis of corporate takeovers (Roll (1986)), acquisitions of bankrupt or distressed firms can be a direct result of acquirer's overconfidence in the accuracy of target firm's valuation. In addition, because acquisitions of distressed, bankrupt, or poorly performing firms are riskier than acquisitions of healthy firms, one would expect potential buyers, depending on the hubris of the acquirers' management, to prefer the "better performing" [101] failing firms over all other failing firms, even if it means paying a higher price (although not as high as they would have paid for a healthy target). We expect

[100] Lambrecht (2004) and Harford (1999) assess timing of acquisitions at a macro level, looking at merger waves and evaluating their causes, and do not relate it to distressed or bankrupt firms.

[101] The "better performing" failing firms are those with higher than average of all failing firms' operating cash returns on assets and sales, return on assets, and profit margin. These firms also have lower than the average debt ratio.

distressed firms to be those "better performing" targets, again depending on the acquirers' hubris. We also expect firms with greater officer, director, and institutional shareholdings to consider merger as a reorganization alternative sooner due to anticipation of appreciation of the share prices than firms with the low officer, director, and institutional ownerships. We anticipate greater transaction discounts for bankrupt than for distressed firms caused by the weakening power to bargain as the firms enter bankruptcy. After evaluating characteristics of both bankrupt and distressed firms, we determine attributes that contribute to the likelihood of the firms to be acquired outside of bankruptcy. We then evaluate the importance of these attributes in cases when the firms are acquired by another operating company and investors.[102] Our first hypothesis is as follows:

> H1: Firms that are larger, less levered, less distressed, and with higher returns on assets and operating cash flow returns on sales reorganize via merger or acquisition outside of Chapter 11 and not while in bankruptcy or shortly after emergence. In addition, firms with greater officer, director, and institutional ownerships are more likely to choose acquisition outside of bankruptcy as a method of reorganization. These conjectures are irrespective of acquirer type: operating firm or investor.

Researchers in the M&A literature demonstrate that acquisition of bankrupt firms is a positive occurrence that results in a better performing enterprise than those firms that reorganized independently. We make a contribution to the analysis of acquisitions of bankrupt firms by evaluating not whether or not bankrupt firms should consider merger to independent reorganization, but whether or not this consideration should come before the struggling firms file for bankruptcy protection versus while they are in Chapter 11 or during the first year as reorganized entities. We compare post-merger performance of bankrupt firms

[102] "Creditors" is another group of acquirers, however they acquire very few distressed and many more bankrupt firms. Creditors also become bankrupt firms' owners in cases when firms' debt is converted to equity as part of reorganization under Chapter 11. We do not perform logistic regression analysis for this acquirer type due to the unusual nature of these acquisitions common primarily to bankrupt firms.

or firms that just emerged from Chapter 11 with that of distressed, but not bankrupt, firms. We anticipate distressed firms to have a better post-merger performance than bankrupt firms due to their better pre-merger conditions, highlighting the importance of the firms' reorganization via merger outside of bankruptcy. We develop our second hypothesis as follows:

> H2: Acquisitions of firms outside of bankruptcy result in a better post-merger operating cash returns on sales and cumulative abnormal returns than do acquisitions in bankruptcy.

III. Sample Selection and Data Analysis

i. Sample selection

We utilize two sources of data to obtain a sample of U.S. non-utility/non-financial firms[103] that filed for Chapter 11 reorganization and emerged from bankruptcy during the period of January 1992 through December 2013: *Thompson Financial Services SDC Platinum* database and *The UCLA-LoPucki Bankruptcy Research Database* (BRD).[104] The two data sources combined consist of 4,086 firms filing for reorganization during this period. Next, we combine firms from the two databases and remove duplicates. We search for firms' identifiers such as CUSIP, TICKER, and PERMNO on the *Center for Research in Security Prices* (CRSP) and eliminate those firms whose identifiers are either missing or inaccurate. This reduces our sample to 1,381 firms.[105] We further revise the sample by retaining the firms that were acquired while in reorganization or one year following their emergence. Our sample consists of 428 firms with 483 acquisition announcements[106] and effective dates classified as follows: (1) 58 acquisition announcements preceding bankruptcy announcements with

[103] Financial and utility firms operate in a highly regulated environment with often very different reporting standards. Including these firms would impair our ability to accurately compare sample firms' characteristics and performance.
[104] For more information refer to http://lopucki.law.ucla.edu/.
[105] It is possible that most of the excluded firms are either private or have never been on CRSP.
[106] Several firms in our sample had multiple acquirers in the same transaction with different announcement dates.

effective dates either during bankruptcy or following the emergence, (2) 335 acquisition announcements while in bankruptcy with effective dates either during Chapter 11 proceedings or following the emergence, and (3) 90 acquisition announcements and effective dates within one year following emergence from bankruptcy.

[Insert Table 1 here]

In Table 1, Panel A, we describe the sample of 428 firms that were acquired from the time they file for Chapter 11 until one year following emergence from bankruptcy proceedings. About 12 percent of our sample has acquisition announcement dates preceding bankruptcy filings. Firms usually start experiencing financial difficulties long before petitioning for reorganization or liquidation in the Federal Court by filing Chapter 11 or Chapter 7, respectively, (Altman (1968), Aharony, Jones, and Swary (1980), Clark and Weinstein (1983), Campbell et al. (2008)) and investors continue to suffer losses up to the time of filing (Clark and Weinstein (1983)). Consequently, most bankruptcy filings are not surprises in that most firms suffer from the throes of financial and/or operating distress for some time before the filings; many are rumored to be contemplating this drastic action well before the actual physical filing. In cases when acquisition announcements come shortly before Chapter 11 filings, the targets may have made a last attempt at reorganizing outside of bankruptcy and if the attempt[107] has failed they petition for Chapter 11 protection. In cases when acquisition announcements follow emergence from bankruptcy (19 percent of our sample), the reorganized firms may have failed to return to the state of going concern and instead of reentering bankruptcy considered acquisition. The bidders in this case may have timed their acquisition and have waited for the firms to emerge from Chapter 11 with less debt and more favorable capital structure. It is also possible that, according to the hubris

[107] For instance, necessary creditors' consent was not achieved, or management was not fully onboard with acquisition as a method of reorganization, or perhaps the acquirer was not willing to accept all targets' liabilities. While in Chapter 11 bankruptcy court can use "cram-down" provision to enforce reorganization via acquisition so long as the plan does not discriminate unfairly and is equitable with respect to each class of claims.

hypothesis (Roll (1986)), the bidders are overly confident in their accuracy of the target firms' valuations. The majority of our sample firms however have acquisition announcements during Chapter 11 proceedings (almost 70 percent of the announcements).

In Table 1, Panel B, we report 38 percent of the sample firms are acquired by creditors and 30 percent by investors. To compare these statistics and later to determine importance of acquisition timing, we create a group of control firms as follows. We first determine all other firms that are not already part of our sample and were acquired between January 1992 and December 2013. We then calculate Altman z-score[108] in the year preceding acquisition announcement date for each of these firms and retain those with the z-score of less than 1.81, where 1.81 is the highest point of distress zone with probability of filing for bankruptcy within two years is very high.[109] We match the distressed firms with the firms in the sample based on the two-digit Securities Data Corporation (SIC) codes, acquisition announcement date, and size measured by market capitalization. Our initial match based on two-digit SIC codes and acquisition announcement dates result in one bankrupt firm being matched to several distressed firms. We then pick a single matched distressed firm closest in market capitalization to the bankrupt firm. Our one-to-one match yields a total of 306 control firms.[110] Creditors acquire only 4 percent of distressed firms and almost ten times as many bankrupt firms (38 percent of bankrupt firms are acquired by creditors or bondholders). Operating companies acquire more distressed (60 percent) than bankrupt firms (32 percent);

[108] Altman's z-score, bankruptcy-risk proxy (Altman (1968)), is defined as 3.3x((pretax income + interest expense)/total assets) + 0.999x(sales/total assets) + 0.6x(market capitalization/total liabilities) + 1.2x(working capital/total assets) + 1.4(retained earnings/total assets).

[109] To evaluate distribution of z-scores for both sample and control firms and to ensure that this distribution does not create a bias in our analysis, we partition both groups of firms on quartiles and analyze minimum and maximum values in the lowest and the highest quartiles, respectively. We find that although the minimum values in the lowest z-score quartile are identical for bankrupt and distressed firms (-29.28 and -33.95, respectively), there are 13 bankrupt firms (out of 345 firms for which we calculate z-score) in the highest quartile with the z-scores exceeding 1.8 (four of these firms have z-scores of 3 or higher). By including these few non-distressed bankrupt firms in our sample we potentially biasing our results upwards when comparing characteristics and performance of bankrupt and distressed firms.

[110] Several sample firms are matched to the same control firm. In order to avoid comparing different sample firms to the same control firms, we eliminate these duplicates from our analysis.

however the percentage of acquisitions within the same industry (as measured by the two-digit SIC code) are nearly identical for the two groups of firms (66 percent for distressed and 60 percent for bankrupt firms).[111] Acquirers operating in the same industry as the target are more likely to find the best use of the target's assets and benefit from consolidation of the operations. Buyers also gain a greater post-acquisition ownership percentage[112] of the bankrupt targets (85 percent with 33 percent of bidders acquiring less than 100 percent of targets' assets) than they do of distressed firms (67 percent with 48 percent of bidders acquiring less than 100 percent of targets' assets). The average value of the transaction[113] is also higher for bankrupt firms than for distressed firms ($440 million vs. $202 million).

ii. Financial and operating characteristics of sample and control targets and their acquirers

We compare characteristics of the firms in the sample by splitting them into three sub-samples—one with announcements during Chapter 11 proceedings, another one with announcements before bankruptcy filings, and the third one with announcements during the year after emergence from bankruptcy.

[Insert Table 2 here]

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[111] These results are similar to those of Clark and Ofek (1994) and Hotchkiss and Mooradian (1998) who find that acquirers of distressed firms are frequently in the same industry.

[112] Per SDC, "Percent Owned by Acquirer Post Merger: The percentage of a company held by the acquirer upon completion of a merger. This data item will be populated if the merger results in the formation of a new company and the percentages held by former target and acquirer shareholders have been disclosed, or in reverse takeovers. In reverse takeovers, if the post merger percentage owned is not disclosed, Thomson Financial will calculate the percentage if the number of shares issued and current number of shares outstanding is available in public disclosure."

[113] Per SDC, "Value of Transaction ($ mil): Total value of consideration paid by the acquirer, excluding fees and expenses. The dollar value includes the amount paid for all common stock, common stock equivalents, preferred stock, debt, options, assets, warrants, and stake purchases made within six months of the announcement date of the transaction. Liabilities assumed are included in the value if they are publicly disclosed. Preferred stock is only included if it is being acquired as part of a 100% acquisition. If a portion of the consideration paid by the acquiror is common stock, the stock is valued using the closing price on the last full trading day prior to the announcement of the terms of the stock swap. If the exchange ratio of shares offered changes, the stock is valued based on its closing price on the last full trading date prior to the date of the exchange ratio change. For public target 100% acquisitions, the number of shares at date of announcement (CACT) is used."

In Table 2, we report characteristics of sample firms categorized by acquisition announcement timing relative to bankruptcy filings. We utilize COMPUSTAT to obtain financial reporting data. Group 1 contains firms with acquisition announcements before Chapter 11 filings, Group 2 contains firms with acquisition announcements either on the day of bankruptcy filings or while in bankruptcy, and Group 3 includes firms with the announcements either on the day of emergence from bankruptcy or during the first year following emergence. All variables for sample firms are measured as of one year preceding bankruptcy filings.[114] We also provide statistical significance tests for differences between means (two-tailed t-test) and medians (Wilcoxon-Mann-Whitney test) reported in the panels at conventional levels of 1, 5, and 10 percent indicated by a, b, and c, respectively. Group 1 contains difference significance indicators when comparing means and medians for firms with acquisition announcements before the filings (Group 1) to those for firms with the announcements while in bankruptcy (Group2); Group 2 contains the indicators when comparing firms with acquisition announcements in bankruptcy (Groups 2) to firms with acquisition announcements following emergence (Group 3); and Group 3 contains the indicators when comparing means and medians for firms with the announcements following emergence (Group 3) to those for firms with the announcements preceding bankruptcy filing (Group 1).

From Table 2 we find no significant differences between means and medians of the variables reported in the panel for firms with acquisition announcements outside of bankruptcy (Groups 1 and 3). Hence, firms in these two groups are qualitatively similar.

[114] To stay consistent, for bankrupt firms we choose to measure variables as of one year prior to bankruptcy filings. Mean (median) number of days between acquisition announcement and bankruptcy filing for the firms with the announcements following the filings is 213 (109). Mean (median) number of days between acquisition announcement and bankruptcy filing for the firms with the announcements preceding the filings is 82 (45). Mean (median) number of days between acquisition announcement and emergence from bankruptcy for the firms with the announcements following the emergence is 144 (133) and mean (median) number of days between acquisition announcements and bankruptcy filings for the same firms is 593 (498).

Firms with the announcements while in bankruptcy (Group 2) are significantly smaller as measured by mean and median total assets and median sales, less distressed as measured by median z-score, and have worse operating cash flow returns on assets and sales than the firms with the announcements outside of bankruptcy (Groups 1 and 3).

Because we have three types of acquirers—operating companies, creditors, and investors[115]—we also provide analysis of bankrupt and distressed firms based on acquirer type. As in Table 2, we report descriptive statistics for the sample firms as of one year preceding bankruptcy filings. For control firms, the same statistics are reported as of one year preceding acquisition announcements. In addition, we report statistical significance tests for differences between means (two-tailed t-test) and medians (Wilcoxon-Mann-Whitney test) of variables reported in the table. We compare means and medians for all bankrupt and all distressed firms, for bankrupt and distressed firms acquired by investors, for bankrupt and distressed firms acquired by creditors, and for bankrupt and distressed firms acquired by other operating companies.

[Insert Table 3 here]

In Table 3 we compare firms acquired in Chapter 11 to acquired distressed firms. In Panel A we provide pre-bankruptcy/pre-announcement financial data for sample and control firms. The sample firms are significantly different from control firms on many reported measures. Although, financial condition and operating performance are poor for both groups of firms, surprisingly, distressed firms significantly underperform bankrupt firms as shown by differences in means of performance related variables such as operating cash flow returns and profit margin. However, median ROA and profit margin are lower for acquired bankrupt firms than for acquired distressed firms. Bankrupt firms are more levered, and have greater assets and sales and lower market capitalization and market-to-book ratio than

[115] Based on acquirers' business description, these firms are primarily investment firms, investment holding companies, and private equity funds.

distressed firms. Bankrupt firms acquired by investors also have greater median assets and sales, lower marker capitalization, and better cash flow returns on assets and ROA than do investor acquired distressed firms. Bankrupt firms acquired by creditors are more levered and better performing as measured by medians of debt ratio, profit margin, and ROA, than distressed firms acquired by creditors.[116] Similarly, operating company acquired bankrupt firms are larger than their distressed counterparts (as measured by medians of assets and sales), have lower market capitalization and market-to-book ratio, greater leverage, and better mean cash flow returns on sales. These firms however have lower median profit margin and mean and median ROA than do distressed firms acquired by other operating companies. None of the differences between Altman z-scores are statistically significant. Contrary to our expectation distressed firms' pre-acquisition operating performance is generally worse than that of bankrupt firms.[117] They are smaller and less levered than their bankrupt counterparts.

In Panel B of Table 3 we present CEO turnover and officers and directors' stock ownership. We utilize COMPUSTAT's Execucomp and Thomson Reuters' Insider Data to gather management turnover and investment data available for bankrupt and distressed firms.[118] The variable "CEO replaced through bankruptcy filing" indicates whether the CEO in office during the two years prior to filing is still in office at the time of filing. We subtract 730 days from the filing data and determine whether or not firms have the same CEOs during this two-year period. CEO turnover we report in Panel B is 44 percent, slightly lower than the levels found in previous studies of distressed firms.[119] The variable "CEO replaced through acquisition" indicates whether the CEO in office during the two years prior to acquisition date

[116] As we already report in Table 1, creditors acquire many more bankrupt than distressed firms.
[117] As discussed earlier the paper, we have 13 bankrupt firms in our sample with z-scores of above 1.8. To verify robustness of our data we remove these firms from our analysis and re-calculate means and medians for the performance related variables. The statistics we obtain are identical to those reported in Table 3, Panel A.
[118] The sources used to gather the data do not have comprehensive coverage of the variables reported in Panel B of Table 3. In addition, COMPUSTAT's Execucomp only provides data on the top officers for the S&P 1500 Index active, inactive, current, and previous members.
[119] About 50-51% of CEOs are replaced by the time of bankruptcy filing (Betker (1994), Hotchkiss and Mooradian (1998)).

is still in office at the time of announcement. We find that fewer distressed firms' CEOs are replaced as a result of acquisition than CEOs of bankrupt firms.[120] Interestingly, this percentage is higher for distressed firms acquired by another operating firm (34 percent) than it is for bankrupt firms acquired by another operating firm (27 percent). It appears that CEOs in these distressed firms who have been with the company for less than two years are more likely to consider merger as a method of reorganization. Firms with higher CEO turnover during two years prior to acquisition by creditors and investors are less likely to reorganize via M&A outside of bankruptcy (mean CEO turnovers for bankrupt firms acquired by creditors and investors are 45 and 30 percents, respectively, and mean CEO turnovers for distressed firms in the same acquirer type categories are only 7 and 11 percent, respectively). The level of officers and directors' stockholdings is similar between bankrupt and distressed firms, suggesting officers and directors are no more or less invested in the firms for the acquired distressed firms than for acquired bankrupt firms. However, officers and directors' ownership is significantly larger for bankrupt than distressed firms acquired by creditors. Median percentage of CEO holdings is higher for bankrupt firms than for distressed firms, with the firms acquired by creditors and other operating companies contributing the most to this difference. Similar to CEO turnover for firms acquired by investors and creditors, firms with a higher CEO ownership are less likely to merge with another operating firm or to be acquired by creditor outside of Chapter 11.

Next, we provide summary of characteristics of the acquirers. We evaluate available financial and market data for the acquirers that are publicly traded operating firms. In Table 4 we report acquirers' characteristics one year prior to acquisition announcements. In the table, we provide available data for publically traded operating firm acquirers.

[Insert Table 4 here]

[120] However, CEO turnover percentages due to acquisition are possibly inflated for bankrupt firms with bankruptcy filings preceding acquisition announcements because these percentages may measure effects of the filings and not of the announcements on the CEO replacement.

As shown in Table 4, both groups of operating firms, those acquiring bankrupt firms and those acquiring distressed firms outside of Chapter 11, are larger, less levered, less distressed and better performing than the firms they acquire. Negative mean values of the firms' performance related measurements are due to the fact that majority of the acquirers (60 percent for bankrupt firms and 66 percent for distressed firms, as reported in Table 1) are operating in the same industry and likely experiencing similar difficulties as their less fortunate counterparts. When comparing two groups of acquirers in Table 4 we find that mean assets, sales, and market values are significantly greater for firms acquiring distressed firms than for acquirers of bankrupt firms. We also observe that the acquirers of distressed firms have significantly lower probability of becoming bankrupt (with mean (median) z-score of 3.38 (2.29)) than do the acquirers of bankrupt firms (with mean (median) z-score of only 0.56 (1.82)). The two groups of acquirers are identical from profitability perspective.

iii. Analysis of merger transactions

Table 5 provides a detailed description of acquisition types, methods of financing, firm and deal valuations, and discounts and premiums. We report characteristics of the acquisitions for both bankrupt and distressed firms and categorize them based on type of acquirer.

[Insert Table 5 here]

In Panel A of Table 5 we report transaction types, number and percentage of targets with multiple bidders and investments from the government. We obtained these data from Thompson Financial Services SDC Platinum Database. Not surprisingly, for 63 percent of bankrupt firms and 54 percent of distressed firms transaction type is "Acquisition".[121] However, 53 percent of distressed firms merge with (rather than acquired by) other operating

[121] Often the two terms "merger" and "acquisition" are used interchangeably. However, from the legal point of view there is a clear distinction between the two types of transactions: merger is a consolidation of two companies into one entity (combination of two "equals"), and acquisition is a transaction where one firm takes over another firm and establishes itself as the controlling entity. See McBride (1996) also provides information on the law with respect to acquisitions in Chapter 11.

companies. Hotchkiss and Mooradian (1998) analyze firms acquired in Chapter 11 which filed for reorganization between October 1979 and December 1992 and find multiple bidders for almost 33 percent of their bankrupt targets. We however observe only 3 percent of targets with multiple bidders for both sample and control firms. This percentage is slightly higher for distressed and bankrupt firms acquired by other operating companies (7 percent for bankrupt and 4 percent for distressed firms). In addition, 3 percent of acquired distressed firms have government ownership as opposed to 1 percent of bankrupt firms. All bankrupt firms with government owned involvement are acquired by creditors or investors and nearly all distressed firms with government ownership are acquired by other operating firms.

There are several different ways to finance acquisition of a target. Buyers, for instance, may use all cash, all securities, or a combination of cash and securities. In Panel B we list financing methods used by acquirers to complete the transaction.[122] We report most commonly used financing methods and find that fewer bankrupt firm acquirers utilize these methods than do distressed firm acquirers. For instance, only 7 purchases of bankrupt targets (or 2 percent) are financed with stock, and 1 percent with either debt securities, internal corporate funds, or via borrowing. Acquirers of 42 distressed firms (or 14 percent) utilize internal corporate funds and acquirers of 27 distressed firms (or 9 percent) borrow money to complete the acquisitions. In total, 69 distressed firms (or 23 percent) are acquired for cash.

In Panel C of Table 5 we report available statistics on firm and deal valuations at the time of acquisitions. Deal value and firm market and book values are greater for bankrupt firms than for distressed firms. However, when analyzing these values for each sample and control subcategories we observe that mean and median deal and firm values of the distressed and bankrupt firms acquired by another operating company are identical.

[122] SDC does not provide data on mixed methods of financing, for example, cash and stock or cash and debt. Although we assume that the remaining percentages belong to mixed sources of financing, we do not report them in the table.

In Panel C we also report that relative to distressed firms, both means and medians of deal and enterprise values as multiples of either sales or book value of total assets are lower for bankrupt targets. In addition, mean (median) deal value divided by common equity and mean (median) offer price divided by book value are 2.0 (1.1) and 1.7 (1.0), respectively, for bankrupt firms and 5.7 (2.1) and 4.9 (1.8), respectively, for distressed firms. These differences remain when comparing bankrupt and distressed firms categorized based on acquirer type.[123] In summary, enterprise and deal value multiples are higher for distressed than for bankrupt firms, suggesting greater valuation of distressed firms and possibly their ability to secure better acquisition prices than bankrupt firms.

As part of our analysis we evaluate whether or not distressed firms negotiate better prices than do firms merging in bankruptcy. This is also important in determining whether timing of acquisitions plays an important role. Jensen (1986b) analyzes the premium paid relative to the pre-offer share price of the target. However, this measure is not meaningful for transactions involving bankrupt and distressed targets. Bankrupt target shareholders, for instance, receive little or no distribution as the result of the transaction. In addition, the common stock of many distressed and bankrupt targets ceases trading. For our purposes of determining premiums and/or discounts that acquirers pay for bankrupt and distressed firms' assets we utilize a modified methodology of Hotchkiss and Mooradian (1998). They find that the price paid for the assets of the struggling firms relative to a benchmark is a more useful measure. First, we select the benchmark to compare the price paid for the sample and control firms to all other acquisitions in the same industry[124] reported by SDC within one year[125] of the sample transaction. The price paid for a target is defined as transaction price (total value

[123] Due to the small subsample size for distressed firms acquired by creditors, two tailed t-test and Wilcoxon-Mann-Whitney test failed to identify apparent differences between the means and the medians as statically significant.
[124] As in Hotchkiss and Mooradian (1998), we base our analysis on the three-digit SIC code.
[125] The period includes one year prior to, day of, and one year following the sample and control transactions.

of consideration paid by the acquirer, excluding fees and expenses) plus all liabilities assumed by the acquirer (the price paid is equal to the enterprise value). We then calculate industry median price paid as a multiple of sales or total assets for the benchmark firms. This multiple times the bankrupt or distressed target's sales or total assets yields the price that would have been paid for the bankrupt or distressed firm if it had been valued similarly to all other firms in the industry. Transaction premium (+) or discount (-) is the percentage difference between the actual price paid for the target and the "industry benchmark price." We use the following formula to calculate transaction premiums and discounts.

$$EV_b = S_t * \frac{EV_b}{S_b} \text{ or } EV_b = AT_t * \frac{EV_b}{AT_b}$$

$$Premium(+)/Discount(-) = \frac{EV_t - EV_b}{EV_b}$$

where EV_t and EV_b are enterprise values of target and benchmark, respectively; S_t and $S_b$are sales of target and benchmark, respectively; and $AT_t$and $AT_b$are total assets of target and benchmark, respectively.

In Table 5, Panel D, we demonstrate that relative to the industry benchmark, acquirers pay substantially lower multiples of sales and book value for bankrupt firms than they do for distressed firms. Regardless of the benchmark multiple used, bankrupt targets are purchased at a deep discount: -29 percent when measuring against industry's median of enterprise value divided by sales and -37 percent when measuring against industry's median of enterprise value divided by total assets. These discounts are the highest for the bankrupt firms acquired by other operating companies and the lowest for the bankrupt firms acquired by creditors. Creditors acquire bankrupt firms at a -19 percent discount when measuring against industry's median of enterprise value divided by sales and at a -28 percent discount when measuring

against industry's median of enterprise value divided by total assets, indicating that these transactions are more likely involuntary conversions of firms' debt to equity.[126]

Distressed firms are sold at a premium or at a discount smaller than that of bankrupt firms. Median discounts when using benchmark enterprise values relative to sales and total assets are -12 and -20 percent, respectively. Although medians of these values are negative, indicating discounted sales, they are greater than those for bankrupt targets (hence, sales are less discounted). Similarly, three subgroups of distressed firms are sold at a discount (as measured by the median values) significantly smaller than that secured by bankrupt firms in the respective subcategory. In addition, creditors acquiring distressed firms pay the lowest price for the eleven targets in the sub-sample (-45 and -39 percent acquisition discounts when measuring against industry's median of enterprise value divided by sales and assets, respectively), suggesting that these acquisitions are very different from those of bankrupt firms, where creditors may be forced to accept less favorable acquisition terms in order to avoid 100% loss on their investments. The differences in sale terms between bankrupt and distressed firms lead us to believe that time plays an important role in securing a better price for target's assets: the sooner the firms are acquired (while in distress and not bankruptcy), the better price they can get for their assets or the worse off the target. Bankrupt firms may not have as much leverage in negotiating better deal terms with the bidders once they enter Chapter 11 and may benefit from reorganizing via M&A prior to entering Chapter 11. Another reason why bankrupt firms' assets are sold at a discount may be acquirers' inability to pay a premium for the firms' assets or consider purchasing firms other than those sold at a bargain price. As we observe from Table 4, the operating firm acquirers of bankrupt firms are smaller and have significantly lower z-scores (mean of 0.56, well below 1.81, the threshold of

[126] For median discount of -19 percent, 58 percent of the firms are acquired at a discount and for median discount of -28 percent, 67 percent of the acquisitions are at a discount.

high probability of failure, and median of 1.82) than do acquirers of distressed firms (mean of 3.38 and median of 2.29).

iv. Market reaction to acquisition announcements

We now turn to analyzing the market reaction to announcements of acquisitions of bankrupt and distressed firms. Day 0 is the day of acquisition announcement. We present market adjusted and cumulative market adjusted returns and abnormal trading volumes for days -10 through +10 surrounding the announcement day. Market adjusted returns are defined as security returns adjusted for the NYSE/Amex/NASDAQ equally-weighted returns including dividends. Brown and Warner (1985) describe "market adjusted returns" (p. 7) as one of the methods and models of the return-generating process. We use equally-weighted returns instead of value-weighted returns in calculations of market adjusted returns because equal weighting captures the extent of underperformance better than value weighting does and this is important given particular nature of bankrupt equity (Gilson (1995), Brav et al (2000), Kadiyala and Rau (2004)). In addition, Brav et al (2000) argue that because small stocks are likely to be mispriced more than large stocks, then the magnitude of mispricing consideration alone implies the use of equal weighting. We utilize CRSP to gather market related data. We expect to observe a more favorable market reaction to acquisition announcements of distressed than bankrupt firms. In case of acquisitions of bankrupt firms there is an increased possibility of the demise of existing shareholdings or their more massive dilution than distressed firms' shareholders face.

To determine abnormal trading volumes we utilize volume event study (Sanders and Zdanowicz (1992), Meulbroek (1992)). Trading volume data are highly non-normal (Ajinkya and Jain (1989)). To address the issue of non-normal distribution we use the following transformed volume variable to perform volume event study:

$$V_{i,t} = Ln(1 + v_{i,t})$$

where $v_{i,t}$ is raw trading volume of firm *i* at time *t*. Trading volume data also exhibit significant positive serial correlation (Ajinkya and Jain (1989), Sanders and Zdanowicz (1992), Meulbroek (1992)). We adjust for positive serial correlation by utilizing lagged firm trading volume to the model. Finally, there are day-of-the-week patterns in volume (Mulherin and Gerety (1991), Meulbroek (1992)). To account for day-of-the-week effect in volume data we include day-of-the-week dummies in our model. In our volume event study we use an OLS regression of the following form to analyze relationship between trading volumes over the two periods: one period begins on 250th day before the announcement date and ends on 30th day before the announcement date and the other period begins on 10th day before acquisition announcement date and ends on 10th days after the announcement date. The first period is the estimation period reflecting expected trading volumes and the second period includes trading volumes around the event date:

$$\Delta V_{i,t} = \alpha + \beta_i \Delta V_{i,t-1} + \sum_{j=1}^{4} \theta_j Day_{i,t} + \varepsilon_{i,t}$$

where $\Delta V_{i,t}$ is a natural logarithm transformed trading volume of firm *i* at time *t*, $\Delta V_{i,t-1}$ is lagged transformed trading volume of firms *i* at time *t-1*, and $Day_{i,t}$ is day-of-the-week indicator dummy variables for Monday through Thursday, and $\varepsilon_{i,t}$ is a residual term. In addition

$\Delta V_{i,t} = V_{i,t} - V_{i,t-1}$ over the interval (-250, -30)

We use coefficients from the above estimation equation in the calculation of abnormal transformed trading volumes. We calculate daily abnormal trading volume $AV_{i,t}$ in relation to the estimated expected volume for each trading day in the interval beginning 10 trading days before the announcement date and ending 10 trading days after the announcement date as follows. We then determine and report changes (in multiples) between $AV_{i,t}$ and $\Delta V_{i,t}$:

$$AV_{i,t} = V_{i,t} - \widehat{\alpha_i} - \widehat{\beta_i} V_{i,t-1} - \sum_{j=1}^{4} \widehat{\theta_j} Day_{i,t}$$

[Insert Table 6 here]

In Panel A of Table 6 we present abnormal returns and volume analysis. The volume analysis consists of the difference between natural log transformed volumes during the event period and the estimated expected trading volumes for all bankrupt targets and their publically traded operating firm acquirers. Daily and cumulative abnormal returns are statistically insignificant for both targets and acquirers on most of the days prior to the announcements. Bankrupt targets' mean CMAR is -1.86 percent and not statistically significant for the pre-announcement period t-10 through t-1. Bankrupt firm acquirers' CMAR for the same pre-announcement period is 2.54 percent, which is also not statistically significant. This indicates that there is little or no information leakage prior to bankrupt firms' M&A being formally announced. On the day of acquisition announcement, bankrupt targets' mean daily abnormal return is -8.5 percent and it is 3.85 percent for their acquirers, both statistically significant. The two-day mean abnormal returns are -9.6 (significant at a ten percent level) and 5.1 (significant at a five percent level) for bankrupt targets and acquirers, respectively. The daily mean abnormal returns are negative for the bankrupt targets three days following the announcement, with mean abnormal return of -3.5 percent on day t+2 being statistically significant at a 5 percent conventional level. Post-announcement CMARs (for days t+2 to t+10) are not statistically significant for bankrupt targets and their acquirers.

Abnormal trading volumes for bankrupt targets are statistically significant on most of the days, and the highest on the day of the announcement and on the following day. Trading volumes are approximately 9 times the estimate of expected volume, which depends on sensitivity of the prior day's log transformed volume and the day of the week, for bankrupt targets on days t=0 and t+1. These abnormal volumes are not statistically significant for

bankrupt targets' acquirers for most of the pre-announcement days. Acquirers' abnormal trading volumes are positive and statistically significant on days t=0 and t+1, perhaps in response to the merger announcements and their share volumes are 95 and 56 percent higher on days t=0 and t+1, respectively, than estimated expected volumes.

In Table 6, Panel B, we describe results of the analysis of market reaction to acquisition announcements for distressed firms and their acquirers. We observe a very different market reaction for distressed as opposed to bankrupt targets. Distressed targets and their acquirers' pre-announcement abnormal returns are positive and statistically significant starting on days -4 and -1, respectively, perhaps due to merger rumors, positive news announcements, and/or insider trading.[127] The pre-announcement CMARs for targets and their acquirers (for period from t-10 to t-1) are 1.85 percent (statistically significant at a 10 percent level) and -0.42 (not statistically significant), respectively. Market participants possibly anticipate resolution of distress through acquisitions and react positively to announcements of the transactions: daily abnormal returns are positive and statistically significant for distressed targets starting several days prior to the announcements. Distressed targets' mean abnormal return on the day of the announcement is economically and statistically significant 12 percent; their acquirers' mean daily abnormal return is 2.7 percent on the day of the announcement. The two-day mean abnormal return (time window 0, 1) is 18.8 percent (significant at a one percent level) for distressed targets and 2.9 percent (significant at a five percent level) for their acquirers. On day t+3 mean abnormal daily returns are 0.69 and -0.73 for distressed targets and their acquirers, respectively, which are statistically significant at a five percent level; these returns are not significant on day t+2 for either targets or acquirers. Post-announcement CMARs for distressed targets and their acquirers are not statistically significant for the time period (+2, +10).

[127] Keown and Pinkerton(1981) find that market reaction to intended mergers begins prior to the public announcement of the merger. They observe trading on this non-public (insider) information as early as 12 trading days prior to the announcement.

As in the case of bankrupt firms and their acquirers, abnormal trading share volumes of distressed firms and their acquirers are the highest on announcement day and they are higher for targets than they are for acquirers. The higher trading volumes for the targets compared to that for their acquirers are possibly due to the targets usually being much smaller than acquirers; therefore, the announcements have a much more material impact for targets' shareholders than they do for acquirers' shareholders. During the pre-announcement period abnormal trading volumes for distressed targets are on average 35 percent higher than the estimated expected trading volume. On the day of the announcement their trading volume is more than 8 times the amount of estimated expected volume, and on the following day it is 9 times the expected volume. For the acquirers', trading volume is almost twice the estimated expected level on days t=0 and t+1.

In summary, abnormal trading volumes are much higher for bankrupt and distressed targets than for their acquirers. Share prices change in response to trading behavior, which depends on the news and its evaluation by the investors. For bankrupt targets we observe a massive sell-off, perhaps in anticipation of demise of the existing shareholdings and/or their dilution, which drives the firms' share price down. Investors acquire shares of distressed targets, possibly in anticipation of distress resolution and future gains, driving the price up.

[Insert Figures 2a and 2b here]

On Figures 2a and b we pictorially present results from Table 6, Panels A and B, for easier interpretation of the analysis. On Figure 2a we plot CMARs and on Figure 2b we plot abnormal trading volumes during 21 days surrounding day of acquisition announcement for bankrupt and distressed targets and their acquirers. Day 0 is the day of acquisition announcement. From Figure 2a we observe a steep decline in CMARs of bankrupt targets and increase in CMARs of distressed targets on day t=0, while changes in CMARS are smaller for bankrupt and distressed firm acquirers on that day. From Figure 2b we observe more significant changes in trading volumes for targets than for acquirers on days t=0 and t+1.

a. Announcement abnormal returns of bankrupt firms categorized by the timing of acquisition announcements relative to bankruptcy filings

Previously in Table 6 we observed positive market reaction to acquisition announcements of distressed firms and negative reaction to acquisition announcements of bankrupt targets. In Table 5 we also found that firm and deal valuation multiples are higher for distressed firms than for bankrupt firms. Finally, we observed that distressed firms sell their assets at a premium while their bankrupt counterparts sell them at a discount. Based on these results we continue to believe that whether the firms are acquired in or outside of bankruptcy matters when it comes to choosing acquisition as a method of reorganization.

However, negative market reaction to the acquisition announcements of bankrupt firms might be due to the timing of these announcements, especially if they take place on the day of bankruptcy filings. That said, to strengthen our evaluation of market reaction to the announcements of bankrupt firms' acquisitions we further analyze the abnormal returns by categorizing our sample firms based on the timing of acquisition announcements in relation to bankruptcy filings and emergence.

[Insert Table 7 here]

In Table 7 we report mean daily market adjusted returns and CMAR for four groups of bankrupt targets, categorized by the timing of acquisition announcements in relation to bankruptcy filings. Firms in the first group have acquisition announcements before Chapter 11 filings,[128] firms in the second group have announcements on the date of the filings, firms in the third group have announcements while in bankruptcy, and firms in the last group have announcements during one year following emergence.

[128] We have searched LexisNexis Academic for the official acquisition announcements and news articles around the same time for the 26 firms with the announcements preceding bankruptcy filings to see if there were any statements made regarding the upcoming bankruptcy filings. Although the stock market may have anticipated the filings, the firms have not made information about the bankruptcy filings official until the actual filings.

Pre-announcement MARs and CMARs for the group of firms with acquisition announcements before Chapter 11 filings are not significant. Market reaction to the acquisition announcements of these firms is negative, perhaps in anticipation of bankruptcy filings (the mean market adjusted return on the announcement day for these firms is an economically material -14.5 percent; the mean abnormal returns are 3.16 percent and -4.35 percent on days t+1 and t+2, respectively). Considering the effect of acquisition announcements made after the market close, the two-day (days t=0 and t+1) mean abnormal return for the firms in the first group is -11 percent. Post-announcement mean daily MARs and CMARs are not statistically significant for the firms with the announcements preceding bankruptcy filings.

For the firms with acquisition announcements on the day of the filing pre-announcement MARs and CMARs are negative and statistically significant starting on day t-3. CMAR for the time period from t-10 through t-3 is -12.75 percent and statistically significant at a ten percent level, and it declines to -13.93 percent during the pre-announcement period from t-10 through t-1, which is also significant at a five percent level. Not surprisingly, on the announcement date the mean daily market adjusted return for bankrupt firms with the same acquisition announcement and bankruptcy filing dates are the most negative (approximately -30 percent). The two-day mean abnormal return is -40 percent and on day t+2 it is -17 percent for this group of firms. Post-announcement CMARs are negative and statistically significant for the firms with the same announcement and filing dates.

On day t-5, pre-announcement MAR for the group of firms with acquisition announcements while in bankruptcy is -2.16 percent and statistically significant at a ten percent level. Their CMAR is -7.06 for the pre-announcement period t-10 through t-4, and also statistically significant at a ten percent level. Although day t=0's mean abnormal return is also negative for the group of bankrupt firms with acquisition announcements while in reorganization (-3.12 percent), it is not statistically significant. The two-day announcement

period CMAR for these firms is -2.6 percent, which is also not significant. For the firms with acquisition announcements while in reorganization post-announcement CMAR (for the time period from t+2 through t+10) is not significant.

Finally, we observe positive pre-announcement run-up for the firms with acquisition announcements during the year following emergence from Chapter 11. Mean MAR on days t-2 is 3.19 percent, which is statistically significant at a five percent level. Mean CMAR is approximately 10 percent and statistically significant at a five percent level for the pre-announcement period from t-10 through t-1. The two-day CMAR (for days t=0 and t+1) is approximately 12 percent, which is economically material and statistically significant at a ten percent level for the firms with the announcements during the year following emergence from bankruptcy. Post-announcement CMAR (for the period from t+2 through t+10) for these firms is not different from zero.

In summary, for the first three groups of firms we observe negative abnormal returns: mean abnormal returns are negative and statistically significant on the announcement day for the first two groups with the mean daily and cumulative abnormal returns for the second group of firms being the lowest. Although negative, cumulative abnormal returns for the group of firms with acquisition announcements while in bankruptcy are not statistically significant. Based on the analysis of timing of acquisition announcements in relation to bankruptcy announcements we find that bankruptcy (or anticipation of it) leads to a negative market reaction to otherwise good news of the firms being acquired. From examining daily mean abnormal returns we observe three vastly different responses to acquisition announcements—significantly negative, negative, and positive. For easier interpretation of changes in the abnormal returns we plot CMARs from Table 7.

[Insert Figures 3]

From the figure we observe that as the firms move closer to the announcement date, their CMARs become more visibly different, suggesting that market reaction to acquisition

announcements depends on the timing of bankruptcy filings. We find that CMARs for firms with the announcements at the time of filings are the most negative and CMARs for firms with the announcements in the first year of emergence are positive. Post-acquisition CMARs for the firms with announcements before filing and while in bankruptcy do not seem to change as much as for the firms with announcement either at the time of Chapter 11 filing or after emergence from bankruptcy. These CMAR results once again confirm that we have three vastly different responses—extremely negative, somewhat negative, and positive.

v. Post-acquisition performance

To measure post-acquisition performance we use pretax operating cash flow returns. Operating cash flows are earnings before interest, taxes, and depreciation and amortization (EBITDA). To provide measures comparable across sample and control firms we deflate EBITDA by sales. When using operating cash flows to measure firm performance some researchers scale EBITDA by assets to obtain cash flow returns on assets. Return on sales however is not affected by differences in accounting treatment across transactions and differences in the degree of asset writedowns, which can be substantial for distressed and bankrupt firms. The operating cash flow ratios are calculated as the sums of target and acquirer's EBITDA divided by the sums of target and acquirer's sales revenues for three years before the acquisition. After the acquisition, we use the acquirers' operating cash flow ratios. We analyze operating cash flow ratios only for those bankrupt and distressed firms acquired by another operating firm for which accounting data is available.

[Insert Table 8 here]

In Table 8, Panel A, we report median levels of bankrupt and distressed firms' operating cash flow ratios from three years before the effective date of acquisition to three years after the effective day of acquisition. For the firms acquired in Chapter 11 or during the first year following their emergence, the combined target and acquirer's cash flow returns increase from year -3 to year -2 and then in year -1 fall back almost to the same level as in

year -3. Bankrupt firms' post-merger operating cash flow returns improve substantially, peaking at almost 18 percent in year +2. For distressed firms, the level of these combined returns declines somewhat in the years prior to the acquisition, and improves in the two post-acquisition years. Distressed firms' combined pre-acquisition cash flow returns are higher than those of bankrupt firms in two of the three years and slightly lower in each of the three years following effective year of acquisition.

Panel B of Table 8 shows changes in bankrupt and distressed firm operating cash flows relative to the year prior to their acquisitions. For bankrupt firms, we observe positive and significant changes from the year prior to acquisition to years +1, +2, and +3, with the change for the time window -1, +2 being the highest (0.11), although not significantly different from the changes for the other two time windows (0.096 for the time window -1, +1 and 0.107 for the time window -1, +3). For distressed firms these performance changes, although positive, are not significantly different from zero in each period with exception of the period from year -1 to year +3. During the last time horizon the median performance change for distressed firms is 0.01, which is not economically material, while for bankrupt firms it is almost 0.11. Clearly, post-acquisition performance of firms merged with bankrupt firms is better than post-acquisition performance of firms merged with distressed firms. However, in Table 6 we find that bankrupt targets' shareholders incur negative and significant losses around the announcement, while distressed targets' shares have positive abnormal returns around that time. Hence, acquisitions of bankrupt firms add greater economic value than do acquisitions of distressed firms acquired outside of bankruptcy. It is possible that operating firm acquirers of bankrupt targets select firms likely to experience improved performance.

In summary, we analyzed market reaction to acquisition announcements for targets and their acquirers and changes in firms' post-merger operating performance. Price changes around the announcements should reflect anticipated changes in future cash flow, which accrue to firms' shareholders. One must also note that we have fewer bankrupt than distressed

targets that are acquired by other operating companies. Surprisingly, negative market reaction to bankrupt targets' merger announcements reported in Tables 6 and 7 does not accurately reflect positive changes in the post-merger operating cash flows and vice versa, positive market reaction to distressed targets' announcements does not reflect quite weak positive changes in the post-merger operating cash flow returns.

vi. Institutional trading of shares of acquired distressed and bankrupt firms

Using 13f quarterly filings obtained from Thomson Reuters' Institutional (13f) Holdings–s34 we analyze institutional holdings for acquired bankrupt and distressed firms.[129] Institutions are required to file 13f forms with the Securities and Exchange Commission (SEC) on a quarterly basis.[130] We determine quarter-end holdings of institutions for all distressed and bankrupt firms by eliminating all observations from the 13f data file for which filing date does not match reporting date, thereby determining the last quarter of actual 13f filings.[131]

Regrettably, due to the 13f quarterly data limitations we cannot observe daily changes in institutional shareholdings around acquisition announcement dates and therefore cannot accurately assess institutions' ability to predict the upcoming event and to take advantage of

[129] Thomson Reuters adjusts the reported holdings and net changes for stock splits (including reverse stock splits which are a more frequent occurrence in the case of bankrupt firms), and we use the split-adjusted values.

[130] The SEC's institutional investment manager filing mandate is as follows: "An institutional investment manager that uses the U.S. mail (or other means or instrumentality of interstate commerce) in the course of its business, and exercises investment discretion over $100 million or more in Section 13(f) securities (explained below) must report its holdings on Form 13F with the Securities and Exchange Commission (SEC). Form 13F is required to be filed within 45 days of the end of a calendar quarter. The Form 13F report requires disclosure of the name of the institutional investment manager that files the report, and, with respect to each section 13(f) security over which it exercises investment discretion, the name and class, the CUSIP number, the number of shares as of the end of the calendar quarter for which the report is filed, and the total market value." The SEC defines an institutional investor as "(1) an entity that invests in, or buys and sells, securities for its own account; or (2) a natural person or an entity that exercises investment discretion over the account of any other natural person or entity. Institutional investment managers can include investment advisers, banks, insurance companies, broker-dealers, pension funds, and corporations."

[131] Thomson Reuters continues reporting 13f data for several quarters after an institutional manager stops filing with the SEC. The data provider maintains original filing date (date on the holding report in the SEC's EDGAR, the regulator's electronic record database) and changes reporting date for the repeating holdings.

positive abnormal returns in case of distressed firms and bankrupt firms acquired after they have emerged from bankruptcy or to avoid the negative abnormal returns in case of bankrupt firms acquired in bankruptcy. Instead, we analyze quarterly institutional holdings of target firms' shares for four quarters preceding and for four quarters following the quarter of announcement of their acquisitions.

[Insert Table 9 here]

In Table 9 we report mean quarterly institutional holdings and number of bankrupt and distressed firms with investments from institutions in a particular quarter. We report institutional shareholdings for all bankrupt and distressed firms from four quarters before (quarters -4 to -1) the quarter of acquisition announcement (quarter 0) to four quarters following (quarters 1 to 4), and categorize them by institutional manager type.[132] We consider only targets' institutional investments for quarters -4 through -1. For quarters starting with the quarter of the announcement, we report mean institutional holdings as a sum of the holdings for both target and acquirer,[133] depending on the quarter of the acquisition effective date. If in a particular post-announcement quarter institutional manager reports the same shareholdings and net holding changes for both target and acquirer, we do not sum up the holdings and instead use reported numbers for the target. For instance, 213 bankrupt and 274 distressed firms have announcement and effective dates in quarter q=0.[134]

[Insert Figures 4a and 4b here]

For easier interpretation of Table 9, we plot mean quarterly institutional holdings in Figure 4. Institutional shareholdings are relatively unchanged for all bankrupt acquired firms

[132] In Thomson Reuters' 13f Database manager types are delineated as: 1 = Banks, 2 = Insurance companies, 3 = Investment companies and their managers, 4 = Independent investment advisors, and 5 = All others.

[133] For acquirer's post-acquisition institutional holdings we only consider those managers who held shares of the target prior to acquisition's effective date.

[134] In Table 9 we report institutional holdings for totals of 309 bankrupt and 301 distressed firms in the quarter of announcement. We report combined target and acquirer's institutional holdings for 213 bankrupt and 274 distressed firms with the announcement and effective dates in quarter q=0. We report institutional holdings for targets only for the remaining 96 bankrupt and 27 distressed firms.

during the eight-quarter period, but this does not accurately portray the different actions of different manager types. Banks, manager type 1, decrease holdings of the bankrupt firms from quarter -4 to quarter -2 and then again from quarter q-1 to quarter 0; they increase their post-announcement holdings from the quarter of announcement to quarter 2 and then decrease it again from quarter 2 on. Insurance companies, manager type 2, consistently increase holdings of the merged bankrupt firms. From quarter -4 to quarter -3 this increase in ownership is about 37 percent, then from quarter -3 until quarter 2 it becomes rather gradual. Insurance companies' increase in shareholdings of bankrupt targets becomes more dramatic in the last two post-merger quarters. We also observe somewhat continuous increase in the investments of independent investment advisors, although their ownership declines close to the level of insurance companies' holdings in the last post-merger quarter. This demonstrates that the two types of institutional managers, insurance companies and independent investment advisors, increase their ownership in merged bankrupt firms possibly in anticipation of improved performance. In addition, not all bankrupt firms are financial distressed—those firms that file as a result of multiple lawsuits and/or union disputes might be operationally healthy and financially viable. Insurance companies and independent investment advisors may be aware of the firms' quality and acquire undervalued shares of these firms in hopes to earn positive return on their investments. These institutional investors could also have held bankrupt firms' debt that was exchanged for shares of bankrupt firm's acquirer thereby increasing institutions' shareholdings of the merged firms. Holdings of investment companies and their managers rise from quarter -4 to quarter -3, then again from quarter -2 to quarter -1, and then shrink drastically from quarter -1 to quarter 2, perhaps in anticipation of a bankruptcy filing or as a reaction to the filing.

Institutional holdings for all acquired distressed firms remain practically unchanged from quarter -4 to quarter 1. However, when analyzing changes in each manager type's ownership, we find that banks and managers in "all others" category acquire shares of

distressed firms between quarters -1 and 0 and then again between quarters 1 and 4, with the largest share acquisition between quarters 1 and 2 (banks and all other managers' ownerships increase by 75 and 27 percent, respectively). Insurance companies, investment companies, and independent advisors slightly increase their ownership from quarter -4 to quarter -3. Insurance companies reduce their holdings from quarter -1 to quarter 0 by about 12 percent and consistently acquire the shares between quarters 0 and 4, more than doubling their holdings. Investment companies and their managers substantially increase ownership in the acquired distressed firms during two quarters following the announcement quarter (by 24 percent between quarters 0 and 1 and by 39 percent between quarters 1 and 2), then keep it unchanged from quarter 2 to quarter 3, and decrease it slightly in the fourth quarter. Independent investment advisors purchase shares of merged distressed firms between quarters 0 and 2 and then sell them during subsequent quarters.

Prior to the quarter of acquisition announcements and in the quarter of the announcements numbers of bankrupt and distressed firms held by institutions are similar (335 bankrupt firms and 329 distressed firms[135] in q-2, 325 bankrupt firms and 328 distressed firms in q-1, and 309 bankrupt firms and 301 distressed firms in q=0). We find that number of distressed firms with institutional ownership drops from 301 firms in q=0 to 164 firms in quarter q+1 and then to 128 firms in q+2. This decline is greater than the decline for bankrupt firms during the same quarters: 309, 269, and 239 bankrupt firms have investments from institutions in quarters q=0, +1, and +2, respectively, perhaps suggesting that institutions anticipate bigger improvements in the merged bankrupt firms' operating performance than in the distressed firms' operating performance. After the quarter of acquisition announcements the number of bankrupt firms with institutional investors becomes noticeably greater than the number of distressed firms with investments from institutions (in quarters q+1, +2, and +3

[135] In this analysis we also consider those distressed firms that were matched to more than one bankrupt firm (the reason why this total exceeds the total of 306 distressed firms reported in Tables 2 and 5)

105, 111, and 119 more bankrupt firms have institutional investments than distressed firms, respectively). Differences between bankrupt and distressed firms' quarterly institutional holdings also become more pronounced in the post-announcement quarters. In quarter q+1 bankrupt firms' institutional holdings exceed distressed firms' institutional holdings on average by close to 60,500 shares per firm. In the following three post-announcement quarters institutions hold greater number of distressed firms' shares than bankrupt firms' shares (on average 117,808, 56,067, and 144,513 more distressed than bankrupt shares per firm are held by institutions in quarters q+2, +3, and +4, respectively).

Differences in the number of institutional shares invested in bankrupt and distressed firms are the most striking for investment companies and their managers, manager type 3. Investment companies hold greater number of distressed than bankrupt firms' shares in every quarter analyzed, with exception of quarter q-4. In the quarter of the announcements investment companies hold 152,508 (or 35%) more distressed than bankrupt firms' shares; in the following quarter they hold twice as many distressed as bankrupt shares, or 365,673 (or 101%) more shares; and in the following three quarters these differences are 681,593, 613,947, and 541,490 shares (or 205%, 153%, and 140%, respectively). Investment companies reduce their ownership of shares of bankrupt firms from q=0 through q+2 and almost double their ownership of shares of distressed firms during the same quarters. Differences in the number of shares held are quite the opposite for insurance companies. Insurance companies hold more bankrupt than distressed firms' shares from quarter q-2 through quarter q+1, and then again in quarters q+3, and +4. For instance, the differences between numbers of shares held by insurance companies per target firm are as follows: 33,700 shares in quarter q-1, 101,648 shares in q=0, and close to 55,000 in quarter q+1. This again confirms that insurance companies possibly anticipate greater improvements in the post-merger performance of bankrupt rather than distressed firms.

IV. Hypothesis Testing and Presentation of Regression Results

Previously from Table 5 we found that more distressed than bankrupt firms are acquired for cash. From Table 5 we also found that acquired distressed firms secure a higher premium for their assets than do bankrupt firms. In addition, from Tables 6 and 7 we found negative abnormal market returns on the day of acquisition announcements for bankrupt firms while these returns are positive and economically material for acquired distressed firms and reorganized firms acquired in the year following emergence from Chapter 11. In Table 8, we however observed weaker improvements operating performance for the merged distressed than bankrupt firms. Hence, we speculate that distressed firms are better off pursuing acquisition as a more beneficial reorganization alternative than Chapter 11 bankruptcy. That said, we now turn to testing our first hypothesis that firms that are larger, less levered, less distressed, and with higher returns on assets and operating cash flow returns on sales reorganize via merger or acquisition. We evaluate the likelihood of distressed firms to be acquired before they petition for bankruptcy protection under Chapter 11.

[Insert Table 10 here]

To test the first hypothesis related to likelihood of acquisition being used as a method of reorganization for distressed firms we utilize logistic regression and set our binary dependent variable to be equal to one if a firm is an acquired distressed firm (which includes all our control firms and excludes all bankrupt firms, regardless of the announcement in relation to bankruptcy filings), and zero otherwise. Prior to running the regressions, we eliminate all duplicate firms as a result of matching several bankrupt firms to the same distressed firm (in Table 1 we report 428 total number of bankrupt firms and 306 total number of distressed firms). We use the following performance related variables measured as of one year prior to bankruptcy filings for bankrupt firms and as of one year prior to acquisition announcements for distressed firms, identical to those reported in Table 3, as controls: natural logarithm of market capitalization (LNMKTCAP), number of employees (EMP), Altman's z-score (ZSCORE), debt-to-equity ratio (DEBT), return on assets (ROA), operating cash flow

returns on sales (OCFSL), current ratio measured as current assets divided by current liabilities (CURRT), market-to-book ratio (MB), and shareholdings of officers and directors (OFFDIR), and institutions (IH) as percentages of total shares outstanding. We omit using several variables reported in Table 3 such as total assets, sales, and debt-to-assets ratio, to avoid high correlation between variables in the regression.

In Model 1 we use the following independent variables: natural logarithm of market capitalization, number of employees, and z-score to measure effects of firm's size and level of distress on the likelihood of acquisition outside of bankruptcy. Larger firms with smaller workforces are more likely to reorganize via merger: for one unit increase in natural log of market value the likelihood rises by close to 17 percent and for one unit increase in the number of employees it falls by 3 percent.

In Model 2 we add liquidity, debt management, profitability, and market value related variables and remove z-score because it highly correlates with several newly added variables. We find that the size related variables remain statistically significant. The magnitude and the direction of the variables' parameters remain similar to those in Model 1. Variables such as debt-to-equity, ROA, and cash returns on sales do not relate to the likelihood of acquisition outside of bankruptcy. We find that current and market-to-book ratios have parameter estimates of 0.14 and 0.08, respectively, which are statistically significant at a five percent level, indicating that the likelihood to reorganize via acquisition rises for the firms with greater current and market-to-book ratios—for one unit increase in each variable the likelihood rises by 15 and 8 percent, respectively.

In Model 3 we add two more variables to the variables in Model 2, percentage shareholdings of officers and directors, and of institutional managers, to analyze relevance of these variables to the likelihood of being acquired outside of bankruptcy. We find that the relationships between variables such as natural log of market capitalization, number of employees, current and MB ratios and the likelihood of acquisition outside of bankruptcy

remain statistically significant in the third model. We find that officers and directors' percentage shareholdings directly relates to the likelihood of considering merger as a reorganization method—with one unit increase in the variable the likelihood increases by nearly 5 percent. This relation indicates that firms with greater officers and directors' shareholdings, ownership of individuals who directly influence decisions to merger or to petition for reorganization, are more likely to merge outside of bankruptcy. These individuals are likely aware of their firm's high likelihood of filing for bankruptcy. To avoid bankruptcy and possible loss of all of their holdings, officers and directors with greater stake in their companies prefer merger to Chapter 11. We find no relationship between institutional shareholdings variable and the likelihood of merger outside of bankruptcy, suggesting that institutional ownership does not influence probability of the firms' reorganizations via merger.

We now separate our firms based on the type of acquirer (operating company vs. investors) and run regressions 4 and 5 with several variables from Model 3. Model 4 is for distressed and bankrupt firms acquired by investors. Model 5 is for distressed and bankrupt firms acquired by other operating companies. In models 4 and 5 we use fewer independent variables due to the reduced number of observations in each sub-group of firms. We utilize natural log of market capitalization, number of employees, two size related variables, debt-to-equity ratio, a debt management related variable, ROA, ratio that measures profitability, current ratio, ratio that measures liquidity, market-to-book, market value variable, and percentage of officers and directors' shareholdings, an insider related variable. We use an addition dummy variable, SIC, in Model 5 to control for industry. SIC is equal one if a target and its acquirer operate in the same industry, and zero otherwise.

From Model 4 we observe that investors are more likely to acquire distressed firms with smaller number of employees, higher MB ratio and officers and directors' shareholdings. We find that parameter estimates of these three variables are -0.06, 0.159 and 0.142, respectively. For every unit increase in the number of employees the likelihood of the firms

reorganizing via merger declines by 6 percent, which is not economically material. For every unit increase in either MB or executive shareholdings variable the likelihood of the firms choosing merger as a reorganization method rises by on average 16 percent. We find that coefficients of all other variables in the model are not statistically significant.

Based on the results of Model 5, we observe that operating firm acquirers are inclined to purchase outside of bankruptcy struggling targets that are bigger and better performing. We find that for one unit increase in natural log of market capitalization and ROA the likelihood of the acquisition increases by 30 and 84 percent, respectively. The operating firms are also more likely to acquire non-bankrupt firms with higher current ratio—for every unit increase in current ratio the likelihood goes up by 18 percent. Similar to the findings by Hotchkiss and Mooradian (1997), we observe that acquisitions of distressed firms by other operating companies directly relate to whether or not the bidders and the targets operate in the same industry. We observe that parameter estimate of variable SIC is 0.87, which is economically material and statistically significant.

Based on the results reported in Table 10, Models 1 through 3, we find support for our first hypothesis. Bigger firms (as measured by natural log of market capitalization) with higher short-term liquidity (as measured by current ratio) and market valuation (as measured by MB ratio) are more likely to reorganize via M&A. We find that performance related measures such as ROA and operating cash flow returns on sales and variables measuring levels of distress and leverage (z-score and debt ratio) do not seem to play a role in the probability of reorganization via merger. Finally, we find that percentage of shares held by officers and directors directly relates to the likelihood of reorganization via merger.

Based on the results in Model 4, we observe that firms' qualities such as size, leverage, and short-term liquidity and their performance measured by ROA do not seem to matter for timing of acquisitions by investors. Investors prefer to acquire distressed firms with higher share market value and bigger officers and directors' ownership. Based on the results

of the last regression and in line with our earlier conjectures, operating firm acquirers prefer to acquire distressed firms that are bigger, with better short-term liquidity, stronger performance, and operating in the same industry.

To test our second hypothesis, we adopt methodology used by Healy et al (1992), Barber and Lyon (1996), and Hotchkiss and Mooradian (1998). We use cash flow performance variables of bankrupt and distressed firms reported in Table 8 as independent variables and run several cross-sectional regressions of post-merger cash flow returns on sales for years 1, 2, and 3 on pre-merger cash flow returns in year -1. We scale operating cash flows by sales and not total assets in order to address the historic costs and non-operating assets problems. The disadvantage of using cash flow returns on sales is that it does not measure decline in productivity of bankrupt and distressed firms' assets. Our intercept measures abnormal performance and captures post-merger performance influenced by economy-wide and industry factors as well as any omitted variables. We run the regression of the following form:

$$CR_{post,i/j} = \alpha + \beta\, CR_{-1,i/j} + \varepsilon_{i/j}$$

where $CR_{post,i/j}$ is the post-merger (years 1-3) cash flow return on sales for bankrupt (i) and distressed (j) firms, and $CR_{-1,i/j}$ is the pre-merger (year -1) cash flow return on sales for bankrupt (i) and distressed (j) firms. The slope coefficient β measures covariance, scaled by a variance term of the explanatory variable, between pre- and post-merger cash flow returns or the relationship between the firm performance one year prior to acquisition and post-merger cash returns one, two, and three years following the acquisition. We however are more interested in intercept coefficient α that captures magnitude of cash flow improvements from one year prior to acquisition to one, two, and three years following the transaction. To obtain results and to address issues of non-normal distribution of data, heteroscedasticity, and inclusion of observations with large residuals, we estimate the asymptotic covariance matrix

of the estimates under the hypothesis of heteroscedasticity and report heteroscedasticity consistent p-values.

[Insert Table 11 here]

In Panel A, in each regression for bankrupt firms the abnormal performance measured by α is positive and significant. The magnitude of cash flow improvements for year-period (-1, 1) is approximately 17 percent, for period (-1, 2) 15 percent, and for period (-1, 3) approximately 14%.[136] In Panel B, for the distressed firms acquired outside of bankruptcy abnormal performance although positive is not different from zero for the first two year-periods. The magnitude of cash flow improvement is statistically significant 11 percent for the last year-period of (-1, 3), however we don't observe any correlation between pre- and post-merger cash flow returns during this period as the coefficient on variable $CR_{-1,j}$ is not different from zero. In addition, based on the low adjusted R^2, the third regression equation does not have explanatory power while the equations for two prior years do. This evidence reported in Table 11 does not support our second hypothesis. We instead observe that acquisitions of firms in Chapter 11 create greater value in terms of operating cash flow returns than do acquisitions outside of bankruptcy.

In addition to evaluating and comparing operating performance of the merged bankrupt and distressed firms, we perform similar analysis of the pre- and post-acquisition cumulative market adjusted returns for the two groups of firms. We analyze the returns for three, six, and twelve month post-acquisition periods and regress them on the three month pre-acquisition cumulative abnormal returns. We compute three month pre- and post-acquisition cumulative adjusted returns as a weighted sum of the returns for target and its acquirer.[137]

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[136] Hotchkiss and Mooradian (1998), for instance, find cash flow improvements ranging from approximately 5% to year +1 and 6% to year +2. In addition, the further away we move from the year of merger, the more the cash flow improvements become affected by aspects other than merger.

[137] To calculate targets' weights, we divide their pre-acquisition market values by the sum of the targets and acquirers' market values. Similarly, to calculate acquirers' weights, we divide acquirers' pre-acquisition market values by the sum of targets and acquirers' market values. We then multiply targets'

[Insert Table 12 here]

In Table 12 we report combined mean cumulative abnormal returns for 3-, 6-, and 12-month post-merger periods. We determine combined returns for all bankrupt firms, for bankrupt firms that were acquired in Chapter 11, for bankrupt firms that were acquired during the first year after emergence, and for distressed firms. We find that bankrupt firms' combined post-merger cumulative abnormal returns are -1.18, -2.94, and -6.26 percent during the 3-, 6-, and 12-month periods, respectively (abnormal returns for 3- and 6-month periods are not statistically significant and for 12-month period they are significant at a five percent level). Mean abnormal returns for bankrupt firms acquired while in Chapter 11 are approximately -3.54, -5.91, and -9.53 percent during the 3-, 6-, and 12-month periods, respectively (abnormal returns for 3- and 12-month periods are statistically significant at a five percent level and for 6-month period they are significant at a ten percent level). Mean cumulative abnormal returns for bankrupt firms acquired after emergence and positive, however not statistically significant. Cumulative abnormal returns for distressed firms are negative during 3- and 12-month periods and positive during 6-month period; they are also not significant in all three time periods. From these results and the results in Table 6 we observe that when bankrupt firms are acquired, the target firms' shareholders largely suffer great market losses at the time of the merger announcements and the acquirers in the year after acquisition have negative abnormal returns. Conversely, when announcements of distressed firm acquisitions are made, they and their acquirers get large positive announcement abnormal returns and in the year after consummation the acquirer returns are quite modest and not

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cumulative abnormal returns by their weights and acquirers' market adjusted return by their weights. To determine combined abnormal returns, we sum up the weighted abnormal returns for targets and their acquirers. In the 3- and 6-month post acquisition periods, approximately 41 percent of returns are acquirers' only; in the 12-month post acquisition period, this percentage is 39. In addition, mean (median) percentage bankrupt and distressed target weights are 7.99 (6.96) percent and 13.12 (10.93) percent, respectively.

nearly of the magnitude of the announcement returns for the targets, thus the targets' shareholders reap the biggest proportion of these returns.

Finally, in Table 13 we analyze changes in the market performance of merged bankrupt and distressed firms. We run several cross-sectional regressions of post-merger cumulative abnormal returns on the three month pre-merger cumulative abnormal returns for both sample (in Panels A, B, and C) and control (in Panel D) firms. As in Table 11, our intercept measures abnormal performance and captures post-merger market performance influenced by economy-wide and industry factors. It captures magnitude of market return improvements from three month prior to effective date of acquisition to three, six, and twelve months following the transaction. The slope coefficient β measures covariance, scaled by a variance term of the explanatory variable, between pre- and post-merger market returns or the effect of the firm's market performance during three months prior to acquisition on post-merger three, six, and twelve month abnormal returns. Similar to the regressions in Table 11, we estimate the asymptotic covariance matrix of the estimates under the hypothesis of heteroscedasticity and report heteroscedasticity consistent p-values for each regression.

[Insert Table 13 here]

In Panel A of Table 13 we report regression results for all bankrupt firms. In each regression for bankrupt firms in the panel the abnormal market performance measured by α is negative and significant only in the third regression. The magnitude of market performance decline during the month period (-3, +3) is approximately 2 percent, during the period (-3, +6) this decline is 5 percent, and during the period (-3, +12) it is 11 percent. We observe that the relationship between the pre- and post-merger cumulative abnormal returns during the second and third periods is inverse and do not observe any correlation between the returns during the first time period as the coefficients on variable $CR_{-1,j}$ is not different from zero in the first

regression. Based on the adjusted R^2, explanatory power of the equations improves for the longer time periods (equations two and three).

In the following two panels, Panels B and C, we split bankrupt firms into the firms with acquisition announcements either before bankruptcy filings or while in Chapter 11 and the firms with acquisition announcement during the first year after emergence, respectively. We partition our sample firms this way because, as reported in Table 7, the abnormal returns around announcement dates are positive for the firms with acquisition announcements after emergence and negative for all other bankrupt firms. In Panel B, we observe that intercept becomes increasingly negative and statistically significant in all three regressions. We also observe that the relationship between pre- and post-merger cumulative abnormal returns during all three periods is inverse, suggesting that the market performance of bankrupt firms with stronger pre-merger cumulative abnormal returns improves less than the market performance of bankrupt firms with weaker pre-merger returns. In addition, based on the adjusted R^2, explanatory power of the equations improves for the longer time periods (equations two and three).

In Panel C of Table 13 we find that the abnormal market performance measured by α is positive however not statistically significant in all three regressions. We also observe that the relationship between pre- and post-merger cumulative abnormal returns during all three periods is significant and inverse. However, based on the low adjusted R^2, the first regression equation does not have explanatory power while the other two equations do.

In Panel D we report regression results for distressed firms. Similar to the results in Table 11, Panel B, these firms' post-merger market performance improvements are not significant during any of the three periods analyzed. In addition, in Table 12 we observed negative however not statistically significant abnormal returns for acquired distressed firms in the six and twelve month periods; these returns are positive and also not significant in the six month period. In Panel D of Table 13, we find that post-merger cumulative abnormal returns

positively relate to the firms' pre-merger three-month cumulative returns in the six and twelve month periods. In addition, based on the low adjusted R^2, explanatory powers of the three regression equations are weak.

In summary, post-merger market performance improvements does not resemble those of post-merger operating performance. We observe that post-merger market performance of bankrupt firms, especially those acquired while in Chapter 11, declines while market performance of distressed firms somewhat improves. We conclude that acquisitions of bankrupt firms create greater operating value than do acquisitions outside of bankruptcy and acquisitions of distressed firms create greater market value than do acquisitions of bankrupt firms.

V. Conclusion

Our research paper provides empirical evidence that whether distressed firms are acquired in or outside of bankruptcy matters. The firms acquired outside of Chapter 11 secure better price for their assets and have positive and material market reaction to the acquisition announcements. We first analyze characteristics of bankrupt firms that were acquired either while in bankruptcy or during one year following emergence from bankruptcy and compare them to similar distressed firms that did not file for bankruptcy and were acquired at around the same time period. We also categorize both groups of firms by the type of acquirer because we realize that qualities of the firms acquired by another operating company, creditors, or investors and of their acquirers may differ. Acquired bankrupt firms' total assets and sales are greater and market capitalization is lower than those of distressed firms acquired outside of bankruptcy. Although mean operating cash returns on sales is greater for bankrupt firms than it is for distressed firms, bankrupt firms' profitability and operating performance measured by median profit margin and ROA are significantly lower than those for distressed firms. We also find greater median values of executives' shareholdings for bankrupt firms, especially

those acquired by creditors and other operating companies, than for distressed firms with the same types of acquirers.

Most importantly, we find that distressed targets are capable of negotiating better deal terms than their bankrupt counterparts. Distressed firms not only avoid selling their assets at a discount, they are on average capable of securing a sales price that exceeds their enterprise value. In addition, market abnormal returns on the day of acquisition announcements for distressed firms are positive while these returns for bankrupt firms are negative. These differences are perhaps due to the fact that bankrupt and distressed firms are distinctly different groups of firms in size, level of debt, operating performance, market valuation, and bargaining position. Based on this evidence, distressed firms are better off pursuing acquisition as a more advantageous reorganization alternative to Chapter 11 filing and subsequent acquisition in bankruptcy.

We find that bigger firms with smaller workforce, higher current and market-to-book ratios, and greater percentage of shares owned by officers and directors are more likely to reorganize via merger. Investors are more likely to acquire distressed firms with a higher market-to-book ratio and percentage of officers and directors' shareholdings. Operating companies also acquire larger and better performing distressed firms (as measured by ROA) and the firms with higher current ratio. These results explain why operating firm acquirers pay the highest premium for distressed firms' assets than do investors and creditors.

We find that distressed targets sell assets at a better price (e.g., at a premium or lower discount) than bankrupt firms do. Shareholders of distressed targets also enjoy positive abnormal returns at the time of acquisition announcements, while bankrupt targets' shareholders incur losses. We also find that abnormal cash flow changes from one year preceding acquisition to any of the three post-merger annual periods are more pronounced for bankrupt than distressed firms, indicating that acquisitions in Chapter 11 add greater economic value than do acquisitions outside of bankruptcy. Insurance companies and, to a lesser extent,

independent investment advisors recognize this trend in the acquired bankrupt firms' post-merger cash flow improvements and increase their ownership in the firms. However we find that market returns around the day of the announcements do not accurately reflect post-merger changes in the operating cash flow returns. Abnormal market returns are negative for bankrupt targets, suggesting that investors do not anticipate positive changes in firms' future cash flows that we find as part of our analysis. Similarly, positive market reaction to acquisition announcements of distressed firms does not correspond to weak positive changes in their post-acquisition operating cash flow returns.[138] We find post-merger market performance improvements for bankrupt and not distressed firms. In summary, distressed firms get a merger announcement premium and bankrupt firms give it away to their acquirers whose shareholders benefit from acquisition premiums in a year after the mergers.

[138] We analyze mean abnormal market returns around announcement dates (same analysis as in Table 6) for the firms included in Table 11. We find that the returns for those firms are qualitatively similar to those reported in Table 6: the two-day CMAR for bankrupt targets is negative and statistically significant (-21%) and it is positive and also statistically significant for their acquirers (5%); the two-day CMARs for distressed targets and their acquirers are positive and statistically significant (22% and 3%, respectively).

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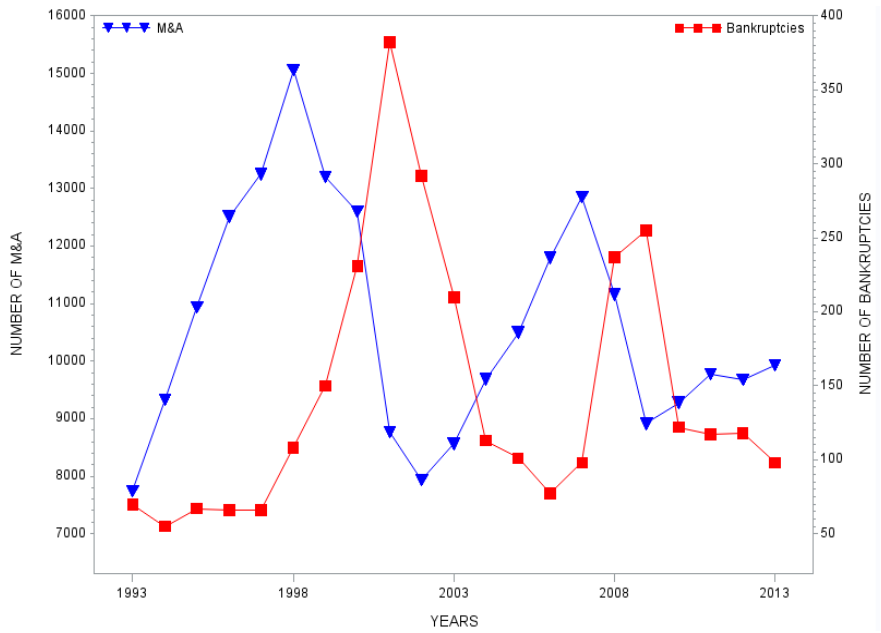
Figures 1a and 1b
Annual volume of M&A and Chapter 11 filings for the period between 1993 and 2011

(a) All M&A announcements and bankruptcy filings



(b) Bankrupt and distressed firm acquisition announcements

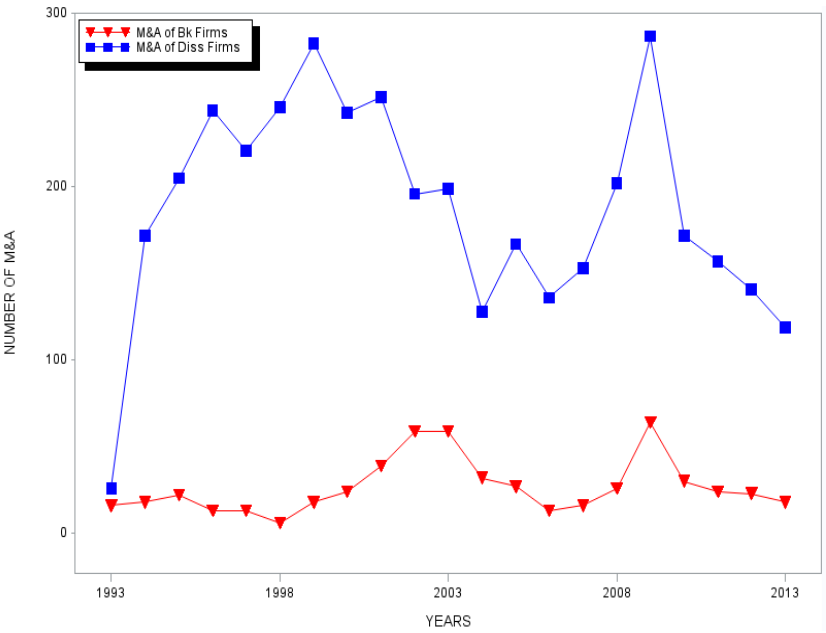


Figure 1a presents annual volumes of all M&A announcements and Chapter 11 filings for the period between 1993 and 2013. Figure 1b provides annual numbers of acquisition announcements of bankrupt and distressed firms during the same annual periods. We obtain data from Thompson Financial Services SDC Platinum database. Figure 1a contains two y-axes and one shared x-axis. The left y-axis plots yearly number of M&A transactions, and the right y-axis plots yearly number of bankruptcy filings. X-axis shows years. Figure 1b plots number of M&A on y-axis and year on x-axis.

Correlation Matrix

NAME	MA_NO	BKPCY_NO	BK_ACQ	DISS_ACQ
MA_NO	1			
BKPCY_NO	-0.33028	1		
BK_ACQ	-0.65102	0.706581436	1	
DISS_ACQ	0.415926	0.465999247	0.253378808	1

The matrix reports correlation between annual volumes plotted in Figures 1a and 1b. MA_NO is number of M&A announcements, BKPCY_NO is number of bankruptcy filings, BK_ACQ is number of bankrupt firm acquisition announcements, and DISS_ACQ is number of distressed firm acquisition announcements.

Table 1
Sample formation and description of M&A transactions for distressed firms and firms filing for Chapter 11 between 1/1/1992 and 12/31/2013

Panel A: Sample of bankrupt firms formation description

	Number	Percentage
Chapter 7 and Chapter 11 filings from SDC; excludes utilities and financial firms	3,243	
Chapter 7 and Chapter 11 filings from Lopucki's Database; excludes utilities and financial firms	843	
Non-duplicating Chapter 11 filings from both data sets with accurate identifiers (Permno, CUSIP, Ticker) and emergence dates between 1992 and 2013; excludes utilities and financial firms	1,429	100%
Number of firms reorganized between 1992 and 2013	1,381	100%
Number of bankrupt firms acquired while in reorganization or one year following emergence	428	31%
Timing of acquisitions:		
*number of acquisition announcements before filing and effective date while in Chapter 11**	*14*	*3%*
number of acquisition announcements before filing and effective date after emergence	*44*	*9%*
*number of acquisition announcement and effective dates of acquisitions while in Chapter 11**	*157*	*33%*
number of acquisition announcements while in Chapter 11 and effective dates after emergence*	*178*	*37%*
number of announcement and effective dates of acquisitions during one year following emergence date	*90*	*19%*
Total number of acquisition announcements:	483**	*100%*

Panel B: Acquisition description

	Bankrupt firms	Distressed firms
Percentage of firms acquired by creditor or bondholder	38%	4%
Percentage of firms acquired by investors (other than creditors and bondholders)	30%	36%
Percentage of firms acquired by firms in the same industry (only for firms acquired by operating company: 169 bankrupt firms and 195 distressed firms)	60%	66%
Mean percentage of target owned after completion of acquisition	85%	67%
Percentage of acquirers with less than 100% post-acquisition ownership	33%	48%
Mean value of transaction ($mill)	440.22	201.75

* This time period includes dates of bankruptcy announcement and emergence.
** Several firms were acquired by more than one bidder with different announcement and effective dates.

The table presents number of firms filed for Chapter 11 reorganization and emerged from bankruptcy during the period of January 1992 through December 2013. The data reported here comes from *Thompson Financial Services SDC Platinum* and Lopucki's Bankruptcy database. The sample consists of all U. S. non-utility and -financial firms that filed for Chapter 11 and completed reorganization during the period. Panel A describes sample formation. Sample consists of bankrupt firms that were acquired either while in Chapter 11 of during one year following emergence. Panel B provides information on type of acquirer and magnitude of post-merger ownership. We compile control (distressed) firms based on the two-digit Securities Data Corporation (SIC) codes, acquisition announcement date, and size measured by market capitalization.

Table 2
Characteristics of bankrupt firms acquired in Chapter 11 categorized by timing of acquisition announcement relative to bankruptcy filing

Variable	Group 1 (n=42)		Group 2 (n=234)		Group 3 (n=69)	
	Mean	Median	Mean	Median	Mean	Median
Total assets ($mill)	3,451.51[b]	620.90[b]	1,111.53	304.91[b]	1,473.40	583.25
Sales ($mill)	1,228.86	556.66[b]	975.72	339.83[c]	1,435.37	484.85
Market capitalization ($mill)	97.40	32.39	134.39	28.67	106.94	29.29
Altman z-score	-1.712	-1.307[b]	-1.686	-0.057	-1.670	-0.351
Total liabilities/total assets	1.222	1.157[b]	1.116	0.930	1.253	1.076
EBITDA/total assets	0.049[a]	0.067[b]	-0.140[a]	0.022[b]	0.043	0.049
EBITDA/sales	0.054[c]	0.084[a]	-0.458	0.014[b]	-0.065	0.050
Profit margin	-0.450[c]	-0.368	-0.955	-0.181	-0.734	-0.125
ROA	-0.311[b]	-0.244	-0.537[b]	-0.226[c]	-0.291	-0.133

EBITDA: Earnings before interest, taxes, depreciation and amortization.
[a,b,c] denote mean (median) significantly different between firms in the two groups at the 1, 5, and 10% level, respectively, based on t-test (Wilcoxon rank sum test).

Table presents accounting related data gathered from COMPUSTAT's annual financial reporting statements. In the table we report characteristics of sample firms categorized by acquisition announcement timing. Group 1 contains firms with acquisition announcements before bankruptcy filings, Group 2 contains firms with acquisition announcements either on the day of bankruptcy filings or before emergence, and Group 3 contains firms with the announcements either on the day of emergence from bankruptcy or during the first year following the emergence. In parenthesis, n is a number of firms in each group with available financial data. All variables in the table are measured as of one year preceding bankruptcy filing. Altman's z-score, bankruptcy-risk proxy (Altman (1968)), is defined as 3.3x((pretax income + interest expense)/total assets) + 0.999x(sales/total assets) + 0.6x(market capitalization/total liabilities) + 1.2x(working capital/total assets) + 1.4(retained earnings/total assets). Profit margin is net income divided by sales and ROA is return on assets and calculated as net income divided by total assets.

Table 3
Characteristics of acquired bankrupt and distressed firms, categorized by acquirer type

Panel A: Firm characteristics

Variable	All bankrupt firms acquired (n=345)		Bankrupt firms acquired by investors (n=114)		Bankrupt firms acquired by creditors (n=104)		Bankrupt firms acquired by another operating company (n=127)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Total assets ($mill)	1,468.77	403.222[a]	1,134.20	465.36[a]	2917.62[c]	673.71	622.89	209.25[a]
Sales ($mill)	1,098.47	386.15[a]	1,088.12	367.15[a]	1,897.29	696.90	499.92	210.82[a]
Market capitalization ($mill)	124.76[b]	30.14	105.99[b]	36.80	169.06	37.19	106.03[b]	22.69[b]
Altman z-score	-1.686	-0.254	-1.190	0.441	-1.930	-0.336	-1.859	-0.596
Total liabilities/total assets	1.157[b]	0.989[a]	1.062	0.864	1.355	1.068[b]	1.077[b]	1.003[a]
EBITDA/total assets	-0.080[b]	0.033	0.008[b]	0.059	-0.0002	0.053	-0.208	-0.006
EBITDA/sales	-0.316[b]	0.028	-0.305	0.040	-0.184	0.052	-0.425[c]	-0.004
Profit margin	-0.849[c]	-0.189[b]	-0.747	-0.098	-0.698	-0.146[b]	-1.043	-0.343[a]
ROA	-0.461	-0.211[b]	-0.272[c]	-0.127	-0.382	-0.177[b]	-0.664[c]	-0.354[a]
Market-to-book	0.263[a]	0.090[a]	0.319	0.324	0.308	-0.015	0.186[a]	0.047[a]
Days spent in Chapter 11 prior to effective day of acquisition	368	240	479	329	358	248	288	186

(Table 3, Panel A continues)

Panel A: Firm characteristics

Variable	All distressed firms acquired (n=306)		Distressed firms acquired by investors (n=111)		Distressed firms acquired by creditors (n=13)		Distressed firms acquired by another operating company (n=182)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Total assets ($mill)	995.58	100.90	1,488.65	100.90	1,386.76	297.39	635.62	95.04
Sales ($mill)	850.34	91.20	1,214.42	133.44	1,423.38	277.09	542.68	63.87
Market capitalization ($mill)	257.19	35.77	292.37	35.62	222.85	57.03	235.67	39.69
Altman z-score	-1.872	0.457	-1.483	0.732	-2.404	-0.486	-2.307	0.314
Total liabilities/total assets	0.943	0.736	1.015	0.790	1.526	0.857	0.843	0.662
EBITDA/total assets	-0.293	0.033	-0.278	0.054	-0.750	0.085	-0.267	0.014
EBITDA/sales	-0.979	0.041	-0.755	0.053	-1.234	0.062	-0.996	0.023
Profit margin	-1.178	-0.126	-0.738	-0.079	-2.562	-0.456	-1.302	-0.139
ROA	-0.516	-0.122	-0.546	-0.103	-1.225	-0.359	-0.435	-0.136
Market-to-book	1.204	0.722	0.709	0.500	0.344	0.359	1.642	0.870
Days spent in Chapter 11 prior to effective day of acquisition	NA	NA	NA	NA	NA	NA	NA	NA

(Table 3, Panel B continues)

Panel B: Management turnover & ownership

Variable	All bankrupt firms acquired (n=93)		Bankrupt firms acquired by investors (n=27)		Bankrupt firms acquired by creditors (n=40)		Bankrupt firms acquired by another operating company (n=26)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
% CEO replaced through bankruptcy filing	44.00	0.00	49.00	0.00	47.00	0.00	35.00	0.00
% CEO replaced through acquisition	35.00[a]	0.00	30.00[a]	0.00	45.00[a]	0.00	27.00[c]	0.00
% stock held by officers and directors	2.92	0.11	2.19	0.11	3.88[a]	0.11[a]	2.69	0.10
% stock held by CEO	2.51	0.25[b]	3.70	0.75	1.88	0.15[a]	2.14	0.22[c]

Panel B: Management turnover & ownership

Variable	All distressed firms acquired (n=91)		Distressed firms acquired by investors (n=41)		Distressed firms acquired by creditors (n=12)		Distressed firms acquired by another operating company (n=38)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
% CEO replaced through bankruptcy filing	NA	NA	NA	NA	NA	NA	NA	NA
% CEO replaced through acquisition	20.00	0.00	11.00	0.00	7.00	0.00	34.00	0.00
% stock held by officers and directors	3.44	0.10	2.87	0.09	0.80	0.02	4.20	0.14
% stock held by CEO	2.64	0.13	3.72	0.55	1.66	0.002	2.51	0.17

EBITDA: Earnings before interest, taxes, depreciation and amortization.
[a,b,c] denote mean (median) significantly different between firms in the two groups at the 1, 5, and 10% level, respectively, based on t-test (Wilcoxon rank sum test).

Table presents accounting related data gathered from COMPUSTAT's annual financial reporting statements as well as information on executives and directors obtained from Thomson Reuters' Insider Data. We categorize the data by acquirer type: investors, creditors, and operating firms. In Panels A we report characteristics of sample (bankrupt) and control (distressed) firms and in Panel B we report executive management entrenchment related data. In parenthesis, n is a number of firms for which data is available. We report descriptive statistics for the sample firms as of one year preceding bankruptcy filings. For control firms the same statistics are reported as of one year preceding acquisition announcements. The variable "CEO replaced through bankruptcy filing" indicates whether the CEO in office two years prior to filing is still in office at the time of filing. The variable "CEO replace through acquisition" indicates whether the CEO in office two years prior to acquisition date is still in office at the time of announcement.

Table 4
Characteristics of operating firm acquirers of Chapter 11 and distressed firms

Variable	All operating firm acquirers of bankrupt firms (n=54)		All operating firm acquirers of distressed firms (n=143)	
	Mean	Median	Mean	Median
Total assets ($mill)	1,976.30[b]	581.48	4,127.10	418.12
Sales ($mill)	1,900.53[c]	479.34	3,627.70	492.80
Market capitalization ($mill)	1,703.32[c]	418.08	4,104.98	593.65
Altman z-score	0.56[b]	1.82[c]	3.38	2.29
Total liabilities/total assets	0.697	0.611	0.614	0.572
EBITDA/total assets	-0.036	0.088	0.039	0.103
EBITDA/sales	-0.047	0.112	-0.119	0.117
Profit margin	-0.226	0.010	-0.276	0.025
ROA	-0.243	0.010	-0.083	0.029

EBITDA: Earnings before interest, taxes, depreciation and amortization.

The table presents acquirers' characteristics similar to those reported in the previous tables for bankrupt and distressed targets. We obtain data from COMPUSTAT. We report descriptive statistics for acquirers that are operating companies as of one year preceding acquisition announcements. In parenthesis, n is a number of operating firm acquirers for which data is available.

Table 5
Transaction characteristics for bankrupt and distressed firms

Panel A: Transaction characteristics

Variable	All bankrupt firms acquired (n=428)		Bankrupt firms acquired by investors (n=130)		Bankrupt firms acquired by creditors (n=164)		Bankrupt firms acquired by another operating company (n=134)	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Acquisition	270	63%	101	78%	102	62%	67	50%
Buyback	1	0%	0	0%	0	0%	1	1%
Exchange offer	8	2%	1	1%	5	3%	2	1%
Merger	148	35%	28	22%	56	34%	64	48%
Recapitalization	1	0%	0	0%	1	1%	0	0%
Multiple bidders	13	3%	4	3%	0	0%	9	7%
Government owned involvement	4	1%	1	1%	3	2%	0	0%

(Table 5, Panel A continues)

Panel A: Transaction characteristics

Variable	All distressed firms acquired (n=306)		Distressed firms acquired by investors (n=111)		Distressed firms acquired by creditors (n=13)		Distressed firms acquired by another operating company (n=182)	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Acquisition	166	54%	81	73%	10	77%	75	41%
Buyback	13	4%	2	2%	0	0%	11	6%
Exchange offer	1	0%	0	0%	1	8%	0	0%
Merger	126	41%	28	25%	2	15%	96	53%
Recapitalization	0	0%	0	0%	0	0%	0	0%
Multiple bidders	10	3%	2	2%	0	0%	8	4%
Government owned involvement	8	3%	0	0%	1	8%	7	4%

(Table 5, Panel B continues)

Panel B: Transaction financing

Variable	All bankrupt firms acquired (n=428)		Bankrupt firms acquired by investors (n=130)		Bankrupt firms acquired by creditors (n=164)		Bankrupt firms acquired by another operating company (n=134)	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Financing via borrowing	6	1%	0	0%	1	1%	5	4%
Financing via stock offering	7	2%	2	2%	0	0%	5	4%
Financing via debt securities	5	1%	0	0%	0	0%	5	4%
Financing via internal corporate funds	4	1%	1	1%	0	0%	3	2%

Panel B: Transaction financing

Variable	All distressed firms acquired (n=306)		Distressed firms acquired by investors (n=111)		Distressed firms acquired by creditors (n=13)		Distressed firms acquired by another operating company (n=182)	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Financing via borrowing	27	9%	6	5%	0	0%	21	12%
Financing via stock offering	2	1%	0	0%	0	0%	2	1%
Financing via debt securities	3	1%	0	0%	0	0%	3	2%
Financing via internal corporate funds	42	14%	2	2%	0	0%	40	22%

(Table 5, Panel C continues)

Panel C: Firm and deal valuations

Variable	All bankrupt firms acquired (n=278)		Bankrupt firms acquired by investors (n=77)		Bankrupt firms acquired by creditors (n=72)		Bankrupt firms acquired by another operating company (n=129)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Deal value ($mill)	428.98[b]	58.25[a]	185.39[b]	58.42[a]	1136.12[b]	266.80	163.11	41.75
Enterprise market value ($mill)	1,097.19	327.30[a]	640.50	292.04[b]	1,890.44	927.57	595.81	195.97
Ent. value based on financials ($mill)	1,164.00	354.46[a]	659.31	292.02[b]	1994.84[c]	927.57	714.59	160.00
Deal value/sales	0.946[a]	0.297[a]	0.782[b]	0.213[c]	0.789	0.369[b]	1.088[a]	0.308[a]
Deal value/total assets	0.302[b]	0.218	0.247	0.188	0.319	0.255	0.333[a]	0.219[a]
Enterprise value/sales	2.351	0.930	2.318	0.930	2.144	0.860[c]	2.727	0.990
Enterprise value/total assets	0.753[a]	0.640[a]	0.669[a]	0.636[b]	0.792	0.648	0.789[a]	0.533[b]
Deal value/common equity	2.040[a]	1.086[a]	1.767[a]	1.086[c]	3.033	1.255	1.991[a]	0.979[a]
Offer price/book value	1.740[a]	1.027[a]	1.655[b]	0.997[c]	2.287	1.255	1.647[a]	0.962[a]

(Table 5, Panel C continues)

Panel C: Firm and deal valuations

Variable	All distressed firms acquired (n=264)		Distressed firms acquired by investors (n=89)		Distressed firms acquired by creditors (n=11)		Distressed firms acquired by another operating company (n=164)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Deal value ($mill)	195.22	24.34	88.80	13.10	347.57	197.70	260.60	33.06
Enterprise market value ($mill)	868.13	116.32	1,124.64	116.30	1,298.17	1,182.84	678.11	91.76
Ent. value based on financials ($mill)	925.83	121.15	1,216.74	157.82	1,266.00	1,182.84	764.81	93.63
Deal value/sales	2.509	0.602	1.677	0.313	3.176	0.841	3.108	0.827
Deal value/total assets	0.907	0.270	0.805	0.102	0.275	0.226	1.005	0.538
Enterprise value/sales	3.427	1.010	1.757	0.670	4.179	1.130	4.422	1.220
Enterprise value/total assets	1.653	0.911	1.348	0.865	1.055	0.659	1.880	0.975
Deal value/common equity	5.732	2.074	5.683	1.599	7.689	0.882	5.682	2.390
Offer price/book value	4.893	1.814	3.960	1.286	7.011	0.882	5.291	2.055

(Table 5, Panel D continues)

Panel D: Price paid versus value based on benchmark

Variable	All bankrupt firms acquired (n=278)		Bankrupt firms acquired by investors (n=77)		Bankrupt firms acquired by creditors (n=72)		Bankrupt firms acquired by another operating company (n=129)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Premiums (+) and discounts (-) calculated based on:								
industry median ent. value/sales	-15%[a]	-29%[a]	-19%[a]	-26%	5%	-19%	-27%[a]	-38%[a]
industry median ent. value/total assets	-27%[a]	-37%[a]	-29%[b]	-37%[c]	-16%	-28%	-33%[a]	-50%[a]

Panel D: Price paid versus value based on benchmark

Variable	All distressed firms acquired (n=264)		Distressed firms acquired by investors (n=89)		Distressed firms acquired by creditors (n=11)		Distressed firms acquired by another operating company (n=164)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Premiums (+) and discounts (-) calculated based on:								
industry median ent. value/sales	20%	-12%	18%	-14%	12%	-45%	21%	-9%
industry median ent. value/total assets	6%	-20%	-1%	-27%	19%	-39%	9%	-17%

This table reports transaction related data. The data reported here comes from Thompson Financial Services SDC Platinum and COMPUSTAT. Panel A describes transaction type, number and percentage of firms with multiples bidders and government involvement. Panel B reports acquisition financing methods (SDC does not report mixed financing). Panel C presents firm and deal values. Enterprise values are reported as of announcement of acquisition. Panel D includes transaction premiums (+) and discounts (-) in percentages for two multiples calculated as industry median enterprise value divided by sales and industry median enterprise value divided by book value of total assets. In parenthesis, n is a number of bankrupt and distressed targets for which data is available.

Table 6
Stock price effects on targets and acquirers around announcement of acquisition

Panel A: Acquisitions of Chapter 11 firms

Day	Target (n=107)						Acquirer (n=48)					
	Mean daily abnormal returns	P-values	Mean CMAR	P-values	Abnormal trading volume	P-values	Mean daily abnormal returns	P-values	Mean CMAR	P-values	Abnormal trading volume	P-values
-10	-0.28%	(0.7202)	-0.28%	(0.7202)	1.44	(0.0614)	0.44%	(0.4450)	0.44%	(0.4450)	-0.11	(0.4389)
-9	0.27%	(0.8362)	-0.01%	(0.9166)	1.41	(0.0104)	1.52%	(0.1751)	1.96%	(0.0998)	-0.37	(<.0001)
-8	-0.42%	(0.6325)	-0.43%	(0.7701)	1.76	(0.0031)	-1.05%	(0.0203)	0.92%	(0.9797)	-0.27	(0.0035)
-7	-1.40%	(0.1298)	-1.82%	(0.1623)	1.03	(0.0048)	1.31%	(0.0474)	2.23%	(0.2139)	0.04	(0.7521)
-6	-0.33%	(0.7358)	-2.15%	(0.2097)	0.89	(0.0056)	0.98%	(0.2929)	3.20%	(0.0845)	-0.03	(0.8630)
-5	1.96%	(0.1048)	-0.20%	(0.8438)	1.15	(0.0017)	-0.06%	(0.9043)	3.14%	(0.0793)	-0.13	(0.3668)
-4	-1.24%	(0.1700)	-1.44%	(0.4622)	2.06	(0.0021)	-0.28%	(0.5084)	2.86%	(0.1858)	-0.13	(0.2119)
-3	-1.18%	(0.2200)	-2.62%	(0.2395)	1.52	(0.0013)	0.05%	(0.9224)	2.90%	(0.1669)	-0.23	(0.0319)
-2	2.12%	(0.1557)	-0.50%	(0.5868)	1.60	(<.0001)	0.29%	(0.5758)	3.20%	(0.1411)	0.06	(0.7478)
-1	-1.36%	(0.2459)	-1.86%	(0.3168)	2.63	(0.0002)	-0.65%	(0.1355)	2.54%	(0.3067)	-0.16	(0.1018)
0	-8.50%	(0.0130)	-10.36%	(0.0221)	8.84	(0.0001)	3.85%	(0.0042)	6.39%	(0.0165)	0.95	(0.0002)
1	-1.09%	(0.7039)	-11.45%	(0.0332)	9.32	(0.0006)	1.21%	(0.0504)	7.60%	(0.0036)	0.56	(0.0057)
2	-3.54%	(0.0382)	-14.99%	(0.0774)	5.29	(0.0052)	0.19%	(0.4927)	7.79%	(0.0047)	-0.06	(0.6220)
3	-0.94%	(0.7738)	-15.93%	(0.0965)	3.57	(0.0005)	0.65%	(0.1963)	8.44%	(0.0037)	-0.01	(0.9438)
4	-0.81%	(0.6295)	-16.75%	(0.0567)	3.08	(<.0001)	1.13%	(0.3468)	9.57%	(0.0044)	0.31	(0.0617)
5	0.66%	(0.6819)	-16.09%	(0.0577)	2.98	(<.0001)	0.47%	(0.5284)	10.04%	(0.0047)	0.06	(0.7097)
6	0.13%	(0.9158)	-15.96%	(0.0729)	3.00	(0.0331)	0.27%	(0.7222)	10.31%	(0.0021)	0.03	(0.8200)
7	-0.77%	(0.5439)	-16.73%	(0.0872)	2.48	(0.0153)	-1.07%	(0.0326)	9.24%	(0.0055)	0.06	(0.6605)
8	2.16%	(0.2639)	-14.57%	(0.0820)	1.60	(0.0028)	0.61%	(0.0862)	9.84%	(0.0044)	-0.25	(0.0083)
9	0.70%	(0.6038)	-13.88%	(0.0937)	1.72	(0.0101)	0.51%	(0.2742)	10.35%	(0.0049)	-0.11	(0.4077)
10	1.28%	(0.3699)	-12.60%	(0.0978)	1.35	(0.0458)	-0.42%	(0.3596)	9.93%	(0.0052)	-0.14	(0.0900)

(Table 6 continues)

Panel B: Acquisitions of distressed firms

Day	Target (n=202)						Acquirer (n=125)					
	Mean daily abnormal returns	P-values	Mean CMAR	P-values	Abnormal trading volume	P-values	Mean daily abnormal returns	P-values	Mean CMAR	P-values	Abnormal trading volume	P-values
-10	-0.60%	(0.0805)	-0.60%	(0.0805)	0.13	(0.1047)	0.27%	(0.3523)	0.27%	(0.3523)	-0.07	(0.5657)
-9	-0.45%	(0.1866)	-1.04%	(0.0190)	0.11	(0.1615)	-0.04%	(0.8695)	0.23%	(0.5037)	0.18	(0.3341)
-8	0.18%	(0.6359)	-0.86%	(0.1262)	0.01	(0.9271)	-0.22%	(0.2650)	0.01%	(0.9791)	0.07	(0.6076)
-7	-0.20%	(0.5371)	-1.06%	(0.0959)	0.25	(0.0053)	0.41%	(0.2052)	0.42%	(0.3294)	0.01	(0.9455)
-6	0.20%	(0.5724)	-0.86%	(0.2328)	0.39	(0.0004)	-0.41%	(0.0635)	0.01%	(0.8185)	0.16	(0.1532)
-5	-0.69%	(0.1686)	-1.55%	(0.1000)	0.44	(0.0002)	-0.01%	(0.9660)	0.00%	(0.9630)	0.20	(0.2944)
-4	0.79%	(0.0159)	-0.76%	(0.4654)	0.47	(0.0001)	-0.30%	(0.2484)	-0.30%	(0.6397)	0.29	(0.0544)
-3	0.86%	(0.0324)	0.10%	(0.7860)	0.34	(0.0014)	-0.42%	(0.1148)	-0.73%	(0.1667)	0.15	(0.4060)
-2	0.77%	(0.0810)	0.87%	(0.2731)	0.40	(0.0007)	-0.38%	(0.3972)	-1.10%	(0.1426)	0.17	(0.1345)
-1	0.98%	(0.0177)	1.85%	(0.0602)	0.63	(<.0001)	0.68%	(0.0546)	-0.42%	(0.7578)	0.06	(0.4962)
0	12.02%	(<.0001)	13.87%	(<.0001)	8.37	(<.0001)	2.74%	(<.0001)	2.32%	(0.0203)	1.73	(<.0001)
1	6.78%	(<.0001)	20.65%	(<.0001)	9.06	(<.0001)	0.18%	(0.8293)	2.49%	(0.0424)	1.00	(<.0001)
2	-0.40%	(0.1374)	20.25%	(<.0001)	3.34	(<.0001)	0.28%	(0.4469)	2.78%	(0.0348)	0.46	(0.0367)
3	0.69%	(0.0218)	20.95%	(<.0001)	2.30	(<.0001)	-0.73%	(0.0335)	2.05%	(0.1267)	0.32	(0.0531)
4	0.38%	(0.2408)	21.33%	(<.0001)	1.84	(<.0001)	-0.10%	(0.7111)	1.95%	(0.1229)	0.09	(0.2330)
5	-0.46%	(0.1254)	20.87%	(<.0001)	1.12	(<.0001)	-0.68%	(0.0070)	1.27%	(0.2974)	0.28	(0.0467)
6	-0.04%	(0.8558)	20.83%	(<.0001)	1.08	(<.0001)	0.43%	(0.1186)	1.71%	(0.1786)	0.08	(0.4095)
7	-0.25%	(0.4212)	20.58%	(<.0001)	1.18	(<.0001)	-0.49%	(0.0937)	1.21%	(0.3483)	0.07	(0.4673)
8	-0.12%	(0.6250)	20.46%	(<.0001)	0.83	(<.0001)	0.14%	(0.6914)	1.35%	(0.3209)	0.21	(0.0556)
9	0.06%	(0.7913)	20.53%	(<.0001)	0.69	(<.0001)	-0.30%	(0.1442)	1.05%	(0.4554)	-0.02	(0.6967)
10	0.08%	(0.7997)	20.61%	(<.0001)	0.78	(<.0001)	0.27%	(0.3954)	1.31%	(0.3332)	0.08	(0.3646)

CMAR: cumulative market adjusted returns

This table describes market reaction to acquisition announcements for both targets and acquirers. Day 0 is the day of acquisition announcement. We present market adjusted and cumulative returns for days -10 through +10 surrounding the announcement day. We use equally weighted market return, including dividends, for expected return. We find natural logarithm of (1+volume) to address issue of data non-normality. We also consider issue of positive serial correlation and create day-of-the-week indicator variables. We run OLS regressions controlling for positive correlation and day-of-the-week effect. We utilize CRSP to gather market related data. P-values presented in parenthesis. In parenthesis, n is a number of targets and acquirers for which market data is available. Panel A reports abnormal returns and trading volumes for bankrupt firms and their acquirers and Panel B reports those for distressed firms that their acquirers.

Figures 2a and 2b
Cumulative market adjusted returns and abnormal trading volumes for bankrupt and distressed targets and their acquirers

(a) CMARs **(b) abnormal trading volumes**

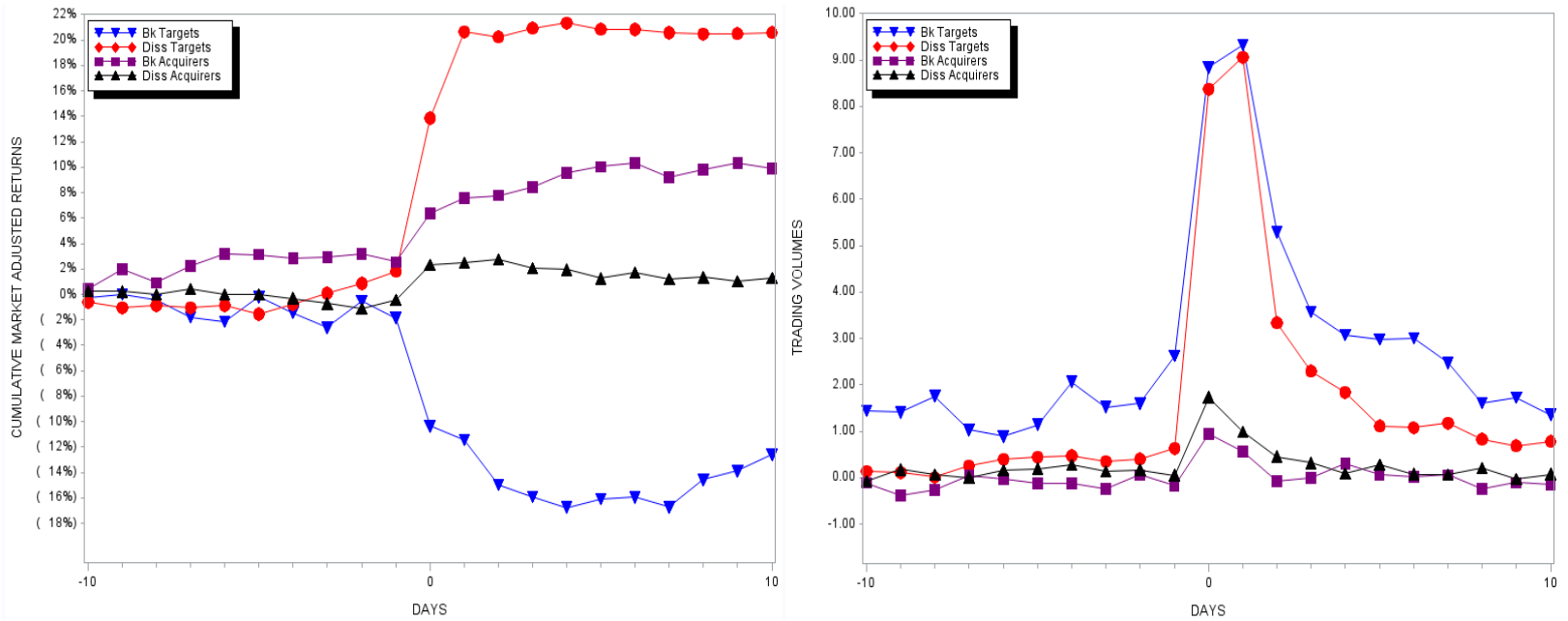


Figure 2a pictorially presents 21-day window CMARs for bankrupt and distressed firms and their targets reported. Figure 2b pictorially presents 21-day window abnormal trading volumes for bankrupt and distressed firms and their targets. We utilize CRSP to gather market related data. X-axis plots number of days with Day 0 being day of acquisition announcement. Y-axes on Figures 2a and 2b plot CMARs and trading volumes, respectively.

Table 7
Stock price effects on bankrupt targets around announcement of acquisition, categorized based on timing of the announcement

Day	Ann. date<Filing date (n=26)		Ann. date=Filing date (n=25)		Filing date<Ann. date <Emerg. date (n=30)		Ann. date>=Emerg. date (n=26)	
	Mean daily abnormal returns	Mean CMAR	Mean daily abnormal returns	Mean CMAR	Mean daily abnormal returns	Mean CMAR	Mean daily abnormal returns	Mean CMAR
-10	0.36%	0.36%	-2.93%	0.36%	1.32%	1.32%	-0.23%	-0.23%
-9	-1.98%	-1.63%	3.52%	0.59%	-2.82%	-1.50%	3.61%[b]	3.39%[c]
-8	0.80%	-0.83%	-3.98%	-3.39%	2.28%	0.78%	-1.33%	2.06%
-7	1.92%	1.09%	-3.36%	-6.75%	-2.81%	-2.03%	-1.37%	0.69%
-6	0.66%	1.76%	-2.50%	-9.25%	-1.03%	-3.06%	1.80%	2.49%
-5	4.44%	6.20%	3.42%	-5.83%	-2.16%[c]	-5.22%	2.52%	5.02%
-4	-0.45%	5.75%	-1.78%	-7.61%	-1.84%	-7.06%[c]	-0.83%	4.19%
-3	-3.27%	2.48%	-5.14%[b]	-12.75%[c]	1.90%	-5.16%	1.73%	5.92%
-2	1.62%	4.10%	1.75%	-11.01%[c]	2.04%	-3.12%	3.19%[b]	9.11%[b]
-1	-0.23%	3.87%	-2.92%	-13.93%[b]	-2.80%	-5.93%	0.74%	9.85%[b]
0	-14.53%[b]	-10.66%	-29.81%[a]	-43.74%[a]	-3.12%	-9.05%	11.81%[c]	21.66%[a]
1	3.16%	-7.50%	-10.23%	-53.96%[a]	0.49%	-8.56%	0.51%	22.17%[a]
2	-4.35%	-11.85%	-17.35%[b]	-71.32%[a]	3.01%	-5.55%	0.53%	22.70%[a]
3	-1.82%	-13.66%	3.20%	-68.12%[a]	-3.05%[c]	-8.60%[c]	-1.15%	21.55%[a]
4	3.37%	-10.30%	-5.03%	-73.15%[a]	-3.38%[b]	-11.98%[b]	2.06%	23.61%[a]
5	-0.47%	-10.76%	1.27%	-71.88%[b]	1.91%	-10.06%[c]	-0.30%	23.31%[a]

(Table 7 continues)

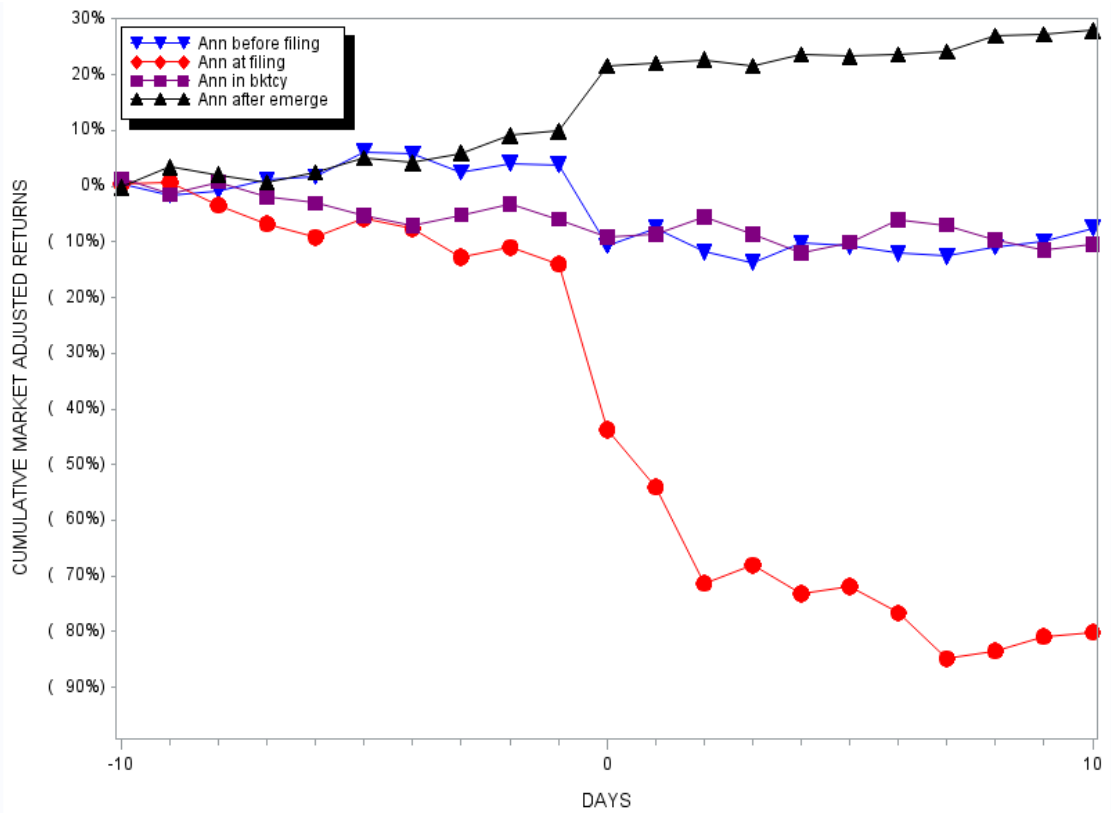
Day	Ann. date<Filing date (n=26)		Ann. date=Filing date (n=25)		Filing date<Ann. date <Emerg. date (n=30)		Ann. date>=Emerg. date (n=26)	
	Mean daily abnormal returns	Mean CMAR	Mean daily abnormal returns	Mean CMAR	Mean daily abnormal returns	Mean CMAR	Mean daily abnormal returns	Mean CMAR
6	-1.30%	-12.06%	-4.78%	-76.66%[b]	3.97%[b]	-6.10%	0.38%	23.68%[a]
7	-0.52%	-12.58%	-8.22%	-84.88%[b]	-0.85%	-6.95%	0.52%	24.20%[a]
8	1.60%	-10.98%	1.46%	-83.42%[b]	-2.73%	-9.69%	2.77%	26.97%[a]
9	1.11%	-9.87%	2.60%	-80.82%[b]	-1.83%	-11.52%	0.27%	27.24%[a]
10	2.39%	-7.48%	0.78%	-80.04%[b]	1.10%	-10.41%	0.70%	27.93%[a]

CMAR: cumulative market adjusted returns

[a,b,c] denote statistical significance at the 1, 5, and 10% level, respectively.

The table presents similar market return data to that reported in the previous table, categorizing the data by acquisition announcement timing as follows: announcement date is before bankruptcy filing date, announcement and filing dates are the same, announcement date is between filing and emergence dates, and announcement date is after emergence date. In parenthesis, n is a number of bankrupt targets for which market return data is available.

Figure 3
Cumulative market adjusted returns for bankrupt targets based on the timing of acquisition announcements in relation to bankruptcy filings



The Figure pictorially presents 21-day window CMARs for bankrupt firms reported in Table 7. We utilize CRSP to gather market related data. X-axis plots number of days with Day 0 being day of acquisition announcement. Y-axis plots CMARs.

Table 8
Post-merger combined operating performance of distressed and bankrupt targets and operating firm acquirers

Panel A: Cash flow performance of combined target and acquirer

Year relative to merger	Bankrupt firms acquired by another operating company			Distressed firms acquired by another operating company		
	Number	Firm median	% Positive	Number	Firm median	% Positive
-3	39	0.073	54%	126	0.114	81%
-2	48	0.132	56%	125	0.093	75%
-1	46	0.081	53%	106	0.098	81%
1	46	0.141	89%	120	0.123	88%
2	37	0.179	95%	105	0.144	90%
3	36	0.135	86%	90	0.131	91%

Panel B: Change in combined cash flow performance (EBITDA/sales) relative to year prior to merger

Years	Number	Median change	Median % change	Number	Median change	Median % change
-1 to +1	46	0.096[a]	7%[c]	106	0.014	1%[c]
-1 to +2	37	0.110[a]	6%	105	0.005	2%
-1 to +3	36	0.107[b]	3%	90	0.010[b]	3%

EBITDA: Earnings before interest, taxes, depreciation and amortization.
[a,b,c] denote statistical significance at the 1, 5, and 10% level, respectively.

This table describes post-merger performance. We utilize COMPUSTAT to obtain necessary financial data. To measure post-acquisition performance we use pretax operating cash flow returns. Operating cash flows are earnings before interest, taxes, and depreciation and amortization (EBITDA). To provide measure comparable across sample and control firms we deflate EBITDA by sales. For three years before the acquisition, the operating cash flow ratios are calculated as the sums of target and acquirer EBITDA divided by the sums of target and acquirer sales revenues. After the acquisition, we use the acquirers' operating cash flow ratios. We analyze operating cash flow ratios only for those bankrupt and distressed firms acquired by another operating firm for which accounting data is available. In Panel A, we report median levels of bankrupt and distressed firms' operating cash flows from three years before the effective date of acquisition to three years after the effective day of acquisition. Panel B of Table 8 shows changes in bankrupt and distressed firm operating cash flows relative to the year prior to their acquisitions.

Table 9
Quarterly average number of shares of bankrupt and M&A distressed firms held by institutional investors, categorized by manager type

Quarter horizons	*Institutional ownership of bankrupt firms*						Institutional ownership of distressed M&A firms					
	All	Manager type					All	Manager type				
		1	2	3	4	5		1	2	3	4	5
-4	417,817	263,450	202,764	468,571	442,228	464,258	395,958	230,100	258,085	460,756	421,531	431,834
	333	259	149	134	283	291	321	277	164	146	274	264
-3	408,255	249,219	276,909	514,875	403,827	459,475	411,847	247,428	312,719	563,799	506,787	418,687
	337	241	132	109	273	296	326	275	161	144	279	281
-2	420,146	243,189	295,554	510,326	436,608	470,130	436,593	255,141	290,944	581,251	505,839	457,923
	335	216	106	89	263	281	329	272	169	140	275	281
-1	454,475	260,481	322,812	568,584	455,317	514,548	403,654	230,293	289,112	588,256	509,005	405,936
	325	178	86	68	235	279	328	258	162	143	274	281
0	464,570	207,703	356,075	434,858	460,681	549,680	433,268	288,501	254,427	587,366	495,318	449,222
	309	122	63	51	209	266	301	228	144	119	250	244
1	512,810	210,003	387,438	363,742	486,035	624,794	452,338	296,324	332,828	729,414	532,161	455,368
	269	91	59	51	165	215	164	118	69	61	133	129
2	470,078	212,484	382,404	332,000	532,988	528,867	587,886	519,231	421,579	1,013,593	633,860	580,135
	239	81	62	46	151	196	128	92	60	53	97	96
3	529,240	174,127	525,169	400,632	609,181	586,011	585,306	540,104	474,445	1,014,579	582,166	585,354
	235	88	52	45	146	189	116	81	56	47	85	86
4	467,620	184,229	556,150	387,052	560,432	482,221	612,133	579,462	531,209	928,542	575,206	622,977
	209	74	52	49	141	161	113	80	56	47	83	88

This table presents institutional holdings during eight quarters surrounding quarter of acquisition announcements (quarter 0). Using 13f quarterly filings obtained from Thomson Reuters' Institutional (13f) Holdings–s34 we analyze institutional holdings for acquired bankrupt and distressed firms. Underneath each quarterly holding we report number of firms with institutional holdings. For quarters -4 through -1, shareholdings and number of firms are for targets only; for the following five quarters these numbers also include acquirers, depending on the quarter when

acquisition was completed. Manager types are delineated as: 1 = Banks, 2 = Insurance companies, 3 = Investment companies and their managers, 4 = Independent investment advisors, and 5 = All others.

Figures 4a and 4b
Quarterly institutional shareholdings for bankrupt and distressed targets

(a) shareholdings for bankrupt firms **(b) shareholdings for distressed firms**

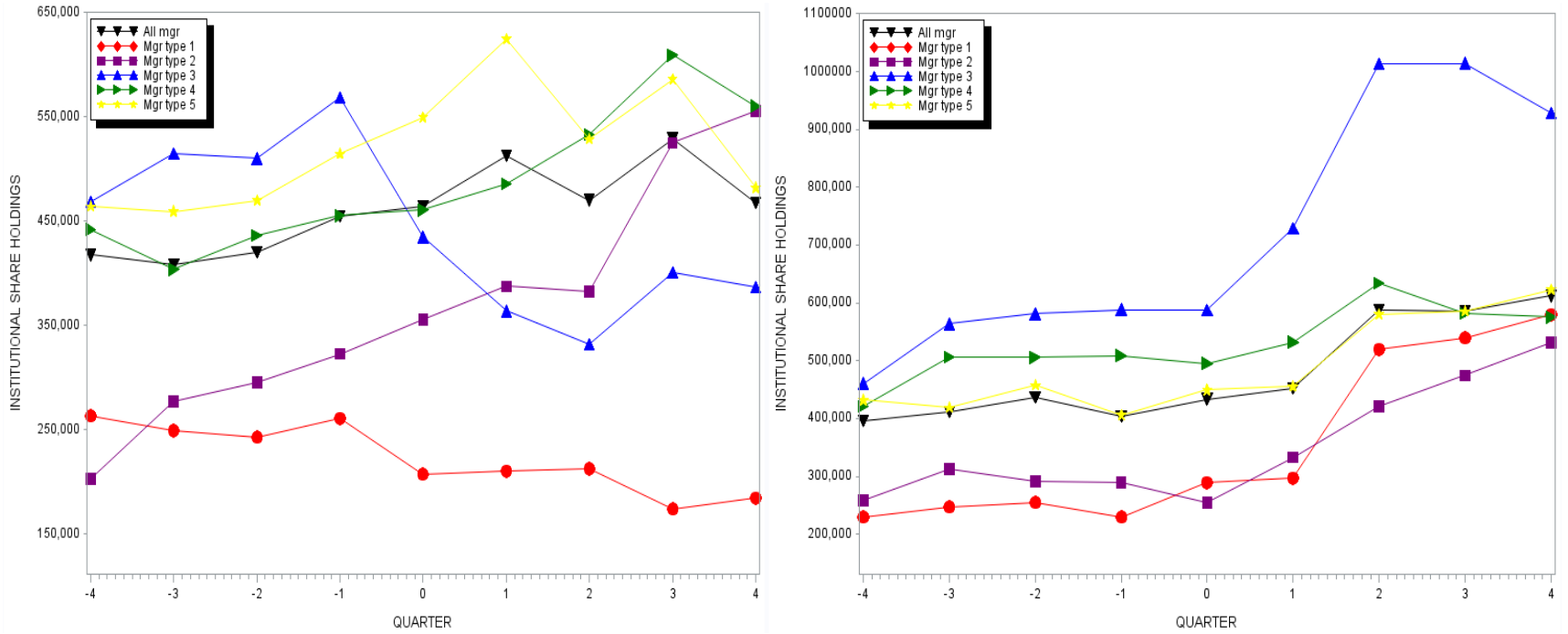


Figure 4a pictorially presents institutional shareholdings for bankrupt firms reported in Table 9. Figure 4b pictorially presents institutional shareholdings for distressed firms also reported in Table 9. X-axis plots number of shares held by institutional managers, all and according to the type. Y-axis plot quarter relative to the quarter of acquisition announcement, quarter 0. Black line on both plots represents institutional ownerships for all respective firms. Lines in color are each manager type's quarterly holdings.

Table 10
Propensity of firms to be acquired outside of bankruptcy

Variables	Model 1		Model 2		Model 3		Model 4		Model 5	
	Estimates	Point estimates	Estimates	Point estimates	Estimates	Point estimates	Estimates	Point estimates	Estimates	Point estimates
Intercept	-1.456[b]	-	-1.680[b]	-	-2.605[a]	-	-3.789	-	-4.666[b]	-
LNMKTCAP	0.154[b]	1.167	0.152[b]	1.164	0.304[a]	1.355	0.235	1.265	0.261[b]	1.298
EMP	-0.032[b]	0.969	-0.034[b]	0.967	-0.040[b]	0.961	-0.064[b]	0.938	-0.014	0.986
ZSCORE	-0.010	0.990								
DEBT			-0.001	0.999	-0.001	0.999	0.003	1.003	0.008	1.008
ROA			-0.014	0.986	-0.074	0.929	-0.481	0.618	0.610[b]	1.841
OCFSL			-0.003	0.997	0.032	1.033				
CURRT			0.144[b]	1.154	0.202[b]	1.224	-0.251	0.778	0.165[c]	1.179
MB			0.080[b]	1.083	0.078[b]	1.081	0.159[c]	1.172	0.046	1.047
OFFDIR					0.044[c]	1.045	0.142[b]	1.152	0.023	1.024
IH					0.096	1.101				
SIC									0.873[a]	2.394
Number of obs.	469		432		317		118		192	
Likelihood Ratio	16.526[a]		34.450[a]		43.633[a]		22.944[b]		31.908[a]	

[a,b,c] denote statistical significance at the 1, 5, and 10% level, respectively.

The table reports results of logistic regression with binary variable equaling to one if distressed firms that have not filed for bankruptcy are acquired, and zero otherwise. We use the following performance related variables, similar to those reported in Tables 2 and 3 as controls: natural logarithm of market capitalization (LNMKTCAP), number of employees (EMP), Altman's z-score (ZSCORE), debt-to-equity ratio (DEBT), return on assets (ROA), operating cash flow returns on sales (OCFSL), current ratio measured as current assets divided by current liabilities (CURRT), market-to-book ratio (MB), shareholdings of officers and directors (OFFDIR) and institutions (IH), and dummy variable (SIC) equaling

one if target and acquirer operate in the same industry (based on a two-digit SIC) and zero otherwise. We partition our firms based on type of acquirer (investors in Model 4 and operating companies in Model 5) and run regressions 4 and 5 with several variables from Model 3.

Table 11
Post-merger abnormal operating performance

Panel A: Abnormal post-merger cash flow returns for firms acquired in Chapter 11 (heteroscedasticity consistent p-values in parentheses)

					Adj R^2	N
$CR_{+1,i}$	=	16.8% (<.0001)	+	0.22 $CR_{-1,i}$ (<.0001)	0.37	46
$CR_{+2,i}$	=	15.2% (<.0001)	+	0.21 $CR_{-1,i}$ (<.0001)	0.42	37
$CR_{+3,i}$	=	13.5% (<.0001)	+	0.37 $CR_{-1,i}$ (<.0001)	0.45	36

Panel B: Abnormal post-merger cash flow returns for acquired distressed firms (heteroscedasticity consistent p-values in parentheses)

					Adj R^2	N
$CR_{+1,j}$	=	3.5% (0.6309)	+	0.54 $CR_{-1,j}$ (0.2482)	0.16	106
$CR_{+2,j}$	=	0.2% (0.9689)	+	0.56 $CR_{-1,j}$ (0.0827)	0.28	105
$CR_{+3,j}$	=	11.0% (0.0005)	+	0.07 $CR_{-1,j}$ (0.4275)	0.02	90

This table reports results of several cross-sectional regressions. We use cash flow performance variables reported in Table 8 as independent variables and run several cross-sectional regressions of post-merger cash flow returns on sales for years 1, 2, and 3 on pre-merger returns in year -1 for both sample (in Panel A) and control (in Panel B) firms. Our intercept measures abnormal performance and captures post-merger performance influenced by economy-wide and industry factors. P-values reported in parenthesis. $CR_{+1\ through\ +3,i/j}$ is the post-merger (years 1 through 3) cash flow return on sales for bankrupt (*i*) and distressed (*j*) firms, and $CR_{-1,i/j}$ is the pre-merger (year -1) cash flow return on sales for bankrupt (*i*) and distressed (*j*) firms. The slope coefficient β measures relationship between pre- and post-merger cash flow returns or the effect of the firm performance one year prior to acquisition on post-merger cash returns one, two, and three years following the acquisition.

Table 12
Post-merger combined cumulative abnormal returns for bankrupt and distressed targets and their acquirers

Post-merger mean cumulative abnormal returns for bankrupt and distressed firms				
Month periods	All bankrupt firms (n=89)	Bankrupt firms acquired in Chapter 11 (n=63)	Bankrupt firms acquired in the first year after emergence (n=26)	All distressed firms (n=202)
3	-1.18%	-3.54%[b]	4.07%	-0.45%
6	-2.94%	-5.91%[c]	3.80%	0.52%
12	-6.26%[b]	-9.53%[b]	1.59%	-1.64%

[a,b,c] denote statistical significance at the 1, 5, and 10% level, respectively.

This table reports combined mean cumulative abnormal returns for 3-, 6-, and 12-month post-merger periods. We utilize CRSP to gather market related data. We determine combined post-merger returns for all bankrupt firms, for bankrupt firms that were acquired in Chapter 11, for bankrupt firms that were acquired during the first year after emergence, and for distressed firms. We compute the post-acquisition cumulative adjusted returns as a weighted sum of the returns for target and its acquirer. In parenthesis, n is a number of firms for which market return data is available.

Table 13
Post-merger abnormal stock market performance

Panel A: Abnormal post-merger cumulative market returns for all bankrupt firms (heteroscedasticity consistent p-values in parentheses)

					Adj R^2	N
$CR_{+3,i}$	=	-1.7%	+	-0.09 $CR_{-3,i}$	0.01	89
		(0.3611)		(0.6532)		
$CR_{+6,i}$	=	-5.1%	+	-0.48 $CR_{-3,i}$	0.05	89
		(0.1080)		(0.0457)		
$CR_{+12,i}$	=	-10.8%	+	-0.96 $CR_{-3,i}$	0.13	89
		(0.0071)		(0.0806)		

Panel B: Abnormal post-merger cumulative market returns for bankrupt firms acquired in Chapter 11 (heteroscedasticity consistent p-values in parentheses)

					Adj R^2	N
$CR_{+3,i}$	=	-5.1%	+	-0.08 $CR_{-3,i}$	0.01	63
		(0.0224)		(0.6767)		
$CR_{+6,i}$	=	-9.7%	+	-0.46 $CR_{-3,i}$	0.06	63
		(0.0292)		(0.0683)		
$CR_{+12,i}$	=	-16.9%	+	-0.97 $CR_{-3,i}$	0.14	63
		(0.0038)		(0.0932)		

Panel C: Abnormal post-merger cumulative market returns for bankrupt firms acquired in the first year after emergence (heteroscedasticity consistent p-values in parentheses)

					Adj R^2	N
$CR_{+3,i}$	=	4.2%	+	-1.39 $CR_{-3,i}$	0.08	26
		(0.1427)		(0.0082)		
$CR_{+6,i}$	=	2.6%	+	-3.17 $CR_{-3,i}$	0.38	26
		(0.3238)		(0.0106)		
$CR_{+12,i}$	=	0.6%	+	-2.51 $CR_{-3,i}$	0.30	26
		(0.7882)		(0.0984)		

Panel D: Abnormal post-merger cumulative market returns for acquired distressed firms (heteroscedasticity consistent p-values in parentheses)

					Adj R^2	N
$CR_{+3,j}$	=	-0.4%	+	-0.09 $CR_{-3,j}$	0.01	202
		(0.4891)		(0.1395)		
$CR_{+6,j}$	=	0.5%	+	0.28 $CR_{-3,j}$	0.05	202
		(0.6138)		(0.0449)		
$CR_{+12,j}$	=	-1.7%	+	0.40 $CR_{-3,j}$	0.02	202
		(0.4228)		(0.0433)		

This table reports results of several cross-sectional regressions. We use cumulative market adjusted returns as independent variables and run several cross-sectional regressions of post-

merger cumulative abnormal returns for 3, 6, and 12 month periods on 3 month pre-merger returns for both sample (in Panels A, B, and C) and control (in Panel D) firms. We utilize CRSP to gather market related data. Panel A contains regression results for all bankrupt firms. Panel B includes results for bankrupt firms with acquisition announcements either before bankruptcy filings or while in Chapter 11. Panel C includes results for bankrupt firms with acquisition announcements in the year following emergence. Panel D contains regression results for all distressed firms. Our intercept measures abnormal market performance and captures post-merger performance influenced by economy-wide and industry factors. Heteroscedasticity consistent p-values are reported in parenthesis. $CR_{+3\ through\ +12,i/j}$ is the post-merger (month 3, 6, and 12) market abnormal returns for bankrupt (*i*) and distressed (*j*) firms, and $CR_{-3,i/j}$ is the pre-merger (month -3) market abnormal returns for bankrupt (*i*) and distressed (*j*) firms. The slope coefficient β measures relationship between pre- and post-merger cumulative abnormal returns or the effect of the firm market performance three months prior to acquisition on post-merger abnormal market returns three, six, and twelve months following the acquisition.