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Dead Stocks Walking: Investor Irrationality in Worthless Stocks

Abstract

This study documents clear evidence of investor irrationality using a sample of bankrupt firm stocks that were canceled without any payoff under the confirmed reorganization plan. Although the intrinsic value of these stocks is zero after the plan confirmation, some of them have sizable dollar trading volume. Prices are higher for more heavily traded or popular stocks, which are more likely to attract uninformed investors. We also document irrational price responses of the worthless stocks to news events. Short-covering cannot account for the price and trading volume observed for worthless stocks. Short-sellers are active in these stocks and play a useful role pushing prices down toward intrinsic value.

Keywords: investor irrationality, worthless stocks, bankrupt firm stocks
JEL Codes: G14, G12

Dead Stocks Walking: Investor Irrationality in Worthless Stocks

“GM management strongly believes that any recovery for the common stockholders in the chapter 11 bankruptcy process is highly unlikely, even under the most optimistic of scenarios.”

Corporate statement regarding GMGMQ stock on June 10, 2009

GMGMQ Stock Price: \$1.29 Shares Traded: 73,666,000

Market data for June 11, 2009

1. Introduction

Stocks of bankrupt firms trade at surprisingly high prices relative to underlying value. Moreover, trading volumes of these firms are pretty robust. The behavior of Motors Liquidation (old General Motors) stock price after the firm declared bankruptcy best exemplifies this phenomenon. On June 1, 2009, General Motors (GM) filed for bankruptcy after surviving for several months through emergency loans provided by the U.S. government. By July 10, 2009, profitable assets were sold to a newly formed firm, with the U.S. government providing the new firm additional funds in exchange for stock. The old GM was saddled with liabilities far in excess of its assets, and ultimately the stock was canceled under the reorganization plan without any payout. In addition to the protestations of the management quoted above, there were multiple related media stories, warnings on the SEC website, and the ticker symbol was changed to MTLQQ on July 15, 2009 in an effort to remove investor confusion about the security's disassociation from the “new GM”. Astoundingly, over the 22 months following the bankruptcy filing, the daily trading volume for the “worthless” GMGMQ/MTLQQ stock averaged \$7.08 million with a maximum value of \$259.14 million. The Motors Liquidation reorganization plan was confirmed on March 29, 2011. On March 31, 2011, the effective date of the reorganization plan and when it was officially canceled, the stock closed at 4.2 cents with 8.9 million shares

traded!

Our primary objective in this study is to determine whether investor irrationality is pervasive in the trading of bankrupt firm stocks. While GM management was unusually forceful in its statements about the stock's worthlessness, stocks of bankrupt firms represent out-of-the-money call options on the underlying firms' assets, and will generally have positive intrinsic values. It is difficult to determine true intrinsic values of stocks, and therefore it is hard to draw definitive conclusions about rationality of stock prices. In a rare exception, Lamont and Thaler (2003) identify six stocks out of a sample of 18 stocks which are clearly mispriced, given their value arising from the claims they represented in other publicly traded stocks. To obtain similarly clear evidence of irrationality, we identify 264 stocks that did not receive any payoffs in the bankruptcy reorganization plan during the period 2000-2011. Following the confirmation of the reorganization plan, these stocks have zero intrinsic value. In a rational market, their prices should have dropped to zero and they should have ceased trading.

The evidence from our sample of worthless stocks reveals that the GM case is not an isolated anomaly. Irrational investors drive up the stock price above intrinsic value; difficulties faced by short-sellers prevent them from arbitraging away this price discrepancy. The observed deviations in prices from intrinsic value are meaningful in economic terms. Based on the closing price on the plan confirmation date, the total market value of equity of all the 264 worthless stocks in the sample exceeds \$1 billion; their total dollar trading volume on and after the plan confirmation date exceeds \$400 million. While most of the sample stocks trade for very low prices with modest volume and the median market capitalization is only about \$275,000, there are several notable anomalies. For 33 worthless firms, market capitalization exceeds \$ 5 million, based on the maximum price observed after plan confirmation; for 66 firms, it exceeds \$ 2

million. In 63 instances involving 19 firms, daily trading volume exceeds \$ 1 million on or after the confirmation date, with a high of \$ 18.7 million in one case. Furthermore, there are many instances of puzzling increases in the prices of these confirmed worthless stocks. The significant market capitalization and trading activity of some worthless stocks provide strong evidence of irrationality in these markets.

Stocks in bankrupt firms are held mainly by individual investors.¹ The lack of much institutional ownership limits the availability of shares that can be borrowed by short-sellers. Most of the worthless stocks experiencing significant trading activity after plan confirmation are firms that are well-recognized by consumers or individual investors. Consistent with the ignorance and irrationality of individual investors, post-confirmation prices are higher for stocks which are more popular as measured by trading volume. In contrast, higher liquidity should lead to more efficient prices, in a rational market; for worthless stocks, this would imply that higher volume leads to lower prices, closer to the intrinsic value of zero.

We buttress the evidence on market irrationality by analyzing stock price responses to news events. Rashes (2001) presents convincing evidence of investor ignorance by documenting unjustified, significant stock price responses to news events; investors trade heavily and significantly impact stock prices in the wake of news about better known firms with similar ticker symbols. In a similar vein, we identify extraordinary changes in price and trading volume of the old General Motors stock (MTLQQ) and our sample of worthless stocks. We search for news events around these changes and find several instances of irrational stock price responses.

The General Motors (GM) case represents an unusual situation where profitable assets of

¹ Coelho, John, and Taffler (2011) report that individual investors own 80% of the stock. Li and Zhong (2011) estimate individual ownership at 95%. Institutional investors exit these stocks after bankruptcy filing.

a bankrupt firm were spun off to a new firm (new GM) before the resolution of the bankruptcy. News on positive developments for new GM, such as its initial public offering, had no relevance for the payoffs to old GM (GMGMQ/MTLQQ) shares, since they did not have claims in the new GM. Nonetheless, old GM stock price and volume increased substantially in response to these events. The evidence indicates that investors in old GM stock are confused and falsely believe that their shares represent claims in the new GM.

Stocks that have been declared worthless in the reorganization plan also exhibit irrational stock price responses to news events on or after the plan confirmation date. We summarize two of these cases here to provide a flavor of this evidence. Kmart's reorganization plan was confirmed on April 22, 2003. Kmart's stock price doubled from 6.6 cents on April 21, 2003 to 14 cents on April 23, 2003 on heavy volume, notwithstanding the fact that these shares were canceled without a payoff.² Headlines in news accounts of this event trumpeted Kmart's "emergence from bankruptcy" and hardly discussed the wiping out of the old stock. The increase in the old stock's price is consistent with investors confusing the old stock for newly issued shares in the reorganized Kmart.

The case of VeraSun Energy, an ethanol producer which was liquidated, provides another striking illustration of investor ignorance. The stock continued to be traded, after the bankruptcy court confirmed on October 23, 2009 that the stockholders will not receive any payout. In early 2010, there was positive news about increased operating margins in the ethanol industry. This positive industry news should have had no bearing on the VeraSun Energy stock that had been

² These stockholders did receive tiny claims (2%) on the net proceeds, if any, from litigation against management and auditors. This payoff was detailed in the reorganization plan which was disclosed before and widely expected to be confirmed and, hence, did not constitute news on the confirmation date. As explained later, the observed stock prices far exceeded any reasonable value of the litigation claims.

canceled already. Yet, market prices surged since investors seemed to be unaware of its ‘dead and buried’ status. The old GM, Kmart, and VeraSun cases clearly point to investor ignorance as the reason for the anomalous trading of stocks of worthless stocks.

Some commentators in the financial press attribute the buying of worthless shares to an alternative explanation: covering by short-sellers. The short-covering hypothesis states that the worthless stocks derive value due to demand from short-sellers seeking to close out their positions, in order to free trading capital locked up as collateral for their short positions. To exclude the possibility that short-interest covering can account for the observed levels of trading after the plan confirmation date in our sample of worthless stocks, we show that in virtually all cases the stocks’ cumulative trading volume after the confirmation date is far greater than their short-interest levels around the confirmation date. Furthermore, in contradiction of the short-covering hypothesis of trading, there is evidence of increased short-interest levels after the confirmation date for at least half the sample.³ Supplementing this evidence, analysis of SEC data on shares that were not delivered by sellers, a proxy for naked short-selling, reveals aggressive short-selling in the days immediately before a stock is canceled.

Potential demand due to short covering may explain the observed positive prices for worthless stocks. Under this hypothesis, prices on confirmation date should be higher for firms with higher levels of outstanding short interest; however, our analysis finds a negative, insignificant relationship. Examining the relationship between the changes in stock price and changes in short interest, we do not find evidence to support the assertion that short-covering causes price increases of worthless stocks after the confirmation date. However, the data reveal

³ Although previous research cites the difficulties faced by short-sellers in stocks of bankrupt firms, their short-interest levels have not been documented before. We also analyze available short-interest data around bankruptcy filing.

that short-selling causes prices to drop closer to the intrinsic value of zero. Thus, the empirical evidence is consistent with a role for short-selling rather than short covering in determining prices of worthless stocks.

To summarize, this paper presents clear evidence that market prices for stocks of bankrupt firms are vulnerable to investor irrationality and ignorance. An additional contribution of the paper is that it contains the first documentation of short-interest levels in stocks of bankrupt firms. This study complements two recent, related studies examining the price behavior of stocks of after bankruptcy filing. They present evidence consistent with rational explanations for the prices of stocks during the bankruptcy process. Li and Zhong (2011) are able to explain 25%-35% of the observed cross-sectional variation in prices of bankruptcy stocks by valuing them as out-of-the-money call options on the firm's assets. Coelho, John, and Taffler (2011) argue that the stocks of bankrupt firms display unique lottery-like characteristics. If investors value right-skewness in potential returns, then they may rationally buy the stock, although it has a negative expected return like a lottery ticket. Neither Li and Zhong (2011) nor Coelho, John, and Taffler (2011) directly examine whether investor irrationality impacts prices of these stocks. Neither the lottery explanation nor option theory can explain significant buying of stocks which are canceled without a payoff under the confirmed reorganization plan. This evidence can be attributed only to investor irrationality.

Our evidence adds to the previously documented evidence that raises serious questions about the market's ability to determine reasonable valuations of financial securities. Rashes (2001) reports that investors, confused about stocks with similar ticker symbols, trade the wrong ticker symbol in response to news. Huberman and Regev (2001) document reaction to a media story reviewing previously published information. Lamont and Thaler (2003) report clear

evidence that stock prices do not assess intrinsic value correctly. These papers rely on case studies of a few firms. We provide evidence using a large sample of worthless stocks whose prices are subject to the influences in each of these three studies. Investors of worthless stocks confuse positive news for newly issued shares in the reorganized firm to have relevance for their canceled shares. They also bid up stock prices in reaction to news stories trumpeting the emergence of the reorganized firm following the confirmation of the reorganization plan, which is widely disseminated and previously approved by creditors through a balloting process. Finally, worthless stocks are priced above their true intrinsic value of zero. By studying a large sample, we are also able to obtain a perspective on the pervasiveness of irrationality in the market for worthless stocks.

While our study analyzes data on worthless stocks after the confirmation of the reorganization plan, it has implications for pricing of stocks during the entire bankruptcy process. The exit of the institutional investors and the impediments faced by short-sellers mean that individual investors set the market prices for bankrupt firm stocks. It is reasonable to infer that if individual investors have trouble discerning that shares are canceled without any payoff in the confirmed reorganization plan, they will encounter serious difficulties in correctly assessing the value of the firm's assets and the complex capital structures to arrive at a reasonable valuation of the equity. The evidence in the GM case as well as the Blockbuster case in October 2011 lends considerable support to this view, although Li and Zhong (2011) report counterevidence.

Our findings suggest a greater need for regulation in these cases to better protect small irrational investors in worthless stocks. Short of prohibiting trading of the worthless stocks, buyers can be required to explicitly acknowledge that these stocks are worthless and canceled

under the confirmed reorganization plan. Alternatively, facilitating short-selling will improve the efficiency of market prices and prevent the formation of manipulated price bubbles designed to exploit gullible investors.

The rest of the paper is organized as follows. Section 2 provides an overview of the bankruptcy process and a brief review of prior studies examining stock price behavior of bankrupt firms. The data sources and sample selection processes are described in Section 3. Section 4 presents the analysis of changes in short-interest levels following the bankruptcy filing. Section 5 presents evidence on market rationality by analyzing price and volume behavior of (“dead”) stocks after they are wiped out by the confirmed reorganization plan. Section 6 examines whether short-covering can explain the trading and price behavior of the worthless stocks. Section 7 documents instances of irrational stock price response to news, and Section 8 contains the conclusions of the study and identifies possible policy solutions to improve the efficiency of pricing worthless stocks.

2. Prior Studies of Stocks of Bankrupt Firms

We start this section with a brief summary of the relevant aspects of the bankruptcy process. Once a firm files for bankruptcy under Chapter 11, management has the exclusive right to propose a reorganization plan during the subsequent 120 days. Committees of different classes of investors are formed to undertake the negotiations relating to the reorganization plan. After the 120 day window, other parties can propose plans. A reorganization plan is put to vote after the court approves the disclosure statement which provides details of the plan to interested parties. Approval of the plan by a class of investors requires a simple majority by numbers and two-thirds majority by dollar amount. Unimpaired claims are deemed to vote for the plan, and

investors who are wiped out (typically stockholders) are presumed to reject the plan. If a class of claims that is impaired by the reorganization plan approves it, then the votes of claims junior to that class are disregarded using the cramdown authority of the bankruptcy court. Once the plan gets necessary approval through the voting process, the bankruptcy court confirms the plan after a hearing scheduled with due notice. After the court confirms the plan, it will consider modification only if there is evidence of fraud or if the modifications do not negatively impact claims of impaired creditors.

There are two main aspects of this process which are relevant for our study. First, the details of the approved reorganization plan are widely disseminated through the voting process and the outcome of the voting process is known ahead of the confirmation of the reorganization plan by the bankruptcy court. Second, stockholders do not have bargaining power in the process unless the court determines that all of the creditors' claims have been fully satisfied, which is highly unlikely in a bankruptcy case.

While early studies document that stockholders of bankrupt firms often receive payoffs in violation of the Absolute Priority Rule (APR), recent evidence suggests that such violations are increasingly rare. Morse and Shaw (1988) is the first study to investigate the performance of stocks of bankrupt firms. Analyzing a sample of 56 stocks over the period of three years following the bankruptcy filing, they do not find evidence of significant abnormal returns. Violation of the APR is one of the explanations for the active trading of stocks in bankrupt firms. Franks and Torous (1989), Weiss (1990), Eberhart, Moore and Roenfeldt (1990) report APR violations for between 80 to 95% of firms in their samples. Bharath, Werner, and Panchapegesan (2007) find a dramatic decline in the frequency of APR violations; it is as low as 9% during the 2000-2005 period compared to 75% before 1990. Thus, Chapter 11 is becoming increasingly

creditor friendly over the years. They attribute this trend to the growing importance of debtor-in-possession financing and key employee retention plans.

Applying option theory, Li and Zhong (2011) find that the equity value in bankrupt firms calculated using the Black-Scholes model explains about 25%-35% of the cross-sectional variation in the observed market values of these stocks. Specifically, the equity value after filing is positively associated with asset value, asset volatility, risk-free rate, and expected duration and it is negatively associated with liabilities. Thus, they provide evidence of rational influences in market pricing of bankrupt stocks.

Following Kumar's (2009) study of low-priced stocks, Coelho, John, and Taffler (2011) argue that stocks of bankrupt firms exhibit lottery-like characteristics: a high probability of a small loss, along with a low probability of huge returns. If investors place a high value on right skewness, they may rationally buy such stocks even if they have a negative expected return. They report that individual investors own an average of 90% of the stock of firms while bankruptcy is underway, consistent with the argument that these lottery-like stocks are attractive to individual investors but not institutions.⁴

The view of bankruptcy stocks as call options suggests that the expected return on these stocks is positive. However, consistent with results reported by Li and Zhong (2011), Coelho, John, and Taffler (2011) document a negative and significant post-bankruptcy announcement return of at least -28% over the following year. They state that arbitragers are deterred from exploiting the slow decline in the price of these stocks by the high risk and large implementation costs of short-selling. According to Miller (1977), prices will be set by the more optimistic

⁴ Li and Zhong (2011) also report that more than 95% of the shareholders post-filing are individual investors as the institutional stockholders dump the stocks surrounding bankruptcy filings.

investors when investors have heterogeneous beliefs about the value of a risky asset in a market constrained with short-selling. Li and Zhong (2011) argue that the high information uncertainty and binding short sale constraints lead bankrupt stocks to be initially overvalued and that the prices inevitably revert to their true values upon the final bankruptcy resolutions, causing the negative returns during the Chapter 11 process.

We first examine the available evidence on the extent of short-selling activity in bankrupt firms. Next, we examine the data for instances of clear irrationality in market pricing of these stocks.

3. Data Sources

We collect our initial sample of bankruptcy filings that were resolved during the period 2000–2011 from Professor Lynn Lopucki’s Bankruptcy Research Database. The database covers bankruptcies of public firms reporting assets in excess of \$100 million (measured in 1980 dollars) in the last pre-bankruptcy 10-K filing. The database provides detailed information on these cases including bankruptcy filing dates, reorganization plan confirmation dates, plan effective dates, etc.⁵ There are 486 bankrupt firms which have dates available for the confirmation of the reorganization plan by the bankruptcy court. Excluding private firms and the firms which stop trading before the bankruptcy filing, we obtain a sample of 396 firms. Table 1 reports the distribution of firms in the sample by the year of bankruptcy filing announcement. There are more bankruptcy cases in 2000, 2001, and 2002 perhaps due to the bursting of the Dot

⁵ We gratefully acknowledge Professor Lynn Lopucki for providing us this data. There are 37 firms which filed for the bankruptcy on the weekend and two firms whose reorganization plan were confirmed on the weekend. For these firms, we replace an event date with the first trading date following this event date.

Com Bubble. The number of sample firms declined in the years 2006-2008, but increased in 2009 due to the recent financial crisis. We are especially interested in stock price behavior during the interval between plan confirmation and effective dates. Of the 396 firms, stocks of 383 firms continued to be traded around the confirmation date of the reorganization plan.

Using the available data on filing, confirmation and effective dates in the Lopucki database, we can get an estimate of the length of the bankruptcy process. After filing for bankruptcy, sample firms take an average of 348 trading days to formulate their reorganization plans and get it confirmed by the bankruptcy court; the range for this interval is 21 trading days to 2,458 trading days, with a median of 261 trading days. The reorganization plans become effective, on average, 25 trading days after the confirmation date. The range for this window is 0 to 428 trading days, with a median value of 13 trading days. In a couple of unusual cases, there was a long delay between the plan confirmation data and the plan effective date because the effectiveness of the plan was contingent on specific contingencies such as an asset sale being completed successfully.

Stocks of bankrupt firms are delisted from major exchanges and trade in the Over-The-Counter market. We collect data on daily prices, daily trading volume, and short-interest for stocks of bankrupt firms from Bloomberg. As a supplement to short-interest data, we use data from the Securities and Exchange Commission website on the number of shares which were not delivered at the time of settlement. Although “failure to deliver” can occur due to reasons other than naked short-selling, this data has been used as a proxy for the extent of naked short-selling in previous studies (see Boulton and Braga-Alves (2010), and Fotak, Raman, and Yadav (2009)).

To assess the percentage daily trading activity, the last available number of outstanding shares is collected from the Center for Research in Security Prices (CRSP) database. The CRSP

database does not have this data after stocks are delisted from the major exchanges; however, the outstanding shares of bankrupt firms are not expected to change much as these firms do not issue shares while they are in bankruptcy proceedings. If there is a large gap between the latest available outstanding shares date and the bankruptcy filing date, we search using 10K Wizard to find the outstanding shares on the closest date to bankruptcy through the 10Q or 10K filings.

4. Short-interest Activity in Bankrupt Firms

Coelho, John, and Taffler (2011) and Li and Zhong (2011) find negative abnormal returns during the Chapter 11 process. These negative returns accrue gradually over a year, and the question arises as to why arbitrageurs do not short-sell these stocks and force a quicker price adjustment. In a blog posting, French clarifies the rationale why arbitrageurs do not step in to correct this market pricing anomaly.⁶ First, arbitrageurs need to post relatively large amounts of collateral to borrow a small amount of bankrupt shares, since the industry standard uses a price of \$1 to calculate the collateral requirement when the stock price is below \$1. Second, there is substantial buy-in risk for arbitrageurs investing in bankrupt firms. Most bankrupt firms are traded on Pink Sheets and are illiquid. The arbitrageurs may have difficulty in finding a new lender if stock lenders recall their shares. Also, it is too expensive for arbitrageurs to cover their positions by buying shares in this illiquid market. Coelho, John, and Taffler (2011) document that an arbitrage strategy will earn negative returns (-18%) after accounting for stock borrowing

⁶ “The problem here is that an arbitrageur can tie up a lot of capital shorting in-bankruptcy securities... For example, if the stock price is \$0.10 and the arbitrageur shorts 1 million shares, he receives only \$100 thousand from the sale but he must post collateral worth perhaps \$1.2 million....As a result, if his loan is called, it may be difficult for the arbitrageur to find a new lender, and it will almost certainly be expensive to buy the shares in the market.” <http://www.dimensional.com/famafrench/2010/02/qa-bankrupt-firms-whos-buying-1.html>

costs, commission costs, and bid-ask spreads. Furthermore, they show that the returns from the strategy are very risky with a high standard deviation and inter-quartile range.

In this section, we analyze available data on short-selling activity in stocks of firms in bankruptcy. As discussed above, difficulties in short-selling bankruptcy stocks are routinely cited in explaining price behavior of bankruptcy stocks. However, there is no empirical evidence in the literature on the prevalence of short-selling activity in these stocks. Hence, our primary aim in this section is to document the change in short-interest levels after the bankruptcy filing. Coelho, John, and Taffler (2011) document a stock price decline of 27% in the three days around the bankruptcy announcement. We expect short-interest levels to decrease after the bankruptcy filing announcement as short-sellers close their successful trades following this price decline. Given the expected decrease in short-interest, increases in short-interest levels would be strong evidence of arbitragers' attempt to drive down the stock price further.

4.1. Short-interest data

The level of short-interest is collected from Bloomberg for “dead” stocks and from Pink Sheets for some existing stocks. Previously, short-interest was not reported once the stock was delisted from the major stock exchanges. Pink Sheets started to report short-interest from July 25, 2006 and Bloomberg began collecting the short-interest from Pink Sheets from April 13, 2007. Thus, there is no short-interest available from the delisted date (delisted from the major stock exchange) through July 25, 2006 for currently existing stocks, or from the delisted date through April 13, 2007 for “dead” stocks. We ignore data after 120 trading days after the effective date, or 500 trading days after the confirmation if the effective date is not available. To ensure reliable comparisons, we require that the time gap between the last reported short-interest

before bankruptcy filing and the first reported short-interest after bankruptcy filing should not exceed 30 days. Short-interest data is not available for several firms following the bankruptcy filing.⁷ Although short-interest data is available only for 113 firms, they nonetheless provide interesting insights.

4.2. Analysis of changes in short-interest ratio after bankruptcy filing

The short-interest ratio is measured as the ratio of short-interest to firms' outstanding shares. Table 2 reports short-interest ratios before and after the bankruptcy filing. We measure the short-interest ratio before the bankruptcy (SI_B) using the last available short-interest data prior to the bankruptcy filing. We utilize all available data on short-interest after the bankruptcy filing and summarize this data using five variables: the average short-interest ratio (Mean (SI_A)), the minimum short-interest ratio (Min (SI_A)), the maximum short-interest ratio (Max (SI_A)), the first available short-interest ratio (First (SI_A)), and the last available short-interest ratio (Last (SI_A)).

Firms filing for bankruptcy do so after an extended period of financial difficulties and stock price declines. Short-sellers are expected to decrease their positions in a stock as it declines in value. Despite the extended price declines before the filing, the short-interest immediately before the filing stands at 6.72% of outstanding shares. Following the sharp negative reaction to the filing, the short-interest ratio declines to 5.96% and continues to decrease in the face of the slow price decline after the filing, with the average of the last available short-interest ratio being 3.92%. The average short interest ratio during the entire post-filing period is 4.17%.

⁷ To enable a larger sample for this portion of the analysis, we include firms even if the database does not report a confirmation date.

Although, on average, short-interest ratios decline during the post-filing period, some firms in the sample experience increases in short-interest during this period. Panel B of Table 3 presents the analysis of the differences between the pre-bankruptcy short-interest ratio and each of the summary measures of the post-bankruptcy ratios. This analysis reveals some interesting patterns in the data. For 34.5% of the 113 firms in the analyzed sample, the first available short-interest ratio after the filing is higher than the pre-bankruptcy ratio. For 55% of the firms, the post-filing short-ratio is higher than the pre-bankruptcy ratio at some point during the bankruptcy process. For 13% of the firms, the minimum post-filing ratio is higher than the pre-filing ratio. Taken together, this data indicates that short-sellers are active in stocks of bankrupt firms, despite the difficulties and costs they may face. Next, we analyze whether the observed short-selling activity enforces rational prices for stocks of bankrupt firms.

5. Evidence of Dead Stocks Walking

The prices observed for Motors Liquidation (MTLQQ) stock constitute a significant puzzle, especially in the face of repeated statements from management saying that stockholders were “highly unlikely to receive payouts even under the most optimistic scenarios.” One argument could be that “highly unlikely” does not mean “impossible”, notwithstanding the fact that it is very surprising that the management did make such an extraordinarily strong statement.

In this section, we provide clear evidence of irrational stock prices by analyzing prices for stocks that have been confirmed as worthless. If a reorganization plan unambiguously states that the old shares will be canceled and stockholders will not receive any distribution on the effective date, rational investors would not buy this stock after the court confirms the reorganization plan (confirmation date). These stocks are equivalent to expired out-of-the-

money call options or lottery tickets that did not win any prize in yesterday's drawing. However, we find that some of these stocks are actively traded after the confirmation date, when they are declared dead. More surprisingly, some stocks still trade on Pink Sheet even after the company canceled (buried) these shares and relists shares newly issued as per the reorganization plan.

5.1. Identification of stocks confirmed to be worthless

We carefully scrutinize the 383 firms that traded around the confirmation date to identify firms whose old shares were canceled without payoffs. We verify the stockholders' payoff in the confirmed reorganization plan by using three primary sources - notices issued by Financial Industry Regulatory Authority (FINRA), Bankruptcy DataSource on Lexis-Nexis, and 10K Wizard (Morningstar Document Research). FINRA typically issues notices alerting dealers/traders about the status of a security following the confirmation of a reorganization plan. Bankruptcy Datasource usually summarizes the reorganization plan including the payoff to stockholders. For the payoffs that we cannot verify through the above sources, we examine the payoff through the latest reorganization plan on 10K wizard by searching keywords such as "no distribution", "any distribution", "receive nothing", "existing", "current", "old", "stock holders", "cancel" etc. Other sources include news stories reported in Lexis-Nexis and the list of worthless stocks published by Commerce Clearing House. We identify a final sample of 264 firms whose stockholders are wiped out on the effective date.⁸

⁸ We retain Kmart in our sample, although old stockholders were given claims to 2% of the net proceeds, if any, from lawsuits pursued against company officers and auditors; 98% of these claims were allotted to creditors. However, as discussed later, the post-confirmation stock value far exceeded any reasonable estimates of the expected value from litigation.

5.2. Price and trading volume of worthless stocks

Prices and trading volume for most sample stocks are consistent with their worthless status. However, there are notable exceptions. Table 3 reports summary statistics for daily stock prices and trading volume on the plan confirmation date and during post-confirmation date period. Panel A in Table 2 reports the statistics for the confirmation date. Several of the worthless stocks are illiquid and do not trade every day. On the confirmation date, we find closing prices for 229 out of the 264 stocks in the sample; for the remaining 35 stocks, we use the first available closing price after that date. The median first closing price on or after the confirmation date is less than 1 cent; however, 25% of the sample stocks have a closing price exceeding 2.5 cents and the maximum closing price is 38 cents.

The high price observed on the confirmation date provides a better measure of the extent of investor irrationality, since prices may have subsided from intra-day highs by the close of trade. To screen out data errors in reported high prices, we disregard high prices if the ratio of high to close prices exceeds three and the difference between these two prices exceeds a cent. The second criterion ensures that we do not discard data for extremely low-priced stocks for which the ratio of high to close prices may exceed three using valid data. These screens lead us to exclude five outliers. Examination of high prices reveals that the median high price is only one cent although one stock traded as high as 61 cents on the confirmation date. Data on trading volume show a similar pattern: while the median trading volume on the confirmation date is low, a subset of stocks experience significant trading, especially when it is measured as a fraction of outstanding shares.

Panel B of Table 3 provides the summary statistics for the period between the

confirmation date and the last day of trading. The median length of this period is 12 days for the sample firms.⁹ For 25% of the sample of worthless stocks, the observed high price during the post confirmation period exceeds 4 cents. The median cumulative trading volume *after* the confirmation date is 16.4% of outstanding shares, while the corresponding mean is 42.4%. However, in dollar terms, the median is only \$30,782. This low dollar volume raises the question of whether the trading in worthless stocks can be dismissed entirely as insignificant noise. To address the potential significance of the issue, we document below instances of stocks that experience substantial dollar trading volume after they are confirmed to be canceled without payoffs according to the reorganization plan approved by the bankruptcy court.

5.3. Instances of significant trading volume for worthless stocks

Table 4 lists the trading days on which daily dollar volume exceeds \$1 million for worthless stocks. There are 63 observations associated with 19 different firms satisfying this screen, with the largest trading dollar volume reaching \$18.7 million.¹⁰ The shares in the sample constitute rare instances where the future cashflows to the securityholders are known without ambiguity: these securities are scheduled to be canceled without payoffs and are worthless. Any trading volume in these securities is not readily explained. Hence, trading volumes exceeding a million dollars suggest that these events are potentially glaring examples of market inefficiency.

⁹ Most stocks stop trading after the effective date; however, some stocks continue to be traded long after the effective date when the stock is officially canceled. While there are regulations preventing dealers from selling such securities to investors, there is nothing to prohibit trading in these stocks amongst retail investors. To limit the impact of such trading, we limit the post-confirmation period to be no longer than 120 trading days after the effective date. If the effective date is not available, we restrict the period to be no longer than 500 days after the confirmation date.

¹⁰ For the sample of 264 firms, there are 424 observations when the daily volume exceeds \$100,000.

We would expect that the prices would never increase for these worthless shares after the confirmation of the reorganization plan. However, stock prices jump on 19 event days out of the total of 63 event days. For example, in the case of Kaiser Aluminum Corp the stock price jumped to 25.5 cents from 16.5 cents on volume exceeding \$1.5 million after the court confirmed the company's reorganization plan, which states that "All of the equity interests of existing stockholders of the Company would be canceled without consideration". We find that most of the firms listed in Table 4 indicating that investors likely make the investment due to their recognition of the firm's name ignoring the fact that the shares have been canceled. We examine this idea more closely in Section 6.4.

Some stocks, such as Global Crossing and Worldcom Inc., take a relatively long time to be canceled after the confirmation date. The total trading days from the confirmation through effective dates are 243 and 117 days for Global Crossing and Worldcom, respectively. Figure 1 illustrates the significant trading activity in these two stocks after the confirmation of the reorganization plan. These stock prices decline slowly and even jump several times during the long period window between the confirmation and effective dates. The mean (median) prices during the post-confirmation period for Global Crossing, Worldcom, Inc are 2.1 (1.9) cents and 6.5 (6.0) cents, respectively. The mean and median daily trading volumes during the post-confirmation period for both stocks exceed 1 million shares, and the minimum price is no less than one cent after the confirmation. The extended, active trading of these securities strongly indicates the presence of irrational investors in the market for bankrupt firm stocks, who are unaware that the intrinsic value of these stocks is zero.

6. Does short covering explain trading of canceled stocks?

Although the evidence in the previous section reveals that trading activity in most worthless stocks is relatively trivial, there are notable exceptions where the worthless stocks experience significant dollar volume. Why would anyone buy a stock that is confirmed to be worthless? Commentators in the financial press offer two potential reasons: investor ignorance, and short covering. In this section, we examine whether short covering can account for the observed behavior of shares prices and trading volume of worthless stocks. Short-covering is cited as a reason given for the extended time taken for MTLQQ stock price to be driven down to zero. Short-interest in this stock declined from over 100 million shares around bankruptcy filing in June 2009 to less than 13 million shares in February 2011 before increasing to 25 million shares around plan confirmation.

Short-sellers have to cover their short positions, only if the stock loan is recalled and a new lender cannot be found. Typically, worthless stocks are canceled within two weeks of the confirmation date. Once the stock is canceled, short-sellers can discharge their short position by providing a letter saying that they will cover any payments that may accrue to holders of the loaned stock. Since the stocks are canceled without any payoffs, such a letter is effectively an inconsequential formality. Trading capital locked up due to the high margin requirement for short positions in these low-priced stocks will be released upon the processing of such a letter, which should normally be within a month after the confirmation date. Short-sellers who do not want to wait to free-up trading capital will cover their short positions.

6.1. Comparison of short-interest around confirmation date with subsequent volume

We can assess whether short-covering accounts for the observed buying of worthless

stocks by comparing the level of short-interest near the confirmation date with the trading volume during the post-confirmation period. We check for data on short-interest levels within ten days before and after confirmation. For 63 firms, short-interest data is available within the ten day period before the confirmation date; for another five firms, short-interest is available within ten days after confirmation.

Table 5 contains evidence suggest that short-covering cannot fully account for the observed trading volume in worthless stocks. For stocks where short-interest data is available on or shortly before the confirmation date, we compare this short-interest level with the cumulative trading volume between the confirmation date and the last day of trading. In the five instances where the short-interest is measured after the confirmation date, the post-confirmation volume is measured after the short-interest date. The ratio of the cumulative post-confirmation volume to short-interest exceeds one for 61 out of the 68 observations. Thus, short-covering cannot account for the observed post-confirmation trading volume.¹¹ In most instances, the reported trading volume on a single day (see last column in Table 5) exceeds the outstanding short-interest. Clearly, there are buyers of these worthless stocks who are not merely covering their short positions. To the extent that not all of the outstanding short-interest is covered before the last day of trading, the supporting evidence is stronger.

6.2. Evidence on short-selling activity around confirmation date

We examine the extent of short-covering by directly examining changes in short-interest around the confirmation date. Most firms cease trading on the plan effective date which is often within a few trading days after the confirmation date. Short-interest levels after the confirmation

¹¹ Trading volume may be double-counted in dealer markets; the ratio exceeds two in 58 out of the 68 cases.

date is not available for most of these firms, since the periodic reporting date for short-interest levels often falls after the last day of trading. Consequently, post-confirmation short-interest data is available for only 55 firms. We use this sample to study short-selling activity after the confirmation date by examining changes in short-interest levels, similar to the analysis in Table 2 of short-selling around bankruptcy filing. We supplement this analysis by examining a proxy for “naked short-selling” which is available for a larger sample of around 125 firms.

Panel A of Table 6 reports that, on average, short interest immediately before the confirmation date amounted to 2.55% of outstanding shares. In comparison, the average short-interest immediately after the confirmation date ($\text{First}(\text{SI_A})$) is 3.45%. The corresponding medians are 1.06% and 1.2%, respectively. The numbers for other measures of short-interest after the confirmation date also do not reveal evidence of marked short-covering. In Panel B of Table 6, we directly examine the changes in short-interest around the confirmation date. The first row in this panel reveals that short-interest levels actually increase immediately after confirmation for slightly more than half of the sample. The third row reveals that short-interest at some point after the confirmation date exceeds pre-confirmation short-interest for 64% of the sample. It should be noted that while the mean increase in short-interest is relatively large, the median changes are very modest. Nonetheless, this evidence reveals that there is short-selling activity in the worthless stocks. Despite hindrances faced by short-sellers, they seize the opportunity to profit by selling these confirmed worthless stocks.

We present additional evidence of short-selling activity after the plan confirmation date by analyzing data reported by the SEC on shares that were not delivered by the sellers on the settlement date. Since January 2005, the SEC collects this data in an effort to monitor and regulate abusive short-selling, whereby traders could drive down the stock prices by short-selling

without first arranging to borrow the stock they sell. The ‘failed-to-deliver’ shares are regarded as a good proxy for naked short-selling, although such failure can occur due to processing errors (see Boulton and Braga-Alves (2010), and Fotak, Raman, and Yadav (2009)). It does not capture short-selling where the seller has been successful in obtaining a stock loan. Although this data is available only since 2005, its daily frequency ensures that the analysis can be conducted for a larger sample of 132 firms.

If the ‘fail-to-deliver’ shares account for more than 0.5% of outstanding shares on five consecutive settlement days, then the stock is put on a ‘Threshold List’. Once a security appears on this list, a dealer/broker is required to rectify any subsequent delivery failures on his account for thirteen consecutive settlement days by buying the security; however, note that a delivery failure by one dealer has no effect on potential short-selling by other dealers.¹²

We examine whether there is short-covering/ reduction in naked short- interest by examining the behavior of fail-to-deliver shares as a percentage of outstanding shares around the confirmation date and near the effective date. The SEC data reports fail-to-deliver shares by settlement date; we analyze the data based on the associated trade date, which can be inferred from the settlement date. Table 7 contains these results. The median percentage of fail-to-deliver shares is almost uniformly zero. Hence, in addition to the mean, we report the 75th, 90th, and 100th percentile values. The data in Panel A for each of these summary measures suggests that delivery failures increase after plan confirmation, suggesting additional naked short-selling rather than short-covering. Panel B reveals a more pronounced increase in naked short-selling in

¹² This is a short summary of the requirements imposed by Regulation SHO. For details, please see the discussion at <http://www.sec.gov/spotlight/keyregshoissues.htm>.

the days immediately prior to the plan effective date, when the shares are officially canceled. This evidence suggests that some market participants, perhaps dealers, aggressively short-sell the stocks which they know are going to be worthless. There appears to be no compulsion to close out short positions before the shares are canceled. In September 2008, the SEC temporarily removed the exemption that allowed market makers to engage in naked short-selling, and in July 2009 the SEC made this change permanent. The data after September 2008 reveal that naked short-selling is reduced though not eliminated; the data during this period still exhibit patterns of increased naked short-selling immediately after plan confirmation and immediately before the effective date.¹³

Overall, the evidence in Tables 6 and 7 reveal a surprising level of short-selling activity in worthless stocks providing strong additional confirmation that short-covering cannot fully account for purchases of the worthless shares. This inference suggests that investor ignorance/irrationality is the most likely explanation for the observed levels of trading in worthless stocks.

6.3. Does short-interest activity explain price behavior of worthless stocks?

A potential explanation for the high prices of bankruptcy stocks and their slow decline during the bankruptcy process is that the price decline is stemmed by demand from short-sellers seeking to cover their positions. The evidence discussed above reveals that for some sample firms, short-interest declines during the post-confirmation period. In this section, we provide

¹³ To examine if the restrictions on naked short-selling introduced in September 2008 lead to higher post-confirmation prices, we estimate the regressions reported in Table 10 after including a dummy variable which is set equal to 1 after September, 2008, and zero otherwise. The coefficient for this dummy is generally negative and insignificant indicating that worthless prices were not higher after the institution of the naked short-selling restrictions on market makers.

evidence on whether short-interest levels and their changes can explain price behavior of worthless stocks.

First, we examine whether stock prices on the confirmation date are higher for stocks with higher short-interest levels. Higher short-interest may lead to a higher price if there is a higher probability of a short-squeeze in which short-sellers are forced to cover their short positions in an illiquid market if their stock loan is recalled. Also, higher short-interest levels reflect higher potential demand from short-sellers seeking to cover their positions and release trading capital locked up in margin accounts. We measure short-interest levels on the confirmation date using available reports during the interval (-10, 10) relative to that date and employ two alternatives to standardize the levels of short-interest across stocks. First, we measure it as a percentage of outstanding shares. Second, to capture the fact that covering short-interest will be more difficult in illiquid stocks, we measure it as a percentage of the average daily trading volume during the interval (-40, -10) relative to the confirmation day.

Table 8 presents the relationship between confirmation date stock prices and short-interest levels. The stock price on the day after the confirmation date is related to neither measure of short-interest; we obtain similar results if we use the maximum closing price on days on the three days following the confirmation date. Substitution of observed intra-day highs for closing prices also does not alter the results. Non-parametric tests confirm that the correlations between short-interest levels and stock prices are insignificant for each of the price variables examined. Thus, there is no evidence to support the notion that worthless stocks derive some value due to potential demand from short-sellers seeking to close their positions.

Next, we examine the relationship between changes in stock prices and changes in short-interest levels to assess whether short-covering can explain the puzzling occurrences of price

increases for stocks confirmed to be worthless. The extent of short-covering is measured as the *decrease* in short-interest using two consecutive reports of short-interest, where the first report used in this analysis falls within the window (-10,10) relative to the confirmation date. Note that ΔSI , the change in short-interest, is constructed to be positive when there is short-covering as indicated by a drop in the level of short-interest. Similar to the analysis in Table 8, we standardize short-covering using the number of outstanding shares as well as the trading volume during the measurement interval. Stock price changes are measured over the corresponding reporting interval.¹⁴ We use price changes instead of returns because returns are very noisy and provide a highly distorted measure of economic significance for low-priced stocks.¹⁵

The number of intervals varies across firms depending upon how long they are traded after the confirmation date. In all, we obtain 273 observations of prices and corresponding short-interest changes. To separate the impact of short-covering versus additional short-selling we create two dummies that reflect the sign of the short-interest change and interact them with the observed short-covering. The *SC (short-covering) Dummy* variable is set equal to 1, if ΔSI is positive, and zero otherwise. The *SS (short-selling) Dummy* is constructed similarly to capture intervals when there is an increase in short-selling.

Results presented in Table 9 show are consistent with stock prices dropping significantly in response to additional short-selling. Stock prices respond positively to short-covering; however, this relationship is weak and statistically insignificant. Thus, there is little support for

¹⁴ While calculating returns if the stock price is missing, we use the closest available stock price by searching in the order of day-1, day-2, day-3, day+1, day+2, and day+3, where day 0 is the day of the missing price needed to compute returns.

¹⁵ Typically, stock returns are used in studies to standardize the differing intrinsic values across stocks. Note that the intrinsic value is zero for our entire sample of worthless stocks.

the argument observed increases in the price of worthless stocks are driven by short-covering activity. Interestingly, the test-statistics for the intercept terms suggest that after controlling for increases in short-selling, there is no significant tendency for the prices of these stocks to decrease. Thus, short-selling plays an important role in driving these stocks down toward their intrinsic value of zero.

6.4. Does higher trading volume lead to more or less rational prices?

At the start of this section, we noted that commentators in the financial press proffered two potential explanations for purchases of worthless stocks: short-covering, and ignorance / irrationality of individual investors. This section has presented strong evidence earlier that short-covering cannot fully account for the trading and price behavior of these stocks. Thus, this evidence points to a significant role for individual investor ignorance/irrationality in generating the observed price and trading volume of stocks of bankrupt firms. If so, this impact is likely to be stronger for firms that are well-known and more easily recognized by individual investors.¹⁶ A perusal of firms listed in Table 4 suggests that such an explanation is reasonable.

Coelho, John, and Taffler (2011) as well as Li and Zhong (2011) find that individual investors are responsible for most of the trading in stocks of bankrupt firms. We rely on the trading volume during the period (-40,-10) relative to the confirmation date as a measure of the

¹⁶ See http://articles.orlandosentinel.com/2003-05-18/news/0305170444_1_kmart-bankruptcy-investors. "This is more of a problem when the company that emerges from bankruptcy protection is a well-known company," Wyderko said. "People know the company and feel they are better able to evaluate its prospects. Except for this one little detail -- the old shares are very likely to become worthless. Also, see the story about Blockbuster's bankruptcy at http://www.washingtonpost.com/business/economy/risky-business-buying-shares-in-a-bankrupt-company/2011/10/11/gIQAltLidL_story.html. "Often with well-known companies, people — through newsletters or Internet sites — will hype the stock hoping to lure less-informed investors. ... Once the price is pumped up, promoters will dump their shares and earn a nice profit, leaving naive investors with losses."

popularity of a stock among individual investors. If the impact of irrational optimism / gullibility of individual investors is stronger for more popular stocks, we expect a positive relationship between stock prices and the level of trading volume. In contrast, higher liquidity should lead to more efficient prices in rational markets. We expect short-selling to be more difficult in illiquid, small-cap stocks, and hence short-sellers' ability to drive down irrationally high stock prices is hampered. In this case, we expect a negative relationship between stock prices and trading volume.

Table 10 reports that (closing and intra-day high) prices on the confirmation date are significantly higher for worthless stocks which are traded more heavily. Log dollar volume provides stronger results compared to percentage trading volume suggesting that the individual investor irrationality effect is more pronounced for larger/popular stocks. Results are similar when we measure trading volume on just the confirmation date, rather than a 30 day window during the pre-confirmation period. Since prices are not available for some stocks that are not traded on the plan confirmation date, we repeat the tests after expanding the sample by including price data from the next two days; the results are essentially unaltered. Additionally, non-parametric correlation tests are fully consistent with the reported results. Next, we turn to more direct evidence of investor irrationality in the market for stocks of bankrupt firms.

7. Irrational Stock Price Response to News Events

Positive prices for bankruptcy stocks during the bankruptcy process are consistent with rationality because of their call option value and/or lottery-ticket like characteristics. Given uncertainty about future payoffs, it is generally not easy to determine whether stock prices are irrationally high or low. It is easier to discern market irrationality by stock price responses to

news events. However, it is relatively easier to gauge irrationality by observing stock price responses to news events. Rashes (2001) provides convincing evidence about investors' confusion about ticker symbols by presenting evidence of unjustified stock price responses to news releases. The news pertained to other firms which were easily confused with the sample firm's stock due to similar names or ticker symbols, although the other firms were in fundamentally different industries. Huberman and Regev (2001) present evidence of unreasonable price movements in response to a *New York Times* article about results of cancer research that had been published and discussed by other media organizations five months earlier.

We check for similar evidence for bankruptcy stocks given the puzzling evidence documented in the previous section. We first present evidence relating to the General Motors case, since it attracted considerable attention in the financial press. Subsequently, we present similar evidence for our sample of worthless stocks.

7.1. Old General Motors: A Pie-in-the-Sky Buy

7.1.1. Background

General Motors (GM hereafter) declared Chapter 11 bankruptcy on June 1st, 2009. GM's assets were divided into two separate and independent firms following bankruptcy: new GM and Motors Liquidation Company (old GM). The new GM retained GM's best assets such as Chevrolet, Cadillac, GMC, and Buick. The owners of new GM were the American and Canadian governments, the United Auto Workers union, and bondholders and other creditors of Motors Liquidation (Figure 2). These shareholders stood to benefit from a potential revival of

GM.¹⁷

Motors Liquidation Company was what is left of the old GM following its bankruptcy, mostly liabilities and claims. It remained in bankruptcy and its assets including brands, factories and other operations would be liquidated over the next few years. Motors Liquidation's stock was traded under the ticker symbol GMGMQ on Pink Sheets from June 2, 2009 to July 15, 2009. The ticker was changed to MTLQQ to clear up any doubts that this stock represented the new GM. The company stated bluntly the fact that shares of MTLQQ will be worth essentially nothing. It issued a release on June 10, 2009: "Any recovery for the common stockholders in the Chapter 11 process is highly unlikely, even under the most optimistic scenarios". After the issuance, the company continued to remind investors that it strongly believes that there is no value for the common stockholders of Motors Liquidation in the bankruptcy process.

Although MTLQQ was declared to be an essentially worthless stock by Motors Liquidation, it was actively traded on Pink Sheets at relatively high prices and trading volume during the approximate three year bankruptcy process. Figure 3 illustrates stock prices and trading volumes for Motors Liquidation Company from Jun 1, 2009 (the announcement of bankruptcy) through March 31, 2011 (the exit from the bankruptcy).

7.1.2. Motors Liquidation stock price response to news events

In this section, we provide clear evidence of irrationality of investors in bankruptcy stocks by presenting detailed evidence on Motors Liquidation (old GM) stock price reaction to news events. Our goal is to investigate whether sudden increases in stock prices and trading volumes

¹⁷ See <http://money.cnn.com/2010/01/19/markets/thebuzz/>, "The new GM will probably sell shares to the public later this year or in 2011. Once that happens, that will be the way to profit from a potential revival in GM".

for bankruptcy stocks are caused by good news or investors' irrationality. To identify news events, we screen the Motors Liquidation data for increases of at least 20% in daily price and volume during the period starting three days after the bankruptcy filing date. To exclude pure noise arising from the extremely low prices, we additionally impose the requirement that the change in dollar volume exceeds \$1 million. These screens yield a sample of 10 events for investigation.

We search for news about the company on or immediately before each event date in the Lexis-Nexis database and also using the Google search engine. We also examine price changes of old GM's bonds on each event date; bond prices are collected from Bloomberg. Bond markets are dominated by more sophisticated institutional investors, whereas bankruptcy stocks are largely owned by individual investors. The increase in old GM bond prices provides a useful criterion to judge the rationality of stockholders' response to the news. The selected bonds trade at significant discounts (less than 40% of face value) and, therefore, should be sensitive to firm value of old GM/Motors Liquidation. The old GM bondholders were entitled to 10%, with warrants for another 15% of the shares, in the new GM. The prices of these bonds may increase if there is good news not only about old GM but also about new GM. However, old GM stock should respond only to good news for old GM. Thus, a positive price response in old GM bonds is a necessary but not sufficient condition for stock price increases for old GM stock.

Panel A of Table 11 provides details on the stock price and volume changes on each event day along with the bond price responses. Panel B lists excerpts from the news stories for each event. None of the news stories provide reasonable justification for the huge stock returns. The stock price response in the worthless Motors Liquidation stock is most likely due to investor confusion between Motors Liquidation and the new GM. Old GM bonds have positive price

reactions on only 5 out of the 10 event days, and even then the reactions on these deep-discount bonds are very much subdued compared to the stock reactions (see bond returns in Panel A of Table 11).¹⁸ We discuss four of these events to present the scope of investors' irrationality.

In a press release dated June 9, 2009, around a week following the bankruptcy filing of GM, New General Motors Corporation announced that Edward E. Whitacre, Jr., would become the chairman of the new company which was expected to purchase assets from the old GM. Google Finance and Charles Schwab websites list this news on the webpage providing stock price quotes for Motors Liquidation.¹⁹ On the same day, the prices of Motors Liquidation stock (MTLQQ) increased to \$1.50 from \$1.21 on the previous trading day, while the volume of shares traded increased to 156 million shares from 104 million shares traded on the previous day, leading to the dramatic volume increase of \$108 million. As explained above, the only connection between new GM and Motors Liquidation was that the bondholders and other creditors of Motors Liquidation held 10% the new GM shares. The beneficiaries of good news about the new GM were the bondholders rather than the stockholders of Motors Liquidation. The stockholders probably were misled by the new GM news on the Motors Liquidation website and failed to distinguish between new GM and old GM. The increase of \$108 million in daily volume on this day strongly suggests an irrational response by the Motors Liquidation stockholders.

On April 19, 2010, new GM announced that it would repay the \$6.7 billion loan to U.S. and Canadian government aid ahead of schedule. The company finally paid off its \$6.7 billion

¹⁸ While, in general, stocks will be more sensitive than bonds to firm news, the deep-discount bonds examined here should be quite sensitive. It can be argued that any gains in values of old GM assets accrue only to the bondholders given old GM's financial situation.

¹⁹ <http://articles.latimes.com/2009/sep/24/business/fi-bankrupt-stocks24/2>

bailout loans by making a last payment of \$5.8 billion to the U.S. and Canadian governments on April 21, 2010. Motors Liquidation stock became incredibly active on April 21: MTLQQ jumped to 69 cents from 54 cents on the previous trading day; trading volume soared to 26.75 million shares, nine times larger than the number of shares traded on the previous trading day; and daily dollar volume increased by \$17 million. The last 8-K filed before April 21, 2010 reports that Motors Liquidation's total assets were worth \$1.24 billion compared to total liabilities of \$33.48 billion. Thus, the new GM's repayment of the government loan had no bearing on the prospects for the stockholders of Motors Liquidation. The frenzied reaction in the market for Motors Liquidation stocks is a good example of the confusion among MTLQQ holders. Following this news, stock prices were driven up for around a month.

If the investors are confused between new GM and Motors Liquidation, we would expect that big news, such as the IPO of new GM, positively influences investors' sentiment about old GM stock. A press release on August 16, 2010 stated that General Motors completed the paperwork for an IPO. As expected, the daily dollar volume of Motors Liquidation on this day increased by \$2.63 million, with an 8.8 cents increase in the stock price and around 3.7 million shares increase in shares traded. On November 15, 2010, new GM confirmed that its IPO price range was being raised to \$32 to \$33 from the previously anticipated price range of \$26 to \$29. On the same day, the daily dollar volume of Motors Liquidation increased by \$2.39 million and 14.2 million shares were traded at 27 cents, jumping from 6.6 million shares at 22 cents on the previous day. The old GM bonds justifiably experienced positive returns, since they held claims on new GM equity. However, on both days with the IPO related news, the deep-discount bond returns were less than 1.5% compared to returns of 23.63% and 69.53% on the old GM stocks.

Stock prices of MTLQQ decline slowly over time following the bankruptcy. This pattern

indicates that investors in bankrupt firm stocks digest information slowly. Gradually more investors understood the difference between the new GM and Motors Liquidation, and, therefore, the true intrinsic value of Motors Liquidation stock.

7.2. Irrational stock price responses to news in the sample of worthless stocks

Worthless stocks experience puzzling increases in stock price after the court confirms that they are worthless (see Figure 1 and Table 4). While forced short-covering can potentially cause such price increases explanation, evidence in Table 9 failed to support this explanation. In order to get a better understanding of these price increases, we identify all instances where prices of confirmed worthless stocks increased by at least one cent with an associated trading volume of at least \$100,000. Panel A of Table 12 lists 59 such events. We then searched for news stories around these events dates. For 11 of these events, we could not find any news stories; Panel B of Table 12 presents the news stories for the remaining events.

In several instances, the news was about the bankruptcy process approaching an end or the emergence of the firm from the bankruptcy process. In other instance, there are news stories with positive implications for the stockholders of the reorganized firm such as development of new technology (e.g. Delphi Corporation), expansion of business operations (e.g. Global Crossing, Worldcom/MCI), earnings announcements (e.g. Frontier Airlines), new credit agreements (e.g. Interstate Bakeries). However, these developments held no significance for old shares, since they were to be canceled without any payoffs. Nonetheless, prices of old shares increased in response providing strong confirmation of investor ignorance of the difference between the canceled shares and newly issued shares in the reorganized firm. This conclusion is supported by the details discussed below for three firms – U.S. Airways, Kmart, and VeraSun

Energy.

7.2.1. Kmart: Case of confusion between the dead and the new-born

Kmart, a national retailer, sought bankruptcy protection in January, 2002. After the bankruptcy, Kmart warned its investors that it is highly risky to buy its stocks in its subsequent filings with the SEC and in new releases on its website. In Kmart Corp's Plan of Reorganization filed on February 27, 2003, the company proposed the cancellation of the existing common stock. In the company's 10K filed on March 24, 2003, Kmart made it clear that the existing Kmart common stock would be canceled and holders would receive no distribution of New Holding Company Common Stock, if the final reorganization plan was consistent with the plan filed by the company. The plan also envisaged a Trust which would pursue litigation against previous management and auditors. Creditors were to receive 98% of the net payoffs from the litigation, while old stockholders were allotted a token 2% claim to these payoffs.

On April 22, the U.S. Bankruptcy Court approved the reorganization plan as proposed. However, the stock price jumped to 8.4 cents from 6.6 cents on the previous day, and the share volume increased to 20,523,600 shares from 20,049,700 shares on April 22, 2003, the confirmation date (see Panel A of Figure 4 and Table 4). Even more surprisingly, the stock price kept increasing to 14 cents, and 133 million shares were traded on April 23, 2003. On April 30, Kmart filed with the SEC a copy of the bankruptcy court's order and this order again clarified that the existing common stock of Kmart Corp. and other interests will be canceled under the plan. However, 47 million shares were still traded at 6.4 cents on that day, up from 27 million on the previous trading day. Also, the stock price jumped to 7.7 cents and 31 million shares were traded on the following day. On May 6, Kmart emerged from Chapter 11 and existing

shareholders officially lost their investment on this day. Still, 91 million shares changed hands at a price of 10 cents just before this stock was canceled. Note that 2% claims to the litigation payoffs cannot explain the observed price levels for Kmart stock. If the litigation yielded \$250 million in net payouts, each of the 506 million old shares would receive about one cent. Considering the probability of success and the time involved in such litigation, the present value at the time of plan confirmation would be much less than a cent.²⁰

Looking through Kmart stories on April 22 (confirmation date) and April 23, 2003 in the Lexis-Nexis database, we found that most stories have encouraging titles such as “Court Approves Kmart Reorganization Plan”, “Kmart clears legal logjam, moves toward court approval”, “Court OKs Kmart plan to emerge from bankruptcy”, “Court OKs Kmart plan, retailer to re-emerge on May 5”, “Kmart investor says company will be strong after bankruptcy” etc. The text of these stories barely mentioned the shareholders’ payoff after emerging from bankruptcy.

Similarly, most stories on May 6, 2003 (effective date) mainly discussed the firm’s emergence from bankruptcy. Only a few stories stated that Kmart's investors will have their stock wiped out in the middle part of articles. Panel B of Table 5 provides evidence that Kmart’s daily trading dollar volumes exceeded one million dollars on all of 11 trading days between the confirmation and effective day, with price jumps on five out of the 11 days. The most probable reason why investors still submit large orders following the confirmation date is that investors failed to read the filings on the SEC websites and believed that Kmart’s canceled shares

²⁰ The Creditor Trust’s litigation against the ex-CEO was eventually dismissed and he was awarded legal costs (<http://www.nytimes.com/2005/08/24/business/24kmart.html>); he later paid a \$5.5 million fine to settle a federal lawsuit. The resolution of the Creditor Trust’s other lawsuits is unclear; according to the 10-Q filed by Sears Holdings on Dec 5, 2006, the Kmart Creditor Trust received \$5 million in settlements.

represented claims in the reorganized firm.

7.2.2. U.S. Airways: Case of a stock flying on a magic carpet

On January 17, 2003, US Airways filed its reorganization plan under which the company's existing stock was to be canceled. The plan was confirmed on March 18, 2003. In a 8-K filing on March 21, 2003, the firm pointed out that the company's canceled shares would not receive any distribution under the reorganized plan, which had an effective date of March 31, 2003. In the annual report filed a few days later on March 27, 2003, the firm reiterated that the equity security holders were not entitled to any distribution. In a rational market, US Airways should cease trading on March 18, 2003 (confirmation date). However, Panel B of Figure 4 shows that this stock flew high, magically defying gravity. It was traded at over 10 cents for seven out of the next 10 trading days, the stock price rose on four of these days, and the daily trading volumes were at least 3.4 million shares between the confirmation and effective days. On the effective day of March 31, 121 million shares were traded at 8.2 cents, jumping from 25 million shares at 6.4 cents on the previous day. The investors loaded up on the company's stock to the tune of \$9.95 million on the day it was canceled. This evidence is consistent with investors falsely believing that the canceled shares represented claims on the reorganized company that emerged from bankruptcy.

7.2.3. VeraSun Energy Corporation: Case of buried stock jumping

VeraSun Energy Corporation was a leading producer of ethanol, and it filed for Chapter 11 bankruptcy protection on October 31, 2008 due to financial difficulties. On July 31, 2009, the

debtors filed a Joint Plan of Liquidation and Disclosure Statement. Under the terms of the Joint Plan, the company's existing common stock was to be canceled and the shareholders did not retain any distribution or other property on the effective date. An order confirming the Plan was entered by the Bankruptcy Court on October 23, 2009 and the Plan was effective on December 27, 2009. On the confirmation date, the stock price is 0.8 cents and the dollar trading volume is only \$6,149.

After the company canceled its stock on the Pink Sheet, the daily trading dollar volume of VeraSun stock reached around \$0.25 million on January 13, 2010, with the stock price reaching 3.2 cents and 7.67 million shares traded. It seems that news regarding the ethanol industry caused this stock to be actively traded again on the Pink Sheet, after it was officially canceled. Related news on January 7, 2010 stated that ethanol margins had turned positive and would continue in 2010.²¹ Also, according to an article on January 6, 2010, denatured ethanol for January delivery (2010) rose 0.8 cents and margins for grinding corn into ethanol had improved as prices for the biofuel had surged 17 percent while corn prices had fallen 1.4 percent in Chicago.²² VeraSun stock reacted to the news and became more active again after January 8, 2010. The trading dollar volume of VeraSun reached the maximum on January 13, 2010, following the news announcement on the same day that corn prices plummeted to the 30-cent-per-bushel limit on the Chicago Board of Trade. Although this was good news for the stocks in the ethanol sector, it should have had no impact on VeraSun stock as it was already "dead". Investors in VeraSun stock believed that the ethanol industry's prospects were improving, but

²¹ For example, United States: State of the Ethanol Industry 2010 and Beyond, January 7, 2010 at www.Tendersinfo.com.

²² Pacific Ethanol Resumes Output at Idaho Distillery on Jan 6 2010 from Bloomberg News

did not know that this stock was already canceled. Thus, this case is an instance of a dead and buried (canceled) stock jumping in response to industry news and provides us yet another piece of clear evidence of investors' irrationality.

8. Summary and Conclusions

After General Motors filed for bankruptcy in June 2009, the company was carved into two entities: new GM consisting of profitable operations and Motors Liquidation which held the remaining assets. Motors Liquidation's liabilities far outstripped the values of its assets, and its stock was essentially worthless. Despite the firm's repeated cautionary statements, the stock traded heavily with prices exceeding \$1. Although there were prior similar instances, this case generated unprecedented media attention to market rationality in the case of bankruptcy stocks.

We document clear instances of market irrationality in bankrupt firm stocks by using a sample of stocks which did not receive any payoff in the reorganization plan approved by the bankruptcy court. Following the plan confirmation, the prices for these worthless stocks should have dropped to zero. However, these stocks continue to trade for positive prices; sometimes, prices exceed 20 cents and dollar volume is in millions. Such behavior is clear evidence of market irrationality. We also find evidence that the propensity for overvaluation of bankrupt firm stocks is higher in the case of well-known firms. Commentators argue that it is easier for manipulators to suck in uninformed investors by hyping such stocks on the Internet.

We uncover several instances of irrational stock price responses of worthless stocks to news events. A noteworthy example is the case of Kmart stock which experienced heavy trading volume and a jump in stock price on the day the reorganization plan was confirmed by the court. This response was likely driven by headlines trumpeting the emergence of Kmart from

bankruptcy and favorable expectations for the reorganized company. Stories barely mentioned that the old stock was slated to be canceled without receiving any distribution. This is striking evidence of investor ignorance about the distinctions between the old, canceled stock and newly issued stock in the reorganized firm. This confusion may help explain the evidence of irrationality documented in our analysis.

Arbitraders cannot remove this pricing inefficiency, due to difficulties of short-selling these stocks. Prior academic studies do not contain evidence on short-interest levels in bankruptcy stocks, perhaps due to the lack of short-interest data for many delisted firms. We collect available data and find that short-interest increases after bankruptcy filing for a significant portion of our sample. Thus, while short-selling may be costly, short-sellers are active in bankrupt firm stocks. Analyzing the short-interest data, we find that short-covering cannot account for the observed trading volume and price increases in the sample of worthless stocks.

There is one silver lining in the empirical evidence - irrationality is not pervasive in the trading of bankrupt firms and Li and Zhong (2011) provide evidence of rational influences. Most of these stocks have insignificant dollar trading volumes, and stock prices exceed ten cents relatively rarely. Nonetheless, the trading volume during the post-confirmation period for our sample of worthless stocks is around \$340 million, and there is potential for considerable loss to uninformed investors.

Prospects for removing investor ignorance by educational efforts are quite unclear. The SEC website cautions investors about the prospects for bankruptcy stocks. Furthermore, a perusal of electronic bulletin boards for some of the worthless stocks on sites such as Yahoo! Finance and InvestorsHub reveals an ample number of posts cautioning uninformed investors who frequently confuse the canceled shares for newly issued shares in the reorganized firms.

Motors Liquidation issued repeated statements, in the sternest possible terms, about the prospects for old stockholders and there was also considerable media attention to this case. In the wake of such extensive coverage of the General Motors story, the prospects look grim for eliminating investor ignorance in lesser-known firms through education. Investor irrationality/ignorance in Blockbuster stock during October 2011 lends support to a version of the adage that implies that “an uninformed investor is born every minute”.

There are some possible regulatory actions that can be taken to protect gullible investors. An effective but drastic solution is to prohibit trading in stocks immediately after the confirmation of their worthless status following the court’s approval of the reorganization plan. This may have the disadvantage of preventing short-sellers from covering their short positions and obtaining access to trading capital locked up as collateral. A more moderate step would be to require an investor initiating a long position (rather than covering a short position) to acknowledge that the stock is worthless under the confirmed reorganization plan. Additionally, the SEC can relax restrictions and mandate lower margin requirements for naked short-selling in worthless. The SEC has imposed restrictions on naked short-selling to prevent abusive trading designed to drive down stock prices below reasonable valuations. This concern does not arise in the context of stocks whose worthlessness has been confirmed by the bankruptcy court. The presence of aggressive short-sellers who police trading in these stocks can prevent the formation of speculative bubbles which draw in a number of unwitting investors.

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Table 1: Time Distribution of Sample Firms

This table presents the distribution of firms which completed the bankruptcy process during the period 2000-2011.

Bankruptcy Filing Announcement	Stocks traded around bankruptcy filing	Stocks traded around confirmation of reorganization plan	Stocks traded around plan confirmation with zero payoffs to old shareholders
Before 2000	32	32	19
2000	50	47	33
2001	73	72	56
2002	60	60	35
2003	37	34	22
2004	19	18	11
2005	19	18	15
2006	10	9	4
2007	8	8	6
2008	16	15	13
2009	58	56	40
2010	10	10	7
2011	4	4	3
Total	396	383	264

Table 2: Short Interest Ratios Surrounding Bankruptcy Filing

This table compares the difference of short interest ratio before the bankruptcy and after the bankruptcy. SI_B represents the last available short interest ratio before the bankruptcy. The short interest ratios after the bankruptcy are measured by four variables: the minimum of short interest ratio (Min (SI_A)), the average short interest ratio (Mean (SI_A)), and the maximum of short interest ratio (Max (SI_A)), the first available short interest ratio (First (SI_A)), and the last available short interest ratio (Last (SI_A)). Percentage measures the split between positive and negative short interest changes. Only firms with the short interest reporting gap between SI_B and First (SI_A) no more than 50 trading days are analyzed. Some firms are traded long after the effective date. The last day of trading is restricted to no more than 120 trading days after the effective date if effective date is available. If the effective date is not available, the last day of trading is restricted to no more than 500 trading days following the confirmation date.

Panel A: Short interest ratio before and after bankruptcy filing

	Obs.	Mean	Median	Max	Min
SI_B	113	0.0672	0.0355	0.3157	0.0001
First (SI_A)	113	0.0596	0.0304	0.4038	0.0001
Mean(SI_A)	113	0.0417	0.0183	0.4108	0.0001
Max(SI_A)	113	0.0680	0.0380	0.4479	0.0001
Min (SI_A)	113	0.0278	0.0068	0.3855	0.0000
Last(SI_A)	113	0.0392	0.0108	0.4258	0.0000

Panel B: Analysis of Changes in Short Ratio

	Obs.	Percentage	Mean	Median	Max	Min
First(SI_A)-SI_B \geq 0	39	34.51	0.0134	0.0026	0.1364	0.0000
First(SI_A)-SI_B < 0	74	65.49	-0.0186	-0.0060	-0.0000	-0.2629
Mean(SI_A)-SI_B \geq 0	26	23.01	0.0163	0.0045	0.1435	0.0000
Mean(SI_A)-SI_B < 0	87	76.99	-0.0380	-0.0139	0.0000	-0.2975
Max(SI_A)-SI_B \geq 0	62	54.87	0.0214	0.0052	0.1923	0.0000
Max(SI_A)-SI_B < 0	51	45.13	-0.0241	-0.0099	0.0000	-0.2603
Min(SI_A)-SI_B \geq 0	15	13.27	0.0203	0.0083	0.1181	0.0000
Min(SI_A)-SI_B < 0	98	86.73	-0.0485	-0.0179	0.0000	-0.3055
Last(SI_A)-SI_B \geq 0	24	21.23	0.0334	0.0088	0.1923	0.0000
Last(SI_A)-SI_B < 0	89	78.76	-0.0476	-0.0195	0.0000	-0.3049

Table 3: Summary Statistics for Sample of Worthless Stocks

This table presents summary statistics relating to our sample of 264 stocks with zero payoffs in the confirmed reorganization plan. The sample period is 2000- 2011. Panel A reports summary statistics for 229 stocks that traded on the confirmation date, and Panel B reports summary statistics for post-confirmation days (one day following the confirmation date to the last date of trading). Volume is measured as number of shares divided by shares outstanding. Some firms are still traded after the effective date. The last day of trading is restricted to no more than 120 trading days after the effective date if effective date is available. If the effective date is not available, the last day of trading is restricted to no more than 500 trading days following the confirmation date. In order to screen out data errors, we drop data on daily high prices if the ratio of daily high prices to that day's closing price is greater than three and the difference between high price and close price is more than one cent.

Panel A: Summary Statistics on the Confirmation Date

	N	Mean	Median	75% Percentile	90% Percentile	Maximum
Closing Price (\$)	264	0.0234	0.0080	0.0250	0.0550	0.3800
High Price (\$)	259	0.0293	0.0100	0.0300	0.0650	0.6100
Daily Volume (%)	264	2.7725	0.2021	1.2750	6.1399	74.2258
Daily Dollar Volume (\$)	264	233,515	757	11,721	90,059	18,786,076
Market Capitalization (\$)	264	4,096,484	276,304	934,187	4,360,398	577,753,020

Panel B: Summary Statistics from CD+1 to the Last Day of Trading

	N	Mean	Median	75% Percentile	90% Percentile	Maximum
Maximum of High Price (\$)	264	0.0394	0.0160	0.0400	0.0900	0.4400
Cumulative Volume (%)	264	42.4422	16.3977	35.6751	108.9218	559.9965
Cumulative Dollar Volume (\$)	264	1,294,334	30,782	202,567	1,642,140	50,009,715
Maximum of Daily Dollar Volume(\$)	264	426,323	8,756	46,906	448,086	15,874,789
Maximum Market Capitalization (\$)	264	6,528,442	516,948	1,994,373	8,017,550	888,850,800

Table 4: Instances of High Trading Volumes for Worthless Stocks after Reorganization Plan Confirmation

This table presents instances of high trading volumes for 63 events. It reports the irrational events with dollar volume above \$1 million after the confirmation days. Price change represents the stock price increases or decreases on the event day compared to the prices on the previous trading day.

Company Name	Confirmed Date	Effective Date	Event Date	Days after Confirmation	Dollar Volume (\$)	Close Price	Price change (%)		Daily Volume
							+	-	
Dollar Volume > \$ 10 million									
CIT Group Inc.	20091208	20091210	20091208	0	18,786,076	0.076		-50.46%	199,908,592
UAL Corporation (United Airlines)	20060120	20060201	20060120	0	16,957,782	0.38		-41.27%	40,361,169
CIT Group Inc.	20091208	20091210	20091209	1	15,874,789	0.045		-40.79%	333,935,096
Kmart Corp.	20030422	20030506	20030423	1	15,669,197	0.14	66.67%		133,495,100
UAL Corporation (United Airlines)	20060120	20060201	20060123	1	13,170,164	0.273		-28.16%	47,274,789
US Airways, Inc. (2002)	20030318	20030331	20030331	9	11,457,433	0.082	28.13%		121,355,200
Dollar Volume > \$ 5 million									
UAL Corporation (United Airlines)	20060120	20060201	20060124	2	9,248,027	0.13		-52.38%	47,935,627
Kmart Corp.	20030422	20030506	20030424	2	8,768,213	0.102		-27.14%	74,769,100
Global Crossing Ltd.	20021226	20031209	20031014	201	8,240,578	0.0475		-13.64%	117,520,800
Kmart Corp.	20030422	20030506	20030506	10	7,799,696	0.1	42.86%		91,264,900
Delta Air Lines, Inc.	20070425	20070430	20070426	1	6,179,454	0.053		-59.23%	112,804,700
Dollar Volume > \$ 2 million									
Delta Air Lines, Inc.	20070425	20070430	20070425	0	4,463,050	0.13		-21.21%	33,709,353
UAL Corporation (United Airlines)	20060120	20060201	20060125	3	4,432,495	0.114		-12.31%	43,979,029
Worldcom, Inc.	20031031	20040420	20031103	1	4,336,862	0.13		-33.33%	30,925,988
Lear Corporation	20091105	20091109	20091105	0	4,181,571	0.0855		-51.14%	37,593,072
US Airways Group, Inc. (2004)	20050916	20050927	20050919	1	3,877,499	0.355	29.09%		10,479,284
Kmart Corp.	20030422	20030506	20030425	3	3,417,527	0.084		-17.65%	39,852,500
Kmart Corp.	20030422	20030506	20030430	6	3,352,394	0.064		-27.27%	47,186,800
US Airways Group, Inc. (2004)	20050916	20050927	20050926	6	2,842,350	0.163		-30.04%	15,223,602

Six Flags, Inc.	20100429	20100430	20100430	1	2,819,357	0.0385		-51.88%	57,288,886
UAL Corporation (United Airlines)	20060120	20060201	20060130	6	2,776,515	0.053		-43.01%	46,417,749
Kmart Corp.	20030422	20030506	20030429	5	2,624,286	0.088		-3.30%	27,509,600
Worldcom, Inc.	20031031	20040420	20031104	2	2,552,429	0.067		-48.46%	36,387,521
Lear Corporation	20091105	20091109	20091106	1	2,547,826	0.0201		-76.49%	64,560,830
Six Flags, Inc.	20100429	20100430	20100429	0	2,514,300	0.08	64.61%		43,820,749
UAL Corporation (United Airlines)	20060120	20060201	20060127	5	2,506,057	0.093		-19.13%	24,816,770
AbitibiBowater Inc.	20101123	20101209	20101201	5	2,447,257	0.0455		-17.27%	53,750,871
Delta Air Lines, Inc.	20070425	20070430	20070427	2	2,415,033	0.018		-66.04%	82,692,703
UAL Corporation (United Airlines)	20060120	20060201	20060126	4	2,318,945	0.115	0.88%		21,061,570
UAL Corporation (United Airlines)	20060120	20060201	20060131	7	2,298,143	0.024		-54.72%	60,288,149
UAL Corporation (United Airlines)	20060120	20060201	20060201	8	2,278,771	0.002		-91.67%	243,179,814
Kmart Corp.	20030422	20030506	20030501	7	2,225,018	0.077	20.31%		30,976,700
Kmart Corp.	20030422	20030506	20030502	8	2,214,340	0.071		-7.79%	31,802,900
Kmart Corp.	20030422	20030506	20030505	9	2,172,080	0.07		-1.41%	30,208,400
Winn-Dixie Stores, Inc.	20061109	20061121	20061121	8	2,157,230	0.0055		-90.83%	103,764,939
US Airways, Inc. (2002)	20030318	20030331	20030328	8	2,130,982	0.064		-38.46%	25,119,200
Worldcom, Inc.	20031031	20040420	20031031	0	2,004,208	0.195		-17.02%	9,467,400
Dollar Volume > \$ 1 million									
US Airways Group, Inc. (2004)	20050916	20050927	20050916	0	1,925,703	0.275	30.95%		8,056,631
Delphi Corporation	20090730	20051008	20091006	47	1,914,145	0.0401		-33.17%	45,028,816
Silicon Graphics, Inc.	20060919	20061017	20061017	20	1,834,935	0.017		-54.05%	85,395,915
Kmart Corp.	20030422	20030506	20030428	4	1,766,965	0.091	8.33%		19,361,900
Silicon Graphics, Inc.	20060919	20061017	20060922	3	1,764,591	0.05	8.70%		31,071,833
Worldcom, Inc.	20031031	20040420	20040419	115	1,719,220	0.0165		-72.50%	74,145,218
Spansion Inc.	20100416	20100510	20100505	13	1,679,307	0.0383		-15.82%	33,749,864
Global Crossing Ltd.	20021226	20031209	20031015	202	1,593,694	0.045		-5.26%	29,202,400
Frontier Airlines Holdings, Inc. (2008)	20090910	20091001	20090930	14	1,579,382	0.0251		-49.90%	45,101,231
Kmart Corp.	20030422	20030506	20030422	0	1,529,952	0.084	27.27%		20,523,600
Kaiser Aluminum Corp.	20060206	20060706	20060511	66	1,511,267	0.14	86.67%		9,680,853

Global Crossing Ltd.	20021226	20031209	20031013	200	1,503,177	0.055	71.88%	35,261,700
US Airways Group, Inc. (2004)	20050916	20050927	20050920	2	1,472,683	0.31	-12.68%	4,661,121
US Airways, Inc. (2002)	20030318	20030331	20030324	4	1,411,044	0.104	-16.80%	12,857,500
Worldcom, Inc.	20031031	20040420	20040304	84	1,334,431	0.115	45.57%	12,104,563
Northwest Airlines Corporation	20070518	20070531	20070518	0	1,332,648	0.015	-48.28%	64,660,290
Kaiser Aluminum Corp.	20060206	20060706	20060531	79	1,297,527	0.255	54.55%	5,802,611
General Motors Corporation	20110329	20110331	20110330	1	1,293,612	0.0455	-5.21%	28,580,184
Global Crossing Ltd.	20021226	20031209	20031009	198	1,275,445	0.03	22.45%	42,977,500
Frontier Airlines Holdings, Inc. (2008)	20090910	20091001	20090929	13	1,239,163	0.0501	-37.38%	20,322,599
Winn-Dixie Stores, Inc.	20061109	20061121	20061110	1	1,205,553	0.09	35.34%	13,334,139
Global Crossing Ltd.	20021226	20031209	20031027	210	1,078,809	0.04	-16.67%	26,236,000
Kaiser Aluminum Corp.	20060206	20060706	20060706	104	1,076,041	0.0057	-57.46%	110,772,261
Trump Entertainment Resorts, Inc. (2009)	20100412	20100716	20100420	6	1,055,797	0.39	50.00%	3,210,560
Spansion Inc.	20100416	20100510	20100504	12	1,041,730	0.0455	62.50%	25,413,818
Trump Entertainment Resorts, Inc. (2009)	20100412	20100716	20100421	7	1,015,665	0.35	-10.26%	3,147,804

Table 5: Short-interest and Trading Volume after the Reorganization Plan Confirmation Date for Confirmed Worthless Stocks

This table presents the evidence that trading volume for confirmed worthless stocks after the confirmation date exceeds short-interest surrounding the confirmation date. We present the data for two subsamples which are based on the time of availability of the last available short-interest: whether the last short-interest data is available after the confirmation or no later than the confirmation date. If the available short interest is collected no later than confirmation date, cumulative and maximum trading volumes are counted from the confirmation date to the last day of trading. If the available short interest is collected after confirmation date, cumulative and maximum trading volumes are counted from one trading day after collecting the available short interest to the last day of trading. Some firms are still traded after the effective date. The last day of trading is restricted to no more than 120 trading days after the effective date if effective date is available. If the effective date is not available, the last day of trading is restricted to no more than 500 trading days following the confirmation date.

Company Names	Confirmation Date (CD)	Date of Short Interest	Day Relative to CD	Short Interest	Cumulative Trading Volume	Ratio of Cumulative Volume/Short Interest	Maximum Daily Trading Volume
Case 1: Short Interest no later than the Confirmation Date							
Advanta Corp.	20110211	20110210	-1	42	3,577,214	85,171.76	3,047,047
Chesapeake Corporation	20110401	20110328	-4	73	1,087,635	14,899.11	410,457
Young Broadcasting, Inc.	20100510	20100427	-9	10,001	18,854,817	1,885.29	6,698,748
Hines Horticulture, Inc.	20090128	20090127	-1	48	90,091	1,876.90	26,571
Magna Entertainment Corp.	20100429	20100427	-2	1,047	469,604	448.52	73,111
Source Interlink Companies, Inc.	20090528	20090526	-2	180,556	74,292,260	411.46	38,602,428
Monaco Coach Corporation	20090629	20090625	-2	120,486	49,215,913	408.48	2,842,129
Spansion Inc.	20100416	20100412	-4	961,910	257,482,027	267.68	36,468,542
Hayes Lemmerz International, Inc.	20091103	20091027	-5	186,652	33,279,151	178.30	6,270,371
Asyst Technologies, Inc.	20100218	20100209	-6	86,092	12,571,957	146.03	1,212,636
VeraSun Energy Corporation	20091023	20091012	-9	450,842	61,422,314	136.24	7,670,219
Constar International Inc. (2011)	20110520	20110510	-8	30,836	3,996,989	129.62	1,905,700
Citadel Broadcasting Corporation	20100519	20100511	-6	2,529,325	327,750,559	129.58	80,201,953
Interstate Bakeries Corporation	20081205	20081124	-8	415,815	53,675,320	129.08	13,540,838
Trump Entertainment Resorts, Inc. (2009)	20100412	20100412	0	920,030	117,708,538	127.94	51,176,375
Silicon Graphics, Inc. (2009)	20091110	20091110	0	15,303	1,898,284	124.05	516,644
Wellman, Inc.	20090114	20090112	-2	58,017	6,596,134	113.69	1,961,499

Noble International, Ltd.	20091130	20091124	-3	12,204	1,307,314	107.12	1,107,269
Mesa Air Group, Inc.	20110120	20110111	-6	1,897,978	192,576,703	101.46	48,986,145
Transmeridian Exploration Incorporated	20090819	20090811	-6	297,617	28,070,950	94.32	2,106,377
Delphi Corporation	20090730	20090728	-2	2,961,799	277,089,779	93.55	45,028,816
Allied Holdings, Inc.	20070514	20070510	-2	125,089	10,995,445	87.90	3,028,050
Dayton Superior Corporation	20091014	20091012	-2	104,145	7,322,370	70.31	4,990,434
Six Flags, Inc.	20100429	20100427	-2	1,968,100	115,089,538	58.48	57,288,886
Lear Corporation	20091105	20091027	-7	2,261,093	122,030,350	53.97	64,560,830
Frontier Airlines Holdings, Inc. (2008)	20090910	20090910	0	2,940,746	127,071,595	43.21	45,101,231
R.H. Donnelley Corporation	20100112	20100112	0	844,165	34,557,828	40.94	19,175,106
Champion Enterprises, Inc.	20110406	20110328	-7	65,953	2,621,859	39.75	1,200,526
Gottschalks Inc.	20110218	20110210	-6	19,518	636,759	32.62	547,039
Capital Corp of the West	20100120	20100112	-5	114,673	3,623,155	31.60	346,634
AbitibiBowater Inc.	20101123	20101110	-9	10,376,131	294,400,226	28.37	109,335,781
California Coastal Communities, Inc. (2009)	20110224	20110223	-1	76,847	2,060,414	26.81	1,343,937
SONICblue, Inc.	20081024	20081010	-10	687,987	16,590,584	24.11	2,974,480
Jackson Hewitt Tax Service Inc.	20110809	20110726	-10	723,691	15,061,802	20.81	8,124,444
Lehman Brothers Holdings Inc.	20111206	20111125	-7	7,091,213	143,626,545	20.25	30,151,965
Sun-Times Media Group, Inc.	20110817	20110810	-5	51,386	805,665	15.68	707,142
Northwest Airlines Corporation	20070518	20070510	-6	22,991,850	305,712,053	13.30	101,367,230
Sea Containers Ltd.	20081124	20081124	0	20,053	266,192	13.27	221,019
FairPoint Communications, Inc.	20110113	20110111	-2	2,490,344	29,616,793	11.89	10,230,095
CIT Group Inc.	20091208	20091124	-9	45,824,383	534,356,488	11.66	333,935,096
LandAmerica Financial Group, Inc.	20091123	20091110	-9	218,944	2,351,874	10.74	1,535,765
WCI Communities, Inc.	20090826	20090826	0	3,234,824	33,651,813	10.40	10,581,708
Luminent Mortgage Capital, Inc.	20090630	20090625	-3	371,270	3,801,445	10.24	2,661,421
American Home Mortgage Investment Corp.	20090223	20090210	-8	4,940,851	49,194,626	9.96	2,423,497
Constar International Inc.	20090514	20090512	-2	406,751	3,677,222	9.04	2,096,200
Apex Silver Mines Limited	20090304	20090224	-6	2,919,250	21,205,907	7.26	2,874,055
Vineyard National Bancorp	20100826	20100826	0	166,331	1,200,014	7.21	118,200
Charter Communications, Inc	20091117	20091110	-5	21,202,609	129,246,724	6.10	40,215,685
Journal Register Company	20090707	20090625	-7	1,216,978	5,717,996	4.70	2,553,010
Tarragon Corporation	20100618	20100610	-6	547,326	2,545,998	4.65	1,579,826
RHI Entertainment, Inc.	20110329	20110328	-1	825,132	2,906,443	3.52	866,541
Eddie Bauer Holdings, Inc.	20100318	20100310	-6	1,071,310	2,928,027	2.73	753,426

Delta Financial Corporation	20081212	20081210	-2	1,492,271	3,564,359	2.39	746,175
Orleans Homebuilders, Inc.	20101201	20101124	-4	306,287	666,744	2.18	134,296
Borders Group, Inc.	20111220	20111212	-6	1,988,967	4,052,765	2.04	801,140
Movie Gallery, Inc. (2010)	20101029	20101026	-3	39,458	73,212	1.86	30,000
General Motors Corporation	20110329	20110328	-1	27,533,511	50,981,061	1.85	28,580,184
Guaranty Financial Group Inc.	20110511	20110510	-1	865,608	960,070	1.11	304,417
Corus Bankshares, Inc.	20110927	20110927	0	905,048	834,732	0.92	204,830
Palm Harbor Homes, Inc.	20111117	20111110	-5	146,652	118,897	0.81	50,000
InPhonic, Inc.	20081022	20081010	-8	5,213,682	1,974,765	0.38	1,740,516
Syntax-Brilliant Corporation	20090706	20090625	-6	10,403,639	3,729,794	0.36	422,900
Midwest Banc Holdings, Inc.	20110531	20110525	-3	547,084	147,567	0.27	44,521

Case 2: Short Interest after the Confirmation date

Lenox Group, Inc.	20091216	20091228	7	14,949	4,990,705	333.85	1,387,209
Spectrum Brands, Inc.	20090715	20090728	9	315,426	37,857,884	120.02	29,213,411
Building Materials Holding Corporation	20091217	20091228	6	861,020	5,172,387	6.01	2,353,638
Edge Petroleum Corporation	20091214	20091228	9	724,028	1,066,785	1.47	504,294
Idearc Inc.	20091222	20091228	3	15,413,762	17,159,077	1.11	10,326,225

Table 6: Short Interest Ratio Surrounding the Reorganization Plan Confirmation

The observations are limited to firms whose shares are canceled without payoffs in the confirmed reorganization plan. SI_B is the last reported short-interest before confirmation date and SI_A denotes short-interest after the confirmation date. SI_B is measured within 30 days prior to the confirmation date. Some firms are still traded after the effective date. The last day of trading is restricted to no more than 120 trading days after the effective date if effective date is available. If the effective date is not available, the last day of trading is restricted to no more than 500 trading days following the confirmation date.

Panel A: Short Interest Ratio Before and After Confirmation Date

	Obs.	Mean	Median	Max	Min
SI_B	55	0.0255	0.0106	0.1906	0.0000
Mean(SI_A)	55	0.0345	0.0120	0.2994	0.0000
Max(SI_A)	55	0.0375	0.0123	0.2994	0.0000
Min (SI_A)	55	0.0323	0.0110	0.2994	0.0000
First (SI_A)	55	0.0349	0.0123	0.2994	0.0000
Last(SI_A)	55	0.0349	0.0120	0.2994	0.0000

Panel B: Analysis of Changes in Short Ratio

	Obs.	Percentage	Mean	Median	Max	Min
First(SI_A)-SI_B \geq 0	29	52.73	0.0216	0.0014	0.1791	0.0000
First(SI_A)-SI_B < 0	26	47.27	-0.0042	-0.0007	-0.0000	-0.0468
Mean(SI_A)-SI_B \geq 0	28	50.91	0.0230	0.0009	0.1791	0.0000
Mean(SI_A)-SI_B < 0	27	49.09	-0.0057	-0.0009	0.0000	-0.0468
Max(SI_A)-SI_B \geq 0	35	63.63	0.0217	0.0013	0.1791	0.0000
Max(SI_A)-SI_B < 0	20	36.37	-0.0052	-0.0009	0.0000	-0.0468
Min(SI_A)-SI_B \geq 0	25	45.45	0.0223	0.0005	0.1791	0.0000
Min(SI_A)-SI_B < 0	30	54.55	-0.0062	-0.0009	0.0000	-0.0699
Last(SI_A)-SI_B \geq 0	27	49.09	0.0259	0.0005	0.1791	0.0000
Last(SI_A)-SI_B < 0	28	50.91	-0.0066	-0.0009	0.0000	-0.0699

Table 7: Delivery Failures in Worthless Stocks Around Reorganization Plan Confirmation and Effective Dates

This table reports the percentage of outstanding shares involved in “fail to deliver” trades for using available data since January 2005 for our sample of worthless stocks. Data on the number of shares which were failed to be delivered on the settlement date is published by the SEC in conjunction with Regulation SHO which restricts naked short-sales. We infer the trade date from the settlement date reported in the SEC data files.

Panel A: Fail-to-Deliver Ratio around the Confirmation Date (CD)

Trade day relative to CD	Obs.	Mean (%)	75 th Percentile (%)	90 th Percentile (%)	Maximum (%)
-5	124	0.74	0.14	1.48	20.63
-4	122	0.79	0.14	1.78	20.56
-3	130	0.90	0.21	2.14	20.75
-2	132	1.12	0.16	2.24	24.96
-1	128	1.65	0.19	4.29	33.73
0	125	2.23	0.71	8.15	33.71
1	126	2.64	0.85	7.09	43.90
2	127	2.97	1.38	8.39	46.86
3	120	2.57	1.25	8.16	41.72
4	121	2.74	1.25	8.75	41.81
5	120	3.31	1.64	10.10	49.91

Panel B: Fail-to-Deliver Ratio prior to the Effective Date (ED)

Trade day relative to ED	Obs.	Mean (%)	75 th Percentile (%)	90 th Percentile (%)	Maximum (%)
-5	119	3.54	2.07	12.85	54.89
-4	126	3.80	2.64	14.53	55.87
-3	122	4.68	3.61	16.61	55.87
-2	122	5.99	7.40	21.31	55.88
-1	114	8.13	8.15	31.46	94.52
0	119	12.28	11.60	39.31	168.74

Table 8: Relationship of Post-confirmation Prices to Short-Interest Levels

The dependent variables are the closing price on the first trading day following the confirmation (price_CD+1), the maximum closing price among three post-confirmation days (price_CD+1, price_CD+2 and price_CD+3), the high price on the first trading day following the confirmation (high Price_CD+1) and the maximum high price among three post-confirmation days (high price_CD+1, high price_CD+2 and high price_CD+3), respectively. The independent variables are the short interest as fraction of shares outstanding and average volume; short-interest levels are measured in the interval (-10, 10) relative to the confirmation date. The average volume is measured for the window [-40,-10] relative to the confirmation. In order to screen out data errors, we drop data on daily high prices if the ratio of daily high prices to that day's closing price is greater than three and the difference between high price and close price is more than one cent. Numbers reported in parentheses are t-statistics; the superscripts a, b, and c denote significance at the 10% level, 5%, 1% level, respectively.

	Price_CD+1		Max Closing Price		High Price_CD+1		Max High Price	
Intercept	0.0262 ^c	0.0289 ^c	0.0278 ^c	0.0311 ^c	0.0318 ^c	0.0342 ^c	0.0333 ^c	0.0365 ^c
	(4.45)	(5.26)	(4.45)	(5.34)	(4.83)	(5.47)	(4.82)	(5.55)
Short Interest/Shares Outstanding	-0.0216		-0.0089		-0.0356		-0.0081	
	(-0.21)		(-0.08)		(-0.31)		(-0.07)	
Short Interest/Average Volume		-0.0005		-0.0005		-0.0005		-0.0004
		(-1.29)		(-1.32)		(-1.16)		(-1.08)
R ²	0.0007	0.0265	0.0001	0.0272	0.0016	0.0227	0.0001	0.0195
N	63	63	64	64	60	60	61	61

Table 9: Relationship of Post-Confirmation Price Changes to Short-Covering

Dependent variable is the stock price change during each short interest reporting interval in the post-confirmation period for. ΔSI_1 measures the change in short interest during each reporting period as a percentage of outstanding shares; ΔSI_2 measures the short interest change during each reporting period as a percentage of cumulative trading volume in the same period. SC (short-covering) Dummy equals one if short-interest decreases (125 cases) and zero otherwise (149 cases); SS (short-selling) Dummy equals 1 – SS Dummy. The last day of trading is restricted to no more than 120 trading days after the effective date if effective date is available. If the effective date is not available, the last day of trading is restricted to no more than 500 trading days following the confirmation date. Numbers reported in parentheses are t-statistics; the superscripts a, b, and c denote significance at the 10% level, 5%, 1% level, respectively.

	ΔP	
Intercept	-0.0011 (-0.95)	-0.0015 (-1.17)
ΔSI_1 *SS Dummy	0.4805 ^c (6.86)	
ΔSI_1 *SC Dummy	0.2497 (1.08)	
ΔSI_2 *SS Dummy		0.0475 ^c (3.51)
ΔSI_2 *SC Dummy		0.0046 (0.43)
R ²	0.1528	0.0451
N	273	273

Table 10: Relationship of Post-confirmation Prices to Stock Popularity

The dependent variables are the closing price on the confirmation date (Price_CD), the maximum closing price among three post-confirmation days (Price_CD, Price_CD+1 and Price_CD+2), the high price on the confirmation (high Price_CD) and the maximum high price among High Price_CD, High Price_CD+1 and High Price_CD+2, respectively. We use two measures of stock popularity: the percentage of average trading volume and log of average dollar volume. The percentage of average trading volume is measured as average trading volume during the window [-40,-10] relative to the confirmation as the percentage of share outstanding. The log of average dollar volume is measured as the log of the average dollar volume during the window [-40,-10] relative to the confirmation. In order to screen out data errors, we drop data on daily high prices if the ratio of daily high prices to that day's closing price is greater than three and the difference between high price and close price is more than one cent. Numbers reported in parentheses are t-statistics; the superscripts a, b, and c denote significance at the 10% level, 5%, 1% level, respectively.

	Price_CD		Max Closing Price		High Price_CD		Max High Price	
Intercept	0.0201 ^c	-0.0323 ^c	0.022 ^c	-0.0286 ^c	0.0225 ^c	-0.0455 ^c	0.0252 ^c	-0.0399 ^c
	(6.09)	(-4.48)	(6.48)	(-4.06)	(4.72)	(-4.44)	(5.18)	(-4.09)
Average Trading Volume (%)	0.6480 ^c		0.6838 ^c		1.2380 ^c		1.2769 ^c	
	(3.35)		(3.23)		(3.44)		(3.30)	
Log(Average Dollar Volumes)		0.0076 ^c		0.0077 ^c		0.0102 ^c		0.0103 ^c
		(8.53)		(8.61)		(7.98)		(8.15)
R ²	0.0472	0.2429	0.0401	0.2257	0.0521	0.2284	0.0438	0.2180
N	229	229	252	252	217	217	240	240

Table 11: Irrational Stock Price Responses to News Events-Case of General Motors

This table reports instances of irrational General Motors stock price responses to news events. Panel A reports the irrational cases. Event day is day t and represents a day when there is a 20% in stock price and trading volume, and trading volume increase by \$ 1million. The stock prices on the event day and the previous day are presented. The returns on deep discount old GM bonds are used to capture the reaction to the event in the bond market, which is dominated by sophisticated institutional investors. The bond returns on the event day are calculated using an equally-weighted portfolio of the three most liquid bonds with a price less than 40% of face value; bond prices are reported as % of face value. Panel B contains summaries of news stories immediately before or on the event day.

Panel A: Significant Price and Volume Increase Events

Event	Date	Stock					Bond	
		V_{t-1} (\$ 'm)	V_t (\$ 'm)	P_{t-1}	P_t	Returns (%)	P_{t-1} (%)	Returns (%)
1	20090609	109.25	229.25	1.210	1.500	23.97	10.38	-1.68
2	20090710	49.41	82.88	0.837	1.150	37.40	10.69	-3.33
3	20090806	4.27	13.61	0.517	0.625	20.91	16.03	3.23
4	20090807	13.61	24.49	0.625	0.756	20.94	14.99	-6.27
5	20090810	24.49	39.10	0.756	0.960	26.98	14.68	-2.10
6	20100107	3.30	11.55	0.601	0.734	22.13	28.92	1.09
7	20100421	1.51	16.48	0.542	0.692	27.68	35.94	0.64
8	20100816	3.34	5.59	0.435	0.523	20.23	33.34	-1.38
9	20101115	1.39	3.55	0.218	0.270	23.63	35.96	1.04
10	20101201	0.84	1.85	0.096	0.162	69.53	31.80	1.48

Panel B: Related Stories

Stories	News Release date
<p>Event 1: General Motors</p> <p>On June 9, 2009, General Motors Corporation (“GM”) issued a press release announcing that Edward E. Whitacre, Jr. will become the chairman of the company (“New GM”) that is expected to purchase substantially all of GM’s assets under section 363 of the Bankruptcy Code.</p> <p>Pages for Motors Liquidation on the Google Finance and Charles Schwab websites, for example, incorrectly list executives of the new GM, including Chairman Ed Whitacre Jr., as company principals when in fact they have no connection to Motors Liquidation.</p>	6/9/2009
<p>Event 2: General Motors</p> <p>On July 10, 2009, a new entity completed the purchase of continuing operations, assets and trademarks of GM as a part of the 'pre-packaged' Chapter 11 reorganization. As ranked by total assets, GM's reorganization marks one of the largest corporate Chapter 11 reorganizations in U.S. history.</p> <p>On July 10, 2009, with financing partially provided by the US Government, a new General Motors was created from the reorganization.</p>	7/10/2009

Events 3, 4: General Motors

General Motors will launch a plug-in hybrid sport utility vehicle under the Buick brand in 2011, the automaker said Thursday. 8/6/2009
The U.S. Senate voted to extend the “cash for clunkers” program on the night of 8/6/09 and the President signed the legislation on 8/7/09. GM ranked last in the brands bought through this program.

Event 5: General Motors

More than 225 General Motors dealers in California will sell vehicles through the eBay online auction site in a four-week trial, the companies announced Monday (8/10/2009). 8/10/2009

Event 6: General Motors

General Motors Co GM.UL said on Thursday (1/7/2010) it will seek to sell its Nexteer Automotive business -- the steering unit the U.S. automaker took back from former parts subsidiary Delphi Corp last year. 1/7/2010
Prospective bidders in Sweden, Luxembourg and the Netherlands were making last-ditch efforts on Thursday to buy Saab, hours before a deadline set by owner General Motors to either sell or close the Swedish carmaker.

Event 7: General Motors

April 19, 2010: General Motors Co. will fully repay the \$6.7 billion loan portion of its U.S. government aid earlier than its previously promised payback date of June. 4/19/2010
April 21, 2010: General Motors (new GM) has made a final payment of \$5.8 billion to the U.S. and Canadian governments, paying off the last of its \$6.7 billion in loans. 4/21/2010

Event 8: General Motors

General Motors Co has completed the paperwork for an initial public offering, and timing of its filing with the U.S. securities regulators rests with the board of the top U.S. automaker, sources familiar with the process said on Monday. 8/16/2010

Event 9: General Motors

Updated General Motors is looking to price shares in its initial public offering to \$32 to \$33, higher than the previously estimated price range of \$26 to \$29, people close to the matter tell DealBook. The size of the common stock offering will remain the same, meaning that G.M. could raise more than \$11.8 billion at the midpoint of the new price range. The company is also expected to raise the amount of money it expects to raise from selling preferred shares to about \$4 billion from \$3 billion, one of these people added. 11/15/2010
The decision to move the price range up was made on Monday afternoon, this person said, and the changes could be disclosed in a regulatory filing as soon as Tuesday morning. Books for the offering are set to close Tuesday afternoon, and G.M. shares will be priced on Wednesday.

Event 10: General Motors

General Motors (NYSE: GM) dealers reported 168,704 total sales in November, a 21-percent increase from the prior year for the company's four brands. The gains were the result of balanced contributions from Chevrolet, Buick, GMC and Cadillac cars, crossovers and trucks. With sales for GM's four brands up 22 percent through November, GM is on track to gain market share for the year. 12/1/2010

Table 12: Irrational Stock Price Increases for Confirmed Worthless Stocks

This table reports instances of stock price increases of at least one cent on volume exceeding \$100,000 for stocks which receive no payoffs in the confirmed reorganization plan. Panel A reports prices and volume on event date (t), and days relative to plan confirmation date (CD) and plan effective date (ED). Panel B contains summaries of news stories immediately before or on the event date.

Company Name	Event	Confirmation Date	Effective Date	Event Date (t)	P_{t-1}	P_{t_High}	P_t	$P_t - P_{t-1}$	V_t (\$)	Relative to CD	Relative to ED
AbitibiBowater Inc.	1	20101123	20101209	20101129	0.039	0.067	0.055	0.016	691,885	3	-8
Acterna Corp.	2	20030925	20031014	20030925	0.031	0.09	0.048	0.017	105,107	0	-13
Adelphia Business Solutions, Inc.	3	20031219	20040407	20040121	0.025	0.065	0.036	0.011	299,931	20	-54
ATA Holdings Corp.	4	20060131	20060228	20060201	0.075	0.25	0.16	0.085	120,752	1	-18
DecisionOne Holdings Corp.	5	20000321	20000407	20000328	0.18	0.21	0.19	0.010	292,443	5	-8
Delphi Corporation	6	20090730	20091006	20090915	0.045	0.064	0.059	0.014	560,885	32	-15
	7	20090730	20091006	20090916	0.059	0.075	0.072	0.013	968,686	33	-14
Frontier Airlines Holdings, Inc. (2008)	8	20090910	20091001	20090914	0.115	0.138	0.138	0.023	211,428	2	-13
	9	20090910	20091001	20090928	0.052	0.086	0.08	0.028	829,151	12	-3
Fruit of the Loom, Inc.	10	20020419	20020430	20020422	0.065	0.085	0.08	0.015	131,311	1	-6
Global Crossing Ltd.	11	20021226	20031209	20031013	0.032	0.06	0.055	0.023	1,503,177	200	-40
Huffy Corp.	12	20050923	20051014	20051003	0.0195	0.045	0.04	0.021	147,566	6	-9
Interstate Bakeries Corporation	13	20081205	20090203	20081215	0.03	0.05	0.0455	0.016	100,412	6	-33
	14	20081205	20090203	20081216	0.0455	0.094	0.068	0.023	313,554	7	-32
Kaiser Aluminum Corp.	15	20060206	20060706	20060510	0.062	0.105	0.075	0.013	115,004	65	-39
	16	20060206	20060706	20060511	0.075	0.24	0.14	0.065	1,511,267	66	-38
	17	20060206	20060706	20060526	0.103	0.12	0.117	0.014	114,555	77	-27
	18	20060206	20060706	20060530	0.117	0.168	0.165	0.048	477,195	78	-26
	19	20060206	20060706	20060531	0.165	0.288	0.255	0.090	1,297,527	79	-25
	20	20060206	20060706	20060606	0.133	0.159	0.148	0.015	201,829	83	-21
	21	20060206	20060706	20060607	0.148	0.18	0.17	0.022	192,193	84	-20
	22	20060206	20060706	20060621	0.075	0.113	0.1071	0.032	500,563	94	-10
	23	20060206	20060706	20060622	0.1071	0.155	0.145	0.038	309,427	95	-9
	24	20060206	20060706	20060627	0.042	0.065	0.062	0.020	399,330	98	-6
Kmart Corp.	25	20030422	20030506	20030422	0.066	0.088	0.084	0.018	1,529,952	0	-10
	26	20030422	20030506	20030423	0.084	0.15	0.14	0.056	15,669,197	1	-9

	27	20030422	20030506	20030501	0.064	0.085	0.077	0.013	2,225,018	7	-3
	28	20030422	20030506	20030506	0.07	0.102	0.1	0.030	7,799,696	10	0
Lehman Brothers Holdings Inc.	29	20111206		20111206	0.0261	0.046	0.04	0.014	732,000	0	
Loral Space & Communications Ltd.	30	20050801	20051121	20050926	0.057	0.11	0.084	0.027	297,956	39	-40
Silicon Graphics, Inc.	31	20060919	20061017	20060921	0.027	0.046	0.046	0.019	586,537	2	-18
Six Flags, Inc.	32	20100429	20100430	20100429	0.0486	0.088	0.08	0.031	2,514,300	0	-1
Spansion Inc.	33	20100416	20100510	20100504	0.028	0.052	0.0455	0.018	1,041,730	12	-4
	34	20100412	20100716	20100413	0.135	0.175	0.155	0.020	185,312	1	-66
	35	20100412	20100716	20100414	0.155	0.19	0.175	0.020	123,512	2	-65
	36	20100412	20100716	20100415	0.175	0.209	0.185	0.010	116,803	3	-64
Trump Entertainment Resorts, Inc. (2009)	37	20100412	20100716	20100416	0.185	0.21	0.2	0.015	108,517	4	-63
	38	20100412	20100716	20100419	0.2	0.27	0.26	0.060	249,640	5	-62
	39	20100412	20100716	20100420	0.26	0.39	0.39	0.130	1,055,797	6	-61
	40	20100412	20100716	20100422	0.35	0.435	0.36	0.010	512,079	8	-59
	41	20100412	20100716	20100426	0.345	0.3765	0.3755	0.031	245,613	10	-57
US Airways Group, Inc. (2004)	42	20050916	20050927	20050916	0.21	0.295	0.275	0.065	1,925,703	0	-7
	43	20050916	20050927	20050919	0.275	0.44	0.355	0.080	3,877,499	1	-6
	44	20030318	20030331	20030320	0.099	0.127	0.111	0.012	882,256	2	-7
	45	20030318	20030331	20030321	0.111	0.129	0.125	0.014	695,995	3	-6
US Airways, Inc. (2002)	46	20030318	20030331	20030325	0.104	0.117	0.116	0.012	718,100	5	-4
	47	20030318	20030331	20030331	0.064	0.124	0.082	0.018	11,457,433	9	0
USInterNetworking, Inc.	48	20020508	20020521	20020513	0.013	0.055	0.03	0.017	378,876	3	-6
VeraSun Energy Corporation	49	20091023	20091217	20100113	0.014	0.05	0.032	0.018	238,145	55	17
Winn-Dixie Stores, Inc	50	20061109	20061121	20061110	0.0665	0.12	0.09	0.024	1,205,553	1	-7
	51	20031031	20040420	20031120	0.058	0.07	0.07	0.012	305,400	14	-102
	52	20031031	20040420	20031222	0.025	0.045	0.04	0.015	174,398	35	-81
	53	20031031	20040420	20040108	0.045	0.065	0.06	0.015	395,668	46	-70
	54	20031031	20040420	20040109	0.06	0.071	0.071	0.011	655,815	47	-69
Worldcom, Inc.	55	20031031	20040420	20040213	0.046	0.065	0.06	0.014	446,534	71	-45
	56	20031031	20040420	20040304	0.079	0.3	0.115	0.036	1,334,431	84	-32
	57	20031031	20040420	20040310	0.102	0.124	0.12	0.018	578,742	88	-28
	58	20031031	20040420	20040318	0.11	0.13	0.127	0.017	574,016	94	-22
Young Broadcasting, Inc	59	20100510	20100624	20100723	0.0009	0.039	0.0167	0.016	122,106	52	20

Panel B: Related Stories

Stories	News Release date
Events following the news such as “Reorganization plan is approved”, “Nears Exit of Chapter 11”, etc. Event 1, 2, 4,5, 24, 29, 31, 32, 42, 43, 47, 48, and 50	
No stories Event 3, 12, 17,18, 20, 21, 30, 41, 57 and 59	
Event 6, 7: Delphi Corporation Fitting its long history of developing high-performance products for high-end luxury vehicles and sports cars, Delphi Corp. will supply key technologies to the new Ferrari 458 Italia including optimized air conditioning, advanced wiring systems and innovative suspension that contribute to the vehicle's lighter weight and lower emissions.	9/15/2009
Event 8: Frontier Airlines Holdings Frontier Airlines (OTCBB: FRNTQ) today announced it will begin new nonstop service to Southwest Florida International Airport (RSW) from Denver and increase the number of flights to Tampa International Airport (TPA) from Denver. Frontier will also begin offering new nonstop service to Cancún International Airport (CUN) from both Indianapolis International Airport (IND) and Lambert-St. Louis International Airport (STL), and will add a third weekly flight from Kansas City International Airport (MCI) to Cancun.	9/14/2009
Event 9: Frontier Airlines Holdings Frontier reported a consolidated operating profit of \$10.2 million for the month of August 2009, compared to an operating income of \$3.3 million for the same period in 2008, and a total consolidated net loss of \$2.0 million compared to a net loss of \$5.6 million for August 2008.	9/25/2009
Event 10: Fruit of the Loom, Inc Judge Peter Walsh in the U.S. Bankruptcy Court in Wilmington, Del., approved the stalking-horse bid. Warren Buffett's Berkshire Hathaway Inc. finally won the go-ahead Friday to acquire bankrupt Fruit of the Loom Inc. for at least \$835 million in cash and to end the underwear maker's 27-month stay in Chapter 11.	4/20/2002
Event 11:Global Crossing Ltd. Global Crossing announced today that it has signed a multi-year contract with Vonage to provide the broadband telephony provider IP Transit, co-location service, and domestic and international voice termination services. The partnership will make Global Crossing Vonage's preferred provider of long distance voice termination.	10/13/2003
Event 13, 14:Interstate Bakeries Corp. The company expects to enter into a \$125 million credit facility with General Electric Capital Corp and a \$344 million first lien term loan credit facility with Silver Point Finance, LLC, Monarch Alternative Capital L.P. and McDonnell Investment Management LLC and other persons (collectively, the “Term Loan Facility Lenders”) reasonably acceptable to IBC Investors I, LLC (“Investor”), an affiliate of Ripplewood Holdings L.L.C..	12/11/2008
Event 15:Kaiser Aluminum Corp. Kaiser Aluminum today announced that Joseph P. Bellino will join the company May 15 as executive vice president and CFO.	5/10/2006

Event 16: Kaiser Aluminum Corp.

Kaiser Aluminum today reported net income of \$38.4 million for the quarter ended March 31, 2006, compared to \$8.3 million for the same period in 2005, driven by strong broad based demand for fabricated aluminum products, particularly in the aerospace and high strength products. 5/11/2006

Event 19: Kaiser Aluminum Corp.

No company specific news stories. Alcoa made progress with workers union in negotiations; Kaiser's unions were involved in bankruptcy negotiations. Alcan is viewed as a possible acquisition target. 5/31/2006

Event 22:Kaiser Aluminum Corp.

Tennalum, which is a division of Kaiser Aluminum, produces aluminum rod and bar stock for consumption by aerospace, automotive and various other markets. Tennessee Department of Labor & Workforce Development Commissioner James Neeley announced that Tennalum in Jackson was chosen to receive the Commissioner's Award of Excellence for Workplace Safety. 6/21/2006

Event 23:Kaiser Aluminum Corp.

Kaiser Aluminum Corporation today announced that it expects its second amended plan of reorganization (POR) to become effective on or about July 6, 2006, whereupon it will emerge from Chapter 11 protection. 6/22/2006

Event 25 and 26:Kmart Corp.

Court OKs Kmart plan to emerge from bankruptcy. A federal court approved Kmart Corp.'s reorganization plan late Tuesday, paving the way for the retail giant to emerge from bankruptcy in less than two weeks. 4/22/2010

Event 27 :Kmart Corp.

Kmart creditors approve plan. 5/1/2010

Event 28 :Kmart Corp.

Kmart Corp. emerges from bankruptcy. 5/7/2010

Event 33:Spansion Inc.

Holder of Spansion Inc SPSNQ.PK convertible notes asked a federal court to block part of the chipmaker's approved bankruptcy plan that would wipe out their investment, according to court documents. 5/4/2010

Event 34 and 35: Trump Entertainment Resorts, Inc.

Trump Entertainment Resorts Inc. said that a U.S. bankruptcy judge in New Jersey confirmed the company's reorganization plan. U.S. Bankruptcy Judge Judith Wizmer declined a competing plan filed by Icahn Partners, the hedge fund controlled by the New York investor Carl Icahn. Old shares receive no payoffs under either plan. 4/13/2010

Event 36: Trump Entertainment Resorts, Inc.

Icahn to appeal his loss of three Trump casinos. 4/15/2010

Event 37, 38, 39 and 40: Trump Entertainment Resorts, Inc.

Icahn to challenge court approval of Trump Entertainment reorganization plan.

4/16/2010
4/19/2010

Event 44 and 45: US Airways, Inc. (2002)

David N. Siegel, US Airways president and chief executive, was quoted incorrectly in a March 19 Business article. Siegel, commenting on a U.S. Bankruptcy Court decision, said, "This is a good day for employees and stakeholders".

3/20/2003

Event 46: US Airways, Inc. (2002)

US Airways and its pilots' union agreed on a plan that cuts the pilots' retirement benefits, clearing one of the final hurdles to the airline's emerging from Chapter 11 bankruptcy protection on Monday.

3/25/2003

Event 49: VeraSun Energy Corporation

Ethanol margins have turned positive and many plants are able to show several months of positive earnings.

1/7/2010
1/13/2010

Corn prices plummeted the 30-cent-per-bushel limit on the Chicago Board of Trade on Tuesday as the final federal report on 2009 production came in higher than expected.

Event 51: Worldcom, Inc

WorldCom Inc. has won a 10-year, \$250 million contract from Virginia to provide advanced voice, data and Internet communications services.

11/20/2003

Event 52: Worldcom, Inc

The cases against Bernard Ebbers and Scott Sullivan -- respectively the former chief executive and chief financial officer of WorldCom Inc. (now MCI) -- continued to grow more complex through 2003. Each faces a slew of state and federal securities fraud charges alleging they orchestrated an US\$11-billion fraud that turned the United States' second-largest long-distance phone company into its largest bankruptcy.

12/18/2003

Event 53 and 54: Worldcom, Inc

The General Services Administration has lifted an exclusion that barred MCI, formerly known as WorldCom Inc, from bidding on new government contracts or extending existing ones.

1/8/2004

The telecom regains its right to bid for government contracts and slashes its DIP loan by \$800 million.

1/9/2004

Event 55: Worldcom, Inc

MCI, formerly the notorious WorldCom, is to ask a court for an extension to its bankruptcy protection in order to complete restructuring. WorldCom entered Chapter 11 bankruptcy following the biggest accounting fraud in history, which was perpetrated by its former bosses. The company will have to restate at least USD 11 billion dollars worth of fraudulent accounting.

2/13/2004

Event 56: Worldcom, Inc

Bernie Ebbers, the former CEO of American telecom giant WorldCom, was accused of share fraud and conspiracy on March 2.

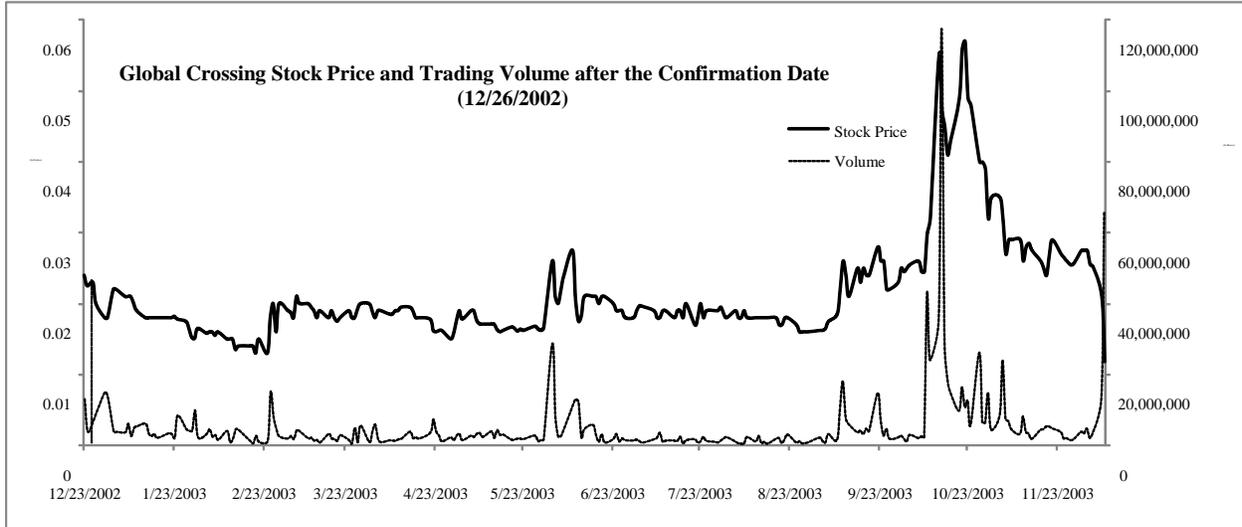
3/03/2004

Event 58: Worldcom, Inc

Fourteen states ask the bankruptcy court to disqualify KPMG as WorldCom's independent auditor, saying it sold the company a "sham" tax shelter that allowed it to avoid paying hundreds of millions of dollars in taxes. 3/17/2004

Figure 1 Extended Trading of Worthless Stocks after Plan Confirmation Date

Panel A: Global Crossing



Panel B: Worldcom

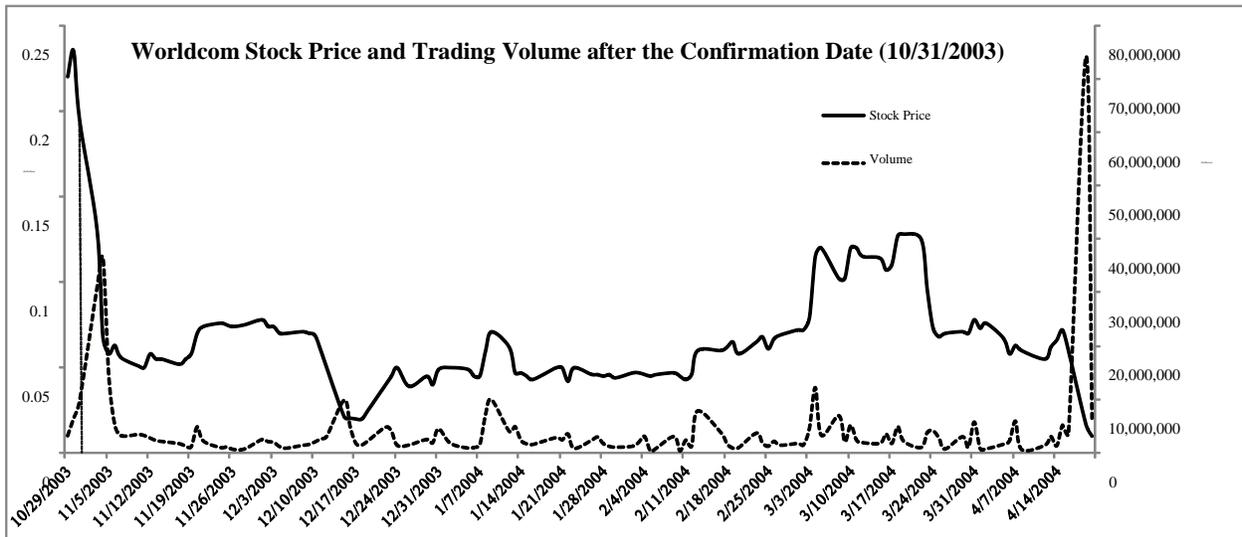


Figure 2: Stock Holdings in New General Motors

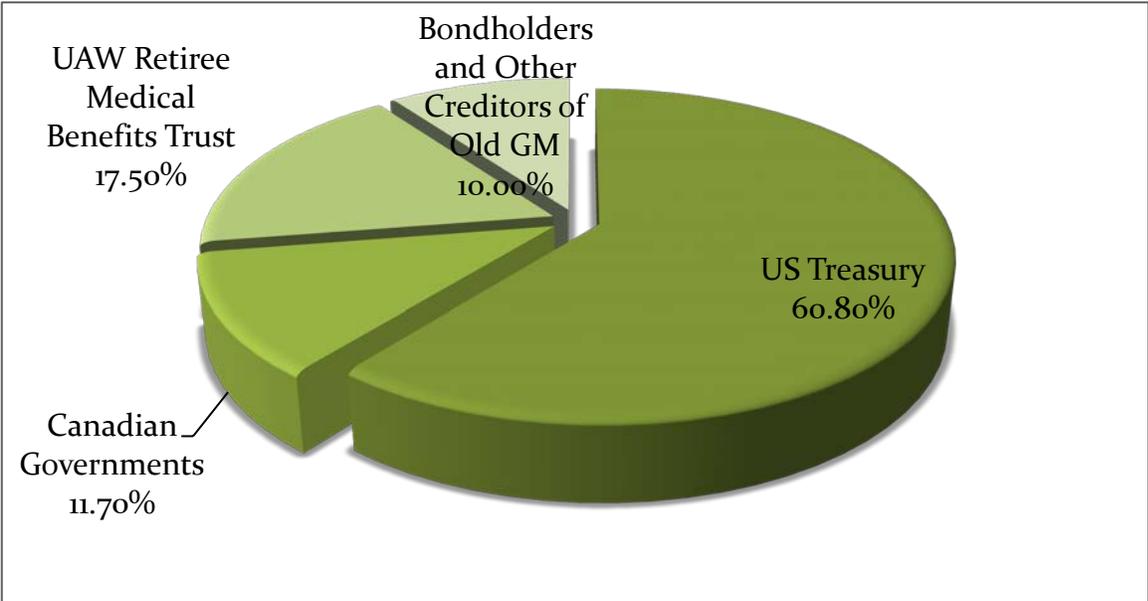


Figure 3: Stock Price and Trading Volume of Motors Liquidation (Old General Motors)

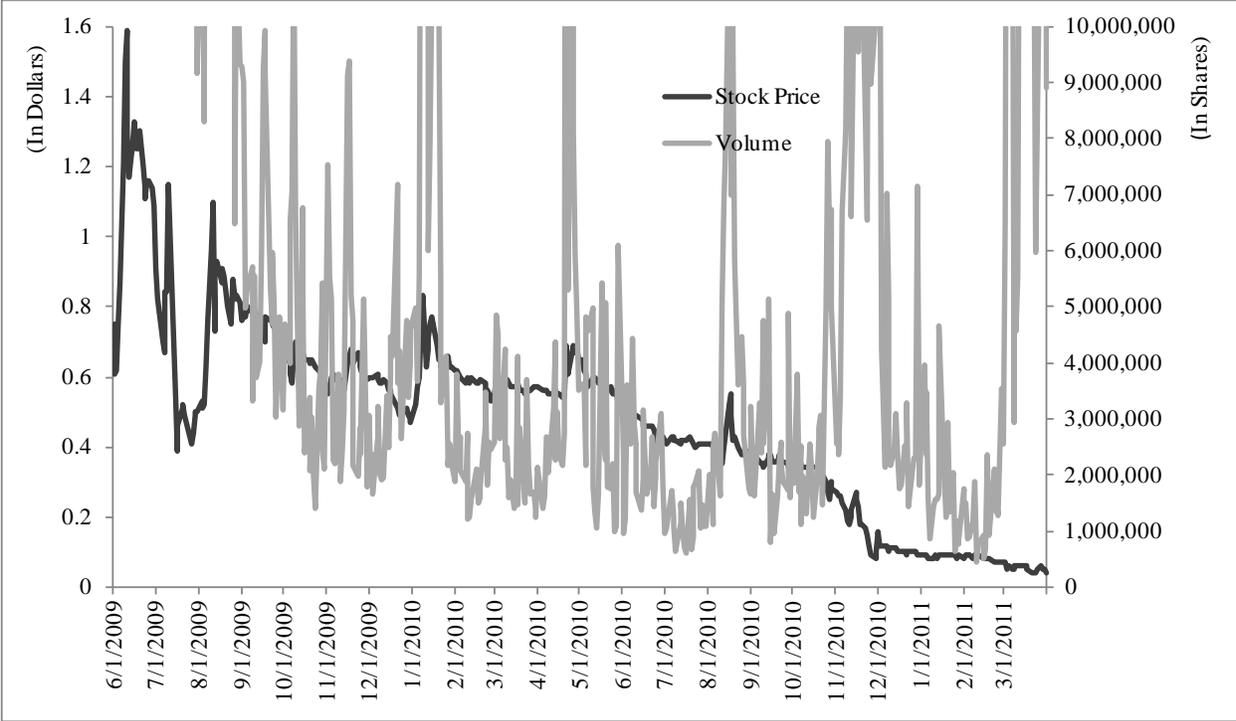
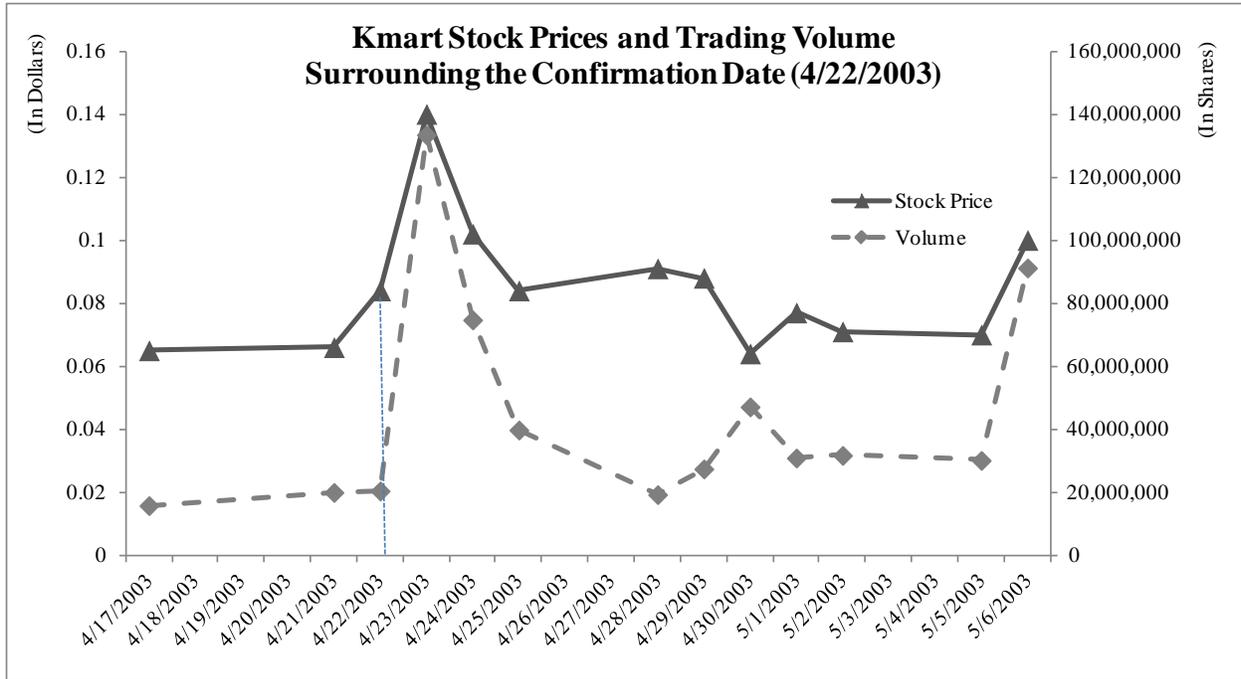


Figure 4: Stock Price and Trading Volume around the Confirmation Date

Panel A: Kmart



Panel B: US Airway (2002)

